Mathematical and Computing Sciences Faculty Handbook 1995
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The University attempts to ensure that the information contained in the handbook is correct as at 4 November 1994. The University reserves the right to vary any matter described in the handbook at any time without notice.
Equal opportunity
It is University policy to provide equal opportunity for all, regardless of race, sex, marital status, physical ability, sexual preference, age, political conviction or religious belief. The University also has an ethnic affairs policy to ensure that the University community is sensitive to the multicultural nature of Australian society and the cultural diversity within the University.

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The University supports the right to freedom of speech and the rights of its members to contribute to the diversity of views presented in our society.

Non-discriminatory language
UTS has adopted the use of non-discriminatory language as a key strategy in providing equal opportunity for all staff and students. Guidelines for the use of non-discriminatory language have been developed and all members of the University community are encouraged to use them.

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   Reserve Road, Royal North Shore Hospital
- Gore Hill Research Laboratories  
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- School of Legal Practice (College of Law)  
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St Leonards campus
- School of Biological and Biomedical Sciences
  Dunbar Building
  Corner Pacific Highway and Westbourne Street
  Gore Hill
- Clinical Studies,
  Centenary Lecture Theatre and West Wing
  Reserve Road, Royal North Shore Hospital
- Gore Hill Research Laboratories
  Royal North Shore Hospital
- School of Legal Practice
  (College of Law)
  Corner Chandos and Christie Streets
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PREFACE

This handbook is one of a suite of twelve publications comprising the University Calendar, the Student Information Guide and ten handbooks: Business; Design, Architecture and Building; Education; Engineering; Humanities and Social Sciences; International Studies; Law and Legal Practice; Mathematical and Computing Sciences; Nursing; and Science. Each handbook provides general information about the faculty as well as detailed information on the courses and subjects offered.

The Calendar contains the University By-law, which all students should read. It also contains a list of the University's courses, giving the name, abbreviation and title as indicated on the testamur. Copies of the Calendar are held in the University Library and in faculty offices, and may be purchased at the Co-op Bookshop.

Copies of the Student Information Guide are provided free to students at enrolment. You should make sure that you read the student rules published in the guide. Information on the rights and responsibilities of students and on the services and facilities available is also given. The guide will assist you in your dealings with the University's administration and tell you whom to contact if you have a problem or need advice. Other publications providing information of a general nature are the UAC Guide, and the UTS Undergraduate and Postgraduate Studies Guides, all of which are available from the UTS Information Service.

For further information not provided in any of the publications mentioned e.g. additional information on courses, methods of assessment and book lists, you should contact the UTS Information Service or your Faculty office. If in doubt, don't hesitate to ask.

We hope you will enjoy your time as a student at UTS and wish you well in your studies.

MESSAGE FROM THE DEAN

On behalf of all the staff of the Faculty of Mathematical and Computing Sciences, I am pleased to extend this welcome to you.

The year 1995 will be an interesting one for the Faculty, with the introduction of major revisions to the undergraduate courses in both Computing Sciences and Mathematical Sciences, and the consolidation of the enhancements, introduced in 1994, to the Master of Science in Computing. These changes reflect the Faculty's commitment to quality education with an emphasis on professional relevance. As it always has done, the Faculty has relied on the considerable expertise of its advisory committees (drawn from industry, government and the professions) in designing programs which produce highly employable graduates.

The success of the Management Development Program, an articulated set of courses including a Graduate Certificate, a Graduate Diploma and the Master of Business in Information Technology Management, also reflects the Faculty's commitment to innovation and excellence in ongoing professional education. These courses are highly regarded because of their balance between theory and practice.

The introduction of a computer algebra system into mathematics teaching will make this an exciting and stimulating year for mathematics students.

The improvements to accommodation for staff and students in Mathematical Sciences in Building 1, the improvements to teaching space and the provision of student study space and lounge areas in Building 4 should also improve the ambience for all in the Faculty.

The Faculty is proud of its increasing profile in research, and sees the existence of a strong corps of postgraduate research students as vital to maintaining research strength. This year will see a major effort directed towards improving
facilities for research students.
The establishment of the Centre for
Object Technology Applications and
Research, and participation in a
number of Cooperative Research
Centres reinforce the commitment
to excellence in focused research
strengths.

This Faculty is cosmopolitan in its
composition and international in its
outlook, and I commend to you the
many activities and support structures
within both the Faculty and the wider
University. Participation in these
activities enriches your experience of
university life. Acquainting yourself
with support services reduces some
of the stress that studying can impose.
Finally, I wish you every success and
trust that your time here is both
enjoyable and productive.

Associate Professor John Hughes, Dean

Associate Professor Lindsay Botten,
Head, School of Mathematical Sciences

Associate Professor Jenny Edwards,
Head, School of Computing Sciences
FACULTY MISSION STATEMENT

The Mission of the Faculty is to provide high quality, innovative programs of teaching, research and consulting, and continuing professional education to clients of wide backgrounds, both nationally and internationally, in the mathematical and computing sciences. It is committed to technology transfer for the benefit of society by interacting closely with industry, business and government in research and development.

To support its Mission, the Faculty aims to:

Teaching
- maintain a comprehensive range of educational programs to satisfy the spectrum of needs in the community
- excel in both the quality and professional relevance of its teaching programs
- develop an international perspective to its teaching programs

Research and scholarship
- excel in the quality of its research activities
- encourage and facilitate participation by all staff in research or scholarly activities while focusing its research activities on to its defined areas of strength and a small number of targeted areas for development
- increase the participation rate of students in postgraduate programs
- promote intra-faculty, inter-faculty, national and international research collaboration
- emphasise to staff and students the benefits of an international perspective on their disciplines

Management and resources
- assure the quality of activities within the Faculty through the ongoing monitoring and the continuous development of a range of quality control processes
- maintain a balanced portfolio of expertise within its staff, which reflects perceived trends within the industries and disciplines addressed by the Faculty
- seek supplementary sources of external funding through research, joint ventures and entrepreneurial activities
- ensure the principles of equity are observed in all aspects of the Faculty's work, with particular emphasis on the areas of importance identified in the UTS Equity Plan
- develop links with prestigious overseas universities and research institutions

Community service
- preserve strong, effective links with industry, government, business, professional and community organisations
- improve credit transfer arrangements to facilitate the movement of properly prepared students who wish to transfer between universities, or who move into the university sector with prior education and knowledge.
PRINCIPAL DATES FOR 1995

AUTUMN SEMESTER

January
3 Enrolment day for Summer schools
4 School of Legal Practice enrolment day at St Leonards campus
9 Release of HSC results
13 Formal supplementary examinations for 1994 Spring semester students
17 Closing date for changes of preference to the Universities Admissions Centre (UAC) from 1994 NSW HSC applicants (by 4.30 p.m.)
19–31 Enrolment of postgraduate students, continuing undergraduate students and new direct entry students at City campus
26 Australia Day – public holiday
27 Public school holidays end

February
1–6 Enrolment of new undergraduate (UAC) students at City campus
7–17 Enrolment of postgraduate students, continuing undergraduate students and new direct entry students at City campus
27 Classes begin

March
10 Last day to enrol in a course or add subjects
   Last day to change to 'pay now/up-front' HECS payment
24 Last day to apply for leave of absence without incurring student fees/charges
31 HECS Census Date
   Last day to withdraw from a subject without financial penalty

April
7 Last day to withdraw from a course or subject without academic penalty
14 Public school holidays begin
   Good Friday
17 Easter Monday
18–21 Vice-Chancellors' Week (non-teaching)
19 Graduation period begins
21 Public school holidays end
   Provisional examination timetable available
25 Anzac Day
28 Last day to apply to graduate in Spring semester 1995

May
5 Graduation period ends
12 Examination Masters due
26 Final examination timetable available
31 Closing date for undergraduate and postgraduate applications for Spring semester

June
12 Queen's Birthday – public holiday
13–29 Formal examination period
30 Autumn semester ends

1 Information is correct as at 15 November 1994. The University reserves the right to vary any information described in Principal Dates for 1995 without notice.
2 HECS/Postgraduate course fees will apply after the HECS Census Date.
SPRING SEMESTER

July

3      Public school holidays begin
3-7    Vice-Chancellors’ Week (non-teaching)
10-14  Formal alternative examination period for Autumn semester students
14     Public school holidays end
21     Release of Autumn semester examination results
24     Formal supplementary examinations for Autumn semester students
24-28  Confirmation of Spring semester programs
25-26  Enrolment of new and readmitted students and students returning from leave/concurrent study
31     Classes begin

August

1      Applications available for undergraduate and postgraduate courses
4      Last day to withdraw from full year subjects without academic penalty
11     Last day to enrol in a course or add subjects
       Last day to change to ‘pay now/up-front’ HECS payment
25     Last day to apply for leave of absence without incurring student fees/charges (Spring enrolments only)
31     HECS Census Date
       Last day to withdraw from a subject without financial penalty
       Last day to apply to graduate in Autumn semester 1996

September

8      Last day to withdraw from a course or subject without academic penalty

22     Provisional timetable available
25     Public school holidays begin
25-29  Vice-Chancellors’ Week (non-teaching)
29     Closing date for undergraduate applications via UAC (without late fee)
       Closing date for inpUTS Special Admission Scheme applications
       Graduation period ends
       Closing date for postgraduate applications (to be confirmed)

October

2      Labour Day – public holiday
6      Public school holidays end
13     Examination Masters due
27     Final examination timetable available
31     Closing date for postgraduate research and course award applications
       Closing date for undergraduate applications via UAC (with late fee)
       Closing date for undergraduate applications direct to UTS (without late fee)

November

13-30  Formal examination period

December

1      Spring semester ends
11-15  Formal alternative examination period for Spring semester students
18     Public school holidays begin
22     Release of Spring semester examination results

2 HECS/Postgraduate course fees will apply after the HECS Census Date.
THE FACULTY OF MATHEMATICAL AND COMPUTING SCIENCES

Only new students and those enrolled in courses that have undergone major changes will receive a free handbook.

The Faculty of Mathematical and Computing Sciences consists of two Schools – Mathematical Sciences and Computing Sciences. Together, these disciplines form the basis of 'enabling technologies' for applications in most other disciplines.

Each School teaches towards its own professional degrees from undergraduate through to doctoral studies. Thus, all the course and student administration, and much of the staff and research management are conducted at the School level. Each School has, as a consequence, developed its own management structure appropriate for the support of its teaching and research programs. Teaching is carried out across all campuses of the University.

The Faculty has a commitment to cooperative education, both of the work experience 'sandwich' form, and of the newer style cooperative scholarship format. The Faculty is active in research and has close liaison with industry in all aspects of its work.

The structure of the School of Mathematical Sciences reflects the orientation and emphases of its academic programs. There are three discipline groups:

- Mathematics
- Computational Mathematics
- Statistics and Operations Research

The School also provides a support service to all students of the University studying in various introductory mathematical or quantitative areas through its Mathematics Study Centre, under the directorship of Ms Leigh Wood. Most of the teaching in the Centre occurs at an individual level and the Centre is open for at least 30 hours each week, with certain times devoted to particular areas of mathematics.

Students can obtain help with individual problems specific to a particular course. Alternatively, students with more systematic problems may study in the Centre on a regular basis, obtaining assistance from a tutor as necessary.

The structure of the School of Computing Sciences reflects the orientation and emphases of its academic work. There are four discipline groups:

- Computer Systems
- Computing Methods
- Information Systems Technology
- Information Systems Management

The Key Centre for Advanced Computing Sciences was established in 1985 by the Commonwealth Government as one of the seven original Key Centres. It was the first federally-funded Centre for Advanced Computing Sciences in Australia. Under the directorship of Professor John Debenham, the Key Centre is based in the School of Computing Sciences and the School of Electrical Engineering; it is committed to research in computing, particularly through the development of links with industry. The structure and operation of the Key Centre is currently under review. Changes, if any, will be introduced in 1995.

The Australian Transputer Centre was set up as a collaborative effort between UTS, SGS-Thomson and GEC Electronics to support and promote parallel processing with the Inmos transputer in Australia. With 43 transputers available to undergraduates, researchers and developers via AARNet, the Centre is also the focus for work in parallel processing in the School of Computing Sciences. The Director of the Centre is Mr Ury Szewcow.

The Centre for Object Technology Applications and Research (COTAR), established in 1994, provides a focal point for the software industry using, or considering using, the new software development techniques of object technology. Under the directorship of Professor Brian Henderson-Sellers, COTAR aims to promote and conduct research in object-oriented software
engineering, object-oriented information systems and object-oriented computing. It provides not only a focus for such research and collaborative work with industry, but also high quality professional development education.

The School of Computing Sciences presents a selection of Continuing Professional Education (CPE) courses each semester. These courses include Object-Oriented Programming with C++, Data Communications, UNIX/C and Auditing Computer Systems. The School also offers a selection of professionally oriented courses from time to time; these courses include database design, expert systems design, distributed databases and capacity planning. Enquiries on CPE courses should be directed to the Key Centre for Advanced Computing Sciences on 330 1331.

In 1995 the newly established Institute for International Studies will offer the first stages of its International Studies Program, which will be open to all UTS students. The program will include language programs; study of history, politics, economics and society; and opportunities for in-country study. Activities will start with a focus on China, Indonesia and Japan, and will later expand to other parts of East and South-east Asia, South America and Western Europe. Subjects within the International Studies Program can be taken as electives within current degrees, or as part of the new combined degrees integrating International Studies with a discipline. In 1995 combined degrees will be available in Engineering and International Studies, and Law and International Studies. Further information on the International Studies Program may be obtained from the Institute for International Studies, 11 Broadway, telephone 330 1574.

**LIST OF COURSES AND CODES**

The Faculty offers the following courses:

**SCHOOL OF MATHEMATICAL SCIENCES**

Bachelor of Science in Mathematics MM01
Bachelor of Science (Honours) in Mathematics MM02
Bachelor of Mathematics and Finance MM03
Bachelor of Mathematics and Finance (Honours) MM04
Graduate Certificate in Mathematical Sciences MM56
Graduate Diploma in Operations Research MM52
Graduate Diploma in Statistics MM65
Master of Science in Operations Research (by coursework) MM53
Master of Science (by thesis) MM51
Doctor of Philosophy MM54

**SCHOOL OF COMPUTING SCIENCES**

Bachelor of Science in Computing Science MC02
Bachelor of Information Technology MC03
Bachelor of Science in Computing Science/Bachelor of Laws LL06
Graduate Certificate in Advanced Information Technology MC62
Graduate Certificate in Applied Computing MC57
Graduate Certificate in Computer Science MC60
Graduate Certificate in Human-Computer Interaction MC65
Graduate Certificate in Information Systems MC61
Graduate Certificate in Information Technology Management MC63
Graduate Certificate in Programming Practice MC64
Graduate Certificate in Software Quality Assurance MC56
Graduate Diploma in Information Technology MC52
Graduate Diploma in Information Technology Management MC75
Master of Business in Information Technology Management (by coursework) MC85
Master of Science in Computing (by coursework) MC53
Master of Science (by thesis) MC51
Doctor of Philosophy MC54

All enquiries regarding courses should be directed to the School Offices. For contact numbers refer to the school sections of this handbook.

OFFICE LOCATION

The office of the Dean of Mathematical and Computing Sciences and the Faculty Office are located in Room 335 on the third floor of Building 4, Broadway, City campus. Staff currently associated with these offices are:

<table>
<thead>
<tr>
<th>Position</th>
<th>Name</th>
<th>Room</th>
<th>Ext</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dean</td>
<td>J M Hughes</td>
<td>343</td>
<td>1801</td>
</tr>
<tr>
<td>Associate Professor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faculty Administrator</td>
<td>Miss F C Ma</td>
<td>341</td>
<td>1880</td>
</tr>
<tr>
<td>Dean's Secretary</td>
<td>Mrs I Ee</td>
<td>342</td>
<td>1800</td>
</tr>
<tr>
<td>Dean's Secretary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Assistant</td>
<td>Mr B M Irvine</td>
<td>373</td>
<td>1806</td>
</tr>
<tr>
<td>Administrative Assistant</td>
<td>Mr G C Goodwin-Moore</td>
<td>335</td>
<td>1308</td>
</tr>
</tbody>
</table>

GRADUATION CEREMONY

University graduation ceremonies are held in the Autumn and Spring semesters each year. All students should take note of the Academic Board policy on late approval of graduands which states that, 'any graduands who have their results confirmed after the appropriate Academic Board meeting should not be eligible to graduate at the immediately forthcoming ceremony'. Any graduand who is approved, through exceptional circumstances, to attend a ceremony after the Academic Board deadline may not have his or her name included in the Graduation Program.

STATEMENT OF GOOD PRACTICE AND ETHICS IN INFORMAL ASSESSMENT

AIMS OF ASSIGNMENTS

In many subjects offered by the Faculty, students undertake assessment tasks in the form of assignments. The setting of assignments is intended to promote a number of educational aims, including furthering each student's learning of the subject, particularly the acquisition of practical skills; providing a means for staff to assess each student's learning; providing feedback to the student on his or her progress in learning; and providing feedback to staff on the effectiveness of their teaching. These aims can be subverted if students deceive staff about the authorship of their work.

ACCEPTABLE BEHAVIOUR

Using sources Whenever anything from someone else's work is used, it is standard practice to indicate exactly where the information comes from. Acknowledgment is done by using a standard system of referencing, such as footnotes, end notes, the Harvard system etc. The Guide to Writing Assignments (available from the Co-op Bookshop) explains how to use all these standard systems of reference.

Collaboration In some cases assignment guidelines may permit or require students to cooperate in developing a solution to part or all of an assignment. This may occur formally when a staff member assigns students to groups and indicates which components of the assignment they are to work on as a group and which components they are to work on individually. It may also occur informally. For example, some assignments may involve an 'ideas gathering' phase followed by an 'execution' phase. Students may be permitted to collaborate informally on the preliminary phase(s), but be expected to work completely individually on the subsequent phase(s). In a programming assignment, for example, it is
normally acceptable for one student to discuss with another student (or other person) the specifications of the task so as to determine the requirements (see below). Whether this collaboration could extend to subsequent phases (such as the design phase) would depend on the assignment guidelines; normally, collaboration in the design and subsequent phases is not permitted. Depending on the type of assignment and degree of collaboration permitted it is possible to define several categories of collaboration:

• individual effort (the student is required to work on all phases entirely by himself or herself);
• group effort (the student is required to work on all phases as part of a formal group);
• mixed effort (the student is required or permitted to work on some or all phases as part of a formal or informal group).

Unless assignment guidelines specifically state otherwise, a student should assume that an assignment requires a completely individual effort. The forms of cooperative collaborative behaviour that are acceptable under most circumstances are:

• discussing assignment specifications with another student (or other person) with a view to clarifying what is required;
• getting help from another student (or other person) on technical matters that are not directly part of the assessment task (e.g. on how to use some facility provided by the computer system, such as the editor);
• getting help from another student (or other person) in debugging a program. This is a common occurrence in computing; and
• obtaining help from a tutor.

Generally, what distinguishes the acceptable cases of collaborative behaviour from the unacceptable ones is the student’s intention to deceive. For example, in an assignment requiring a completely individual effort, a student may encounter some snag, such as an unfamiliar compiler diagnostic. If the student were to seek help from another student (or person) to remove the snag, then this would normally be considered acceptable behaviour. If, however, several students designed and coded a solution together, then disguised this collaboration, that would be unacceptable behaviour.

UNACCEPTABLE BEHAVIOUR

Outright lying This is seen most often in programming assignments, where the program does not run, or runs incorrectly, yet the output handed in is correct. The output has been ‘tailored’ using a word processor in an attempt to fool the marker. Lying is never acceptable behaviour.

Plagiarism Plagiarism is the action of taking and using as one’s own the thoughts, writings, or inventions of another with the intention to deceive.

For example, if one student in a computing subject were to obtain a copy of another student’s (or other person’s) program, were to modify parts of the program (e.g. change variable names) so as to disguise its origin, and then submit the modified program as his or her solution, then this would be considered plagiarism.

As another example, a student may obtain all or a major part of the solution to an assignment problem from a text book and, without acknowledging this, submit the solution as his or her own work.

As a further example, a student may use a source of information in an essay, without acknowledging the source. Such plagiarism may range from a sentence or two, or a table or diagram, to occasional cases where the entire paper consists of material copied from a book with only a few sentences added by the student. The student thus submits another’s ideas as his or her own work. Plagiarism is a form of cheating and is never acceptable.
**Collusion**

Collusion occurs when a student combines with one or more other students (or other persons) to produce a common essay or solution to part or all of an assignment, disguises the shared origin of the solution, and submits the solution as his or her individual work.

Collusion is regarded as a form of cheating and is never acceptable.

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**SCHOOL OF MATHEMATICAL SCIENCES**

The School of Mathematical Sciences offers two courses leading to Bachelor’s degrees, postgraduate courses leading to qualifications at the Graduate Certificate, Graduate Diploma and Master’s levels and two research degree programs leading to Master’s and Doctoral level qualifications. They are:

- the Bachelor of Science in Mathematics, which is a three-year Pass degree with a fourth year Honours degree;
- the Bachelor of Mathematics and Finance, which is a three-year Pass degree with a fourth year Honours degree and is offered in conjunction with the School of Finance and Economics;
- the Graduate Certificate in Mathematical Sciences;
- the Graduate Diploma in Operations Research;
- the Graduate Diploma in Statistics;
- the Master of Science in Operations Research (by coursework);
- the Master of Science, which is awarded on the basis of supervised research and presentation of a thesis; and
- the Doctor of Philosophy, which is awarded on the basis of supervised research and presentation of a thesis.

**STAFF CONTACT LIST**

All staff of the School of Mathematical Sciences are located on Levels 15 and 16 of the Tower Building (Building 1) on the City campus (Broadway).

When telephoning from outside the University all extension numbers should be prefixed by the digits 330.

<table>
<thead>
<tr>
<th>Name</th>
<th>Ext</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate Professor</td>
<td>2247</td>
<td>1520</td>
</tr>
<tr>
<td>Lindsay Botten</td>
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<td></td>
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<tr>
<td>Head of School</td>
<td></td>
<td></td>
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<tr>
<td>Mr Martin Caden</td>
<td>2253</td>
<td>1618</td>
</tr>
<tr>
<td>Senior Systems Programmer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The School of Mathematical Sciences awards the following prizes on a yearly basis.

**Foundation for Australian Resources Prizes**

The Foundation for Australian Resources is an independent non-profit organisation whose nominated beneficiary is the School of Mathematical Sciences. The Foundation has made available three prizes for students in the Bachelor of Science in Mathematics degree course. One prize will be given to the best graduating student, one to the outstanding first-year, full-time student, and one to the outstanding Stage 1 part-time student. Each prize has a cash value of $75.

**Sam Huxham Memorial Prize**

This prize was established in 1994 in memory of Samuel Hugh Huxham, who joined the New South Wales Institute of Technology in 1971 and was Head of the Statistics and Operations Research Unit at the time of his death in May 1994. It is awarded each year for the best performance in the Statistics major by a student completing the Bachelor of Science in Mathematics degree in the preceding year. The prize has a cash value of $250.

**Statistical Society of Australia Prize in Statistics**

In 1980, the Statistical Society of Australia NSW Branch established a prize for excellence in Statistics. This prize is now awarded to the student who is first in order of merit of those students completing the Statistics strand of the Bachelor of Science (Honours) in Mathematics degree. The prize is a cash award of $200.
COMPUTING FACILITIES

The School of Mathematical Sciences operates a number of Sun and Silicon Graphics minicomputer systems, all running versions of the Unix operating system. All of these systems are linked to the University’s network.

Access to these computers is available from a number of laboratories which are owned and operated by the School for mathematics students, as well as from the various public access laboratories operated by the University’s Information Technology Division. The School’s laboratories provide terminal and X-terminal access to the School’s minicomputers as well as IBM-style PC 386 and 486 compatible computers linked via the School’s Novell network. These PCs also act as terminals to any Unix system in the University.

The School provides hardware and software facilities for computer graphics, including high quality graphics workstations, a drafting plotter, PCs emulating graphics terminals, image processing hardware, PostScript laser printers, and an extensive library of FORTRAN subroutines for both 2D and 3D graphics.

The School also has a significant quantity of software running on the Silicon Graphics, PCs, and Sun systems to support teaching and research in statistics, operations research, applied mathematics and computing. This is supplemented by software resources supplied centrally by the University’s Information Technology Division.

Extensive use is made of the University’s central facilities, which consist of a number of large Sun server systems. These can all be accessed from any PC laboratory in the University, via the University’s network.

The School is actively involved in two major regional computing consortia. The Sydney Regional Centre for Parallel Computing operates a Thinking Machines Corporation CM5 parallel computer, located at the University of New South Wales and available to registered users via the AARNet. The Vislab Consortium operates a scientific visualisation project, with principal hardware components located at the University of Sydney, and available to users via AARNet.
UNDERGRADUATE PROGRAMS

Bachelor of Science in Mathematics (BSc)

Course code MM01

This degree aims to prepare students for employment in industry, commerce and government and to provide the foundation for higher studies in mathematics. It provides great flexibility by allowing students to follow a course of study which best suits their interests and aspirations. It aims to help students acquire sufficient experience and understanding in a broad range of mathematical disciplines to enable them to apply mathematical and computing techniques to industrial and commercial problems.

The course operates as a three-year Pass degree with a fourth year Honours degree. The basic structure of the Pass degree is as follows:

*The core* – which provides a thorough grounding in the elements of mathematics, statistics, operations research, computing, and their applications. This component occupies half of the Pass degree and is taught predominantly during the first two years of the full-time program.

*The major* – which occupies half of Year 3 of the full-time course (or Years 5 and 6 of the part-time course) and may be taken in one of the areas of pure or applied mathematics, statistics or operations research. This framework provides for specialised study of a particular area of application. A major in Operations Research involves topics such as linear programming, simulation, optimisation and financial modelling. The Statistics major aims to expose students to realistic statistical problems, preparing them to cope with data and its associated uncertainty and variability. Mathematics, particularly since the advent of computers, has developed a large collection of tools for the solution of practical problems. In many cases, these can be unified by a few basic geometric, analytic and algebraic ideas. The Mathematics major aims to develop these ideas and apply them in a variety of complex and practical situations.

*Electives* – which occupy one-third of the course and, subject to certain restrictions, may be subjects from any school of the University chosen by students to strengthen their understanding in areas of their choice. Common choices are the Computing major offered by the School of Mathematical Sciences, an additional major in mathematics, or a sub-major in computing, finance or one of the sciences.

The Computing major provides students with both practical and theoretical training in computer science and its mathematical foundations, information systems and commercial computing, and a wide variety of applications. Because this major occupies the entire elective sequence, students who wish to pursue it are advised to commence it in their first year of study. However, because it is an elective major, students are not obliged to follow it to completion. The major is accredited at Level 1 by the Australian Computer Society and, accordingly, those who complete it are eligible for Associate Membership of that Society. Students who do not wish to complete the entire major may instead take the Computing sub-major, described in the ‘Sub-majors’ section.

The course may be attempted on either a full-time or a part-time basis. The standard full-time load is 24 credit points per semester (typically, four subjects each worth six credit points) and the standard part-time load is 12 credit points per semester (typically, two subjects both worth six credit points). Most mathematics subjects worth six credit points involve four hours of class contact per week (typically, three hours of lectures and one hour of tutorial), although some first-year subjects have a
higher contact load of six hours. Some subjects, especially those in computing, have additional laboratory hours.

Part-time students will be accommodated by the provision of evening classes for most subjects. It is expected that part-time students will be able to attend classes on one afternoon and three evenings each week during the first two years of the course, and on one afternoon and two evenings each week during later years. Part-time students taking the Computing major may be required to attend a laboratory class on one additional evening per week for some later subjects.

As a general rule, for any given subject, it is wise to devote to home study the same number of hours per week as are allocated to lectures and tutorials in the case of first-year subjects, and twice the number of hours associated with lectures and tutorials per week for more senior subjects.

Details of individual subjects can be found in the ‘Subject Descriptions’ section.

GRADING OF AWARDS

The School of Mathematical Sciences grades students for the BSc in Mathematics degree using the average mark of all subjects undertaken from the second and third years of the full-time program, and all electives other than those at first-year level. Each mark is weighted by the credit point value of the subject.

The degree is awarded at distinction level if the weighted average mark is 75 or greater, at credit level if it is in the range 65-74, and at pass level if it is in the range 50-64.

Note: Gradings for the Pass degree will take place for the final time in 1995.

COURSE PROGRAM

Full-time program

Credit point values are shown in parentheses.

Year 1

<table>
<thead>
<tr>
<th>Autumn semester</th>
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<tbody>
<tr>
<td>35100 Mathematical Practice (3cp)</td>
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<tr>
<td>35101 Mathematics 1 (6cp)</td>
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<tr>
<td>35111 Discrete Mathematics (3cp)</td>
</tr>
<tr>
<td>35170 Introduction to Computing (6cp)</td>
</tr>
<tr>
<td>Electives (approx 6cp)</td>
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<table>
<thead>
<tr>
<th>Spring semester</th>
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</thead>
<tbody>
<tr>
<td>35102 Mathematics 2 (6cp)</td>
</tr>
<tr>
<td>35151 Statistics 1 (6cp)</td>
</tr>
<tr>
<td>Electives (approx 12cp)</td>
</tr>
</tbody>
</table>

Year 2

<table>
<thead>
<tr>
<th>Autumn semester</th>
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<tbody>
<tr>
<td>35212 Linear Algebra (6cp)</td>
</tr>
<tr>
<td>35232 Advanced Calculus (6cp)</td>
</tr>
<tr>
<td>35252 Statistics 2 (6cp)</td>
</tr>
<tr>
<td>Electives (approx 6cp)</td>
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<table>
<thead>
<tr>
<th>Spring semester</th>
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</thead>
<tbody>
<tr>
<td>35231 Differential Equations (6cp)</td>
</tr>
<tr>
<td>35241 Mathematical Programming 1 (6cp)</td>
</tr>
<tr>
<td>35281 Numerical Analysis 1 (6cp)</td>
</tr>
<tr>
<td>Electives (approx 6cp)</td>
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</table>

Year 3

<table>
<thead>
<tr>
<th>Autumn semester</th>
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</thead>
<tbody>
<tr>
<td>35321 Analysis 1 (6cp)</td>
</tr>
<tr>
<td>Major (1) (6cp)</td>
</tr>
<tr>
<td>Major (2) (6cp)</td>
</tr>
<tr>
<td>Electives (approx 6cp)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
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</thead>
<tbody>
<tr>
<td>Major (3) (6cp)</td>
</tr>
<tr>
<td>Major (4) (6cp)</td>
</tr>
<tr>
<td>Electives (approx 12cp)</td>
</tr>
</tbody>
</table>

Part-time program

Credit point values are shown in parentheses.

Year 1

<table>
<thead>
<tr>
<th>Autumn semester</th>
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</thead>
<tbody>
<tr>
<td>35100 Mathematical Practice (3cp)</td>
</tr>
<tr>
<td>35101 Mathematics 1 (6cp)</td>
</tr>
<tr>
<td>35111 Discrete Mathematics (3cp)</td>
</tr>
</tbody>
</table>
Spring semester
35170  Introduction to Computing (6cp)
      Electives (approx 6cp)

Year 2

Autumn semester
35102  Mathematics 2 (6cp)
      Electives (approx 6cp)

Spring semester
35151  Statistics 1 (6cp)
      Electives (approx 6cp)

Year 3

Autumn semester
35212  Linear Algebra (6cp)
      Electives (approx 6cp)

Spring semester
35232  Advanced Calculus (6cp)
35252  Statistics 2 (6cp)

Year 4

Autumn semester
35231  Differential Equations (6cp)
35281  Numerical Analysis 1 (6cp)

Spring semester
35241  Mathematical Programming 1 (6cp)
      Electives (approx 6cp)

Year 5

Autumn semester
      Major (1) (6cp)
      Electives (approx 6cp)

Spring semester
35321  Analysis 1 (6cp)
      Major (2) (6cp)

Year 6

Autumn semester
      Major (3) (6cp)
      Electives (approx 6cp)

Spring semester
      Major (4) (6cp)
      Electives (approx 6cp)

MAJOR AREAS OF STUDY

Students must complete at least one of the majors in the areas of statistics, operations research or mathematics. Students may also choose to complete the Computing major.

- MATHEMATICS MAJOR

Two sequences, one in Pure Mathematics and one in Applied Mathematics, are offered, although it is not expected that all subjects in both sequences would be taught in any one year. Students may be required to choose a program combining subjects from both sequences. Students interested in the Mathematics major should discuss their enrolment with the Director, Undergraduate Studies, late in the year preceding their intended enrolment.

Pure Mathematics sequence

Credit point values are shown in parentheses.

Full-time program Year 3 and part-time program Years 5 and 6

Autumn semester
35312  Pure Mathematics 3A (6cp)
35335  Mathematical Methods (6cp)

Spring semester
35314  Pure Mathematics 3B (6cp)
35322  Analysis 2 (6cp)

Applied Mathematics sequence

Credit point values are shown in parentheses.

Full-time program Year 3 and part-time program Years 5 and 6

Autumn semester
35333  Applied Mathematics 3A (6cp)
35335  Mathematical Methods (6cp)

Spring semester
35334  Applied Mathematics 3B (6cp)
35382  Numerical Analysis 2 (6cp)
• STATISTICS MAJOR
Credit point values are shown in parentheses.

Full-time program Year 3 and part-time program Years 5 and 6

Autumn semester
35353 Regression Analysis and Experimental Design (6cp)
35361 Probability and Stochastic Processes (6cp)

Spring semester
35354 Statistical Inference (6cp)
35355 Quality Control (6cp)

• OPERATIONS RESEARCH MAJOR
Credit point values are shown in parentheses.

Full-time program Year 3 and part-time program Years 5 and 6

Autumn semester
35342 Mathematical Programming 2 (6cp)
35361 Probability and Stochastic Processes (6cp)

Spring semester
35340 Operations Research Practice (6cp)
35363 Stochastic Methods in Operations Research (6cp)

• COMPUTING MAJOR
The Computing major occupies all the electives of the BSc in Mathematics degree. The major is augmented by the core subject 35170 Introduction to Computing and by a component of the subject 35281 Numerical Analysis 1.

Full-time program
Credit point values are shown in parentheses.

Year 1

Autumn semester
31414 Information Systems (6cp)

Spring semester
31424 Systems Modelling (6cp)
35171 Computing 1 (6cp)

Year 2

Autumn semester
31434 Database Design (6cp)

Spring semester
35272 Computing 2 (6cp)

Year 3

Autumn semester
35373 Computing 3 (6cp)
35376 Advanced Topics in Computing A (6cp)

Spring semester
35377 Advanced Topics in Computing B (6cp)

Advanced Topics in Computing
The subjects 35376 Advanced Topics in Computing A and 35377 Advanced Topics in Computing B each consist of two modules to be chosen from the list below. These subjects allow for detailed investigation of selected areas of mathematically-based computing. The modules to be offered each semester will depend on demand and staff availability.

- Computer Graphics
- Computing Machinery
- Cryptology
- Formal Analysis of Business Processes
- Formal Specification
- High Performance Computing
- Language Translation
- Neural Networks

Constraints on completion of the Computing major in the full-time course
In order to accommodate the preferred pattern of operation for the Computing major in Year 3 of the full-time course, certain minor variations of the schedule of subjects are required. Pass degree students taking the Computing major in Year 3 will need to take the subject 35321 Analysis 1 in the Spring semester in order to accommodate the program listed above. However, Pass degree students who wish to undertake both the Computing major and a major in Mathematics involving the subject 35322 Analysis 2 will need to replace 35241 Mathematical Programming 1 in their
fourth semester of study by 35321 Analysis 1 and take both 35322 Analysis 2 and 35241 Mathematical Programming 1 in their sixth (or final) semester of study.

The requirement that students proceeding to Honours must have completed the subject 35322 Analysis 2 in addition to the other requirements for the Pass degree implies that (in general) students will not be able to complete the Computing major and satisfy the Honours entry requirements within the 144-credit-point framework of the Pass degree. Because 35322 Analysis 2 is a prerequisite for Honours studies, most students intending to proceed to the Honours year must take 35321 Analysis 1 and 35322 Analysis 2 in the Autumn and Spring semesters respectively and will have to delay or forego completion of the Computing major within the framework of the standard course. (In the case of the Pure Mathematics sequence of the Mathematics major, however, it is possible to qualify for Honours entry and complete the Computing major within the 144-credit-point structure of the standard Pass degree, because the subject 35322 Analysis 2 is contained within that major).

**Part-time program**

Credit point values are shown in parentheses.

<table>
<thead>
<tr>
<th>Year 1</th>
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<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>No Computing major subjects</td>
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<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>31424 Systems Modelling (6cp)</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>31414 Information Systems (6cp)</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>35171 Computing 1 (6cp)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>31434 Database Design (6cp)</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
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<tr>
<td>No Computing major subjects</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>No Computing major subjects</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>35272 Computing 2 (6cp)</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Year 5</th>
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</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>35373 Computing 3 (6cp)</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>No Computing major subjects</td>
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</tbody>
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<table>
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<tr>
<th>Year 6</th>
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</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>35376 Advanced Topics in Computing A (6cp)</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>35377 Advanced Topics in Computing B (6cp)</td>
</tr>
</tbody>
</table>

See the full-time program for the Computing major for a description of the subjects 35376 Advanced Topics in Computing A and 35377 Advanced Topics in Computing B.

**ELECTIVES**

Electives occupy one-third of the BSc in Mathematics degree and may be chosen by students to strengthen or develop their knowledge in an area of their choice. Electives are split into **free electives and structured electives**.

**Free electives**

Free electives, whose total weight cannot exceed 24 credit points, provide students with an opportunity to select subjects which accommodate their various interests and needs in a less formal manner than is the case for structured electives. These subjects can be taken from any school within the University, or from another university if the subject area is not represented at UTS. The choice of free electives must be discussed with academic advisers and must be approved by the Electives Coordinator, who will ensure that no subjects specifically proscribed by the School are included. The proscribed list includes subjects of a mathematical
nature which are taught elsewhere in the University, and which provide coverage of material that is already incorporated in subjects offered by this School.

Subjects offered by the School of Mathematical Sciences and not included in a student’s chosen major may also be taken as free electives. In addition, the following subjects may be chosen:

- 35205 History of Mathematics (6cp)
- 35344 Network Optimisation (6cp)
- 35292-6 Project (2-6cp)
- 35391 Seminar (Mathematics) (6cp)
- 35392 Seminar (Operations Research) (6cp)
- 35393 Seminar (Statistics) (6cp)
- 35394 Seminar (Computing) (6cp)

**Structured electives**

Structured electives, whose total weight shall not be less than 24 credit points, provide an opportunity for students to systematically develop knowledge of some discipline of their choice. The possibilities are:

- the Computing major (see above)
- a second major within the BSc in Mathematics degree, other than the Computing major
- the Computing sub-major offered by the School of Mathematical Sciences (not available to students who complete the Computing major)
- existing majors or sub-majors within the University, that have been approved by the School as appropriate for use as structured electives
- subject sequences which provide for the systematic development of a topic but which are not recognised formally as either a major or sub-major. These sequences must be negotiated between the students and their academic advisers and approved by the Electives Coordinator.

**SUB-MAJORS**

The following are available as sub-majors. In all cases, full details are available from the School Office. Credit point values are shown in parentheses.

**Computing sub-major**

- 35171 Computing 1 (6cp)
- 35272 Computing 2 (6cp)

**plus any two of the following:**

- 31414 Information Systems (6cp)
- 35373 Computing 3 (6cp)
- 35376 Advanced Topics in Computing A (6cp)
- 35377 Advanced Topics in Computing B (6cp)

**Physics sub-major**

The Department of Applied Physics offers two sub-majors, one in physics and one in electronics. Both contain the subjects 68101 Physics 1 (6cp) and 68201 Physics 2 (6cp). The remaining subjects, with a value totalling 12 credit points, must be chosen from lists of subjects available from the School Office. At the beginning of each semester in which a physics subject is taken, the student should register with the Department of Applied Physics on or before re-enrolment day, at the office of the Physics Sub-major Coordinator.

**Finance sub-major**

The School of Finance and Economics offers a sub-major in finance consisting of 30 credit points. Students must seek permission from the Faculty of Business prior to enrolling in the subjects offered in this sub-major. Students may not be enrolled without the appropriate documentation from the Faculty of Business.

**Communications Studies sub-major**

Students may elect to undertake a sub-major in communication studies offered by the Faculty of Humanities and Social Sciences. This consists of 22 credit points of two compulsory subjects worth eight credit points each, and a third subject selected from a short list.
Aboriginal Studies sub-major
The sub-major in Aboriginal studies is also offered by the Faculty of Humanities and Social Sciences. It comprises 24 credit points, consisting of two compulsory subjects worth eight credit points each and a third subject selected from a short list.

Education sub-majors
These are offered by the Faculty of Education. Students may select 24 credit points in any one of four main areas of education: Adult Vocational Education, Human Resource Development, Adult Education, and Adult and Language Education – Aboriginal Studies.

Bachelor of Science (Honours) in Mathematics (BSc(Hons))
Course code MM02
The Honours degree provides the opportunity for students to develop their level of competence in the area of mathematics chosen as their major in the BSc in Mathematics degree. The Honours degree is offered over one year on a full-time basis, or two years on a part-time basis, and consists of advanced coursework (comprising 75 per cent of the program) and a project. This project allows students to use the expertise developed by their coursework in an area of application. Students who complete the Honours degree will accordingly be well prepared to enter the workforce at a high level or to undertake graduate studies.

The precise selection of subjects to be offered in any particular year will depend on the interests of students, and the interests and availability of staff. Students should consult the Honours Coordinator, who will assist them in planning their program. This is of particular importance for part-time students since few subjects will be offered at night.

Admission to the Honours degree will be assessed individually according to the following criteria:

• students who are eligible to graduate from the BSc in Mathematics degree with an average mark of 65 or more in Year 2 (full-time) of the core and in their chosen major, will be eligible for entry to the Honours degree.

• students who have obtained qualifications equivalent to the BSc in Mathematics degree will, upon application, be considered for entry by the Head of the School of Mathematical Sciences, on the basis of assessed potential to complete the Honours degree.

The Honours program will require the completion of subjects worth 48 credit points in one year of full-time study, or two years of part-time study. Honours
will be offered in Mathematics, Statistics and Operations Research strands and will consist of nine coursework subjects each of four credit points and a project of 12 credit points.

Students contemplating taking Honours are advised to consult the Honours Coordinator or the Director, Undergraduate Studies, on completing the core of the BSc in Mathematics degree. This will enable them to plan studies for the following years and make decisions at an early stage which will not close off options that otherwise would be available to them. Usually students decide to apply for Honours before the completion of the BSc in Mathematics but, under the structure of the course, entry to Honours is possible even if the decision to do so is delayed until completion of the BSc in Mathematics.

Students who are deemed eligible for admission will be assigned a supervisor who will monitor their progress and supervise their project. The project will be assessed by a report and seminar.

The Honours degree consists of:

- 36 credit points of Honours level mathematics subjects (numbered as 340**) chosen in accordance with the rules below; and
- a project whose weight is 12 credit points.

Honours will be offered in Mathematics, Operations Research and Statistics strands, although some strands may not be offered in a given year. Each strand consists of:

- two compulsory subjects: 34013 Modern Analysis (Honours) and 34014 Measure Theory (Honours), each worth four credit points. It should be noted that some Honours subjects have these as prerequisites and these may be taken in Year 3 of the BSc in Mathematics course. If this is not done then some Honours degree options (such as 34062 Stochastic Processes 2) will be unavailable. If these subjects are taken in Year 3, students will need to defer two of their Year 3 BSc in Mathematics electives to the Honours year;

- a further 28 credit points of mathematics Honours (340**) subjects of which at least 20 credit points must be taken from one of the nominated strands: Mathematics, Operations Research or Statistics. (Under certain circumstances, students attempting the Operations Research strand may be permitted to substitute one Year 3 (349**) subject for an Honours level (340**) option in order to satisfy subject prerequisites. Students must consult the Honours Coordinator or the Director, Undergraduate Studies, to seek permission for such a substitution. There are no other exceptions to the general requirement of the 28/20 regulation referred to above.)

(Note: The preceding two paragraphs apply only for the 1995 academic year as some of the subjects mentioned here have been superseded, and some restructuring of the Honours program will take place for 1996.)

- A 12-credit-point project taken in the discipline of the strand.

Subjects offered in the various strands are as follows.

**Mathematics strand**

Credit point values are shown in parentheses.

- 34019 Functional Analysis (4cp)
- 34023 Partial Differential Equations 3 (4cp)
- 34026 Fractal Geometry (4cp)
- 34028 Stochastic Optimal Control (4cp)
- 34029 Nonlinear Dynamical Systems (4cp)
- 34087 Analytic Number Theory (4cp)
- 34096 Convexity and Optimisation (Honours) (4cp)

**Operations Research strand**

Credit point values are shown in parentheses.

- 34031 Large-scale Mathematical Programming (4cp)
- 34033 Dynamic Optimisation (4cp)
- 34038 Corporate and Financial Decisions and Investment Analysis (4cp)
- 34040 Operations Research Models and Methodology (4cp)
34096 Convexity and Optimisation (Honours) (4cp)

Statistics strand
Credit point values are shown in parentheses.
34062 Stochastic Processes 2 (4cp)
34065 Time Series Analysis (4cp)
34066 Nonlinear Statistical Models (4cp)
34067 Multivariate Statistics (4cp)
34068 Statistical Modelling (4cp)
34069 Linear Models and Experimental Design (4cp)

Each strand is augmented by two seminar subjects, 34091 Honours Seminar 1 and 34092 Honours Seminar 2. These seminar subjects will be offered either by a visitor to the School or by members of the School’s staff in some particular area of interest at the given time, and play an important role in providing prospective graduate students with additional exposure to particular research areas of the School.

These strands may be amended as areas of significance and interest in the School change with time.

GRADING OF AWARDS
Students’ final results will be based on the nine chosen Honours level subjects and the project. Satisfactory completion of the Honours program will result in the award of an Honours degree with the grade of First Class, Second Class (Division 1), or Second Class (Division 2).

The grade of Honours will be determined from an average mark of all Honours level subjects (subject numbers 340**) and the project, weighted by the credit point values of the individual components. Grades of First Class, Second Class (Division 1) and Second Class (Division 2) Honours will be awarded respectively to an average mark of 80 or greater, 65 to 79 and 50 to 64. An average mark of less than 50 will be regarded as a failure for the course. A project that is of outstanding merit may justify an increase in the grade of Honours. A student with First Class Honours and outstanding results may be awarded a University Medal.

Bachelor of Mathematics and Finance (BMathFin)

Course code MM03
The years since deregulation of the Australian financial system have witnessed many sweeping changes and a considerable increase in the financial and economic activity of many Australian corporations. During this same period there has been an increasing use by major financial institutions of the sophisticated quantitative techniques that have been developed since the early 1970s. As a consequence, there is a demand for a new type of graduate trained in both mathematics and finance.

To meet this need, the Bachelor of Mathematics and Finance degree is offered jointly by the School of Mathematical Sciences and the School of Finance and Economics.

Students graduating from the BMathFin will have undertaken an integrated sequence of subjects in mathematics, statistics, finance, economics, accounting, business law and computing and so will have sound training in both the traditional theory of finance and the mathematical aspects of modern portfolio management techniques.

As a result, graduates should find interesting and rewarding employment in major financial institutions such as merchant banks, insurance companies and government instrumentalities.

The Bachelor of Mathematics and Finance is offered as a three-year Pass degree with a fourth year Honours degree.

The Pass degree is offered on both a full-time and a part-time basis. In the first four years of the course, part-time students will be expected to be able to attend classes on one afternoon and two or three evenings per week. The final two years may require attendance at morning classes as some subjects, which form parts of other degrees, are not offered at night. Programs will be arranged individually for part-time students to spread the eight subjects of Year 3 of the full-time course over two years.
GRADING OF AWARDS

The School of Mathematical Sciences grades students for the Bachelor of Mathematics and Finance degree using the average mark of all subjects undertaken from the second and third years of the full-time program. Each mark is weighted by the credit point value of the subject.

The degree is awarded at distinction level if the weighted average mark is 75 or greater, at credit level if it is in the range 65-74, and at pass level if it is in the range 50-64.

Note: Gradings for the Pass degree will take place for the final time in 1995.

COURSE PROGRAM

Full-time program

Credit point values are shown in parentheses.

Year 1

Autumn semester
25110 Microeconomics (5cp)
35100 Mathematical Practice (3cp)
35101 Mathematics 1 (6cp)
35111 Discrete Mathematics (3cp)
35170 Introduction to Computing (6cp)

Spring semester
22105 Accounting A (5cp)
25209 Macroeconomics (5cp)
35102 Mathematics 2 (6cp)
35151 Statistics 1 (6cp)

Year 2

Autumn semester
25308 Financial Institutions and Markets (5cp)
25314 Business Finance 1 (5cp)
35122 Linear Algebra (6cp)
35232 Advanced Calculus (6cp)
35252 Statistics 2 (6cp)

Spring semester
25210 Microeconomic Policy (5cp)
25905 Asset Pricing and Capital Market Studies (Honours) (5cp)
35231 Differential Equations (6cp)
35281 Numerical Analysis 1 (6cp)
79101 Law for Business (5cp)

Year 3

Autumn semester
25421 International Financial Management (5cp)
25906 Investment Analysis and Portfolio Management (Honours) (5cp)
35321 Analysis 1 (6cp)
35353 Regression Analysis and Experimental Design (6cp)

Spring semester
25502 Current Issues in Finance (5cp)
25606 Financial Time Series Analysis (5cp)
35241 Mathematical Programming 1 (6cp)

or
35322 Analysis 2 (6cp)
35361 Probability and Stochastic Processes (6cp)

Students intending to undertake the Honours degree will need to include 35322 Analysis 2 in their Year 3 program. They will need to substitute this for the subject 35241 Mathematical Programming 1 that is part of the Pass degree.

Part-time program

Credit point values are shown in parentheses.

Year 1

Autumn semester
35100 Mathematical Practice (3cp)
35101 Mathematics 1 (6cp)
35111 Discrete Mathematics (3cp)

Spring semester
22105 Accounting A (5cp)
35170 Introduction to Computing (6cp)

Year 2

Autumn semester
25110 Microeconomics (5cp)
35102 Mathematics 2 (6cp)

Spring semester
25209 Macroeconomics (5cp)
35151 Statistics 1 (6cp)
Year 3

**Autumn semester**

35212 Linear Algebra (6cp)
79101 Law for Business (5cp)

**Spring semester**

25314 Business Finance 1 (5cp)
35232 Advanced Calculus (6cp)
35252 Statistics 2 (6cp)

Year 4

**Autumn semester**

35231 Differential Equations (6cp)
35281 Numerical Analysis 1 (6cp)

**Spring semester**

25210 Microeconomic Policy (5cp)
25308 Financial Institutions and Markets (5cp)
25905 Asset Pricing and Capital Market Studies (Honours) (5cp)

Year 5

**Autumn semester**

25421 International Financial Management (5cp)
35353 Regression Analysis and Experimental Design (6cp)

**Spring semester**

25502 Current Issues in Finance (5cp)
35321 Analysis 1 (6cp)

Year 6

**Autumn semester**

25906 Investment Analysis and Portfolio Management (Honours) (5cp)
35361 Probability and Stochastic Processes (6cp)

**Spring semester**

25606 Financial Time Series Analysis (5cp)
35241 Mathematical Programming 1 (6cp)

or

35322 Analysis 2 (6cp)

Students intending to undertake the Honours degree will need to include 35322 Analysis 2 in their Year 6 program. They will need to substitute this for the subject 35241 Mathematical Programming 1 that is part of the Pass degree.

---

**Bachelor of Mathematics and Finance (Honours) (BMathFin(Hons))**

**Course code MM04**

The Bachelor of Mathematics and Finance degree is also offered at an Honours level, requiring an additional year of advanced study. Honours degree graduates will be particularly sought after and their additional skills will enable them to compete for high entry level jobs in the banking sector. It is expected that most students will opt to undertake this additional year.

Admission to the Honours degree will be assessed individually according to the following criteria:

- Students who are eligible to graduate from the BMathFin degree at UTS with an average mark of 65 or more over all subjects in Years 2 and 3 (full-time) will be eligible for entry to the Honours degree, subject only to the approval of the Heads of the Schools of Mathematical Sciences and Finance and Economics.

- Students who have obtained qualifications equivalent to the BMathFin degree will be considered for entry, upon application, by the Heads of the two participating Schools on the basis of their assessed potential to complete the Honours degree.

The Honours degree will require completion of subjects worth 48 credit points over one year of full-time study. The year consists of nine coursework subjects of an advanced nature in mathematics, statistics and finance together with a substantial project. The project will involve a major investigation over two semesters in some area of finance, and will provide students with the opportunity to apply the skills developed in their coursework. The project will be assessed on the basis of a thesis and a seminar presented to the staff of both Schools.
GRADING OF AWARDS
The assessment of students' results will take into account the Honours level coursework subjects, the thesis and the seminar. Honours at the grades of First Class, Second Class (Division 1), Second Class (Division 2) and Third Class will be awarded for the successful completion of the course.

COURSE PROGRAM
Listed below is the course program for the BMathFin(Hons) degree.
Credit point values are shown in parentheses.

Year 4

**Autumn semester**
- 25910 Thesis (12cp)
- 25907 Advanced Microeconomics (4cp)
- 34062 Stochastic Processes 2 (4cp)
- 34065 Time Series Analysis (4cp)
- 34927 Deterministic Optimal Control (4cp)

**Spring semester**
- 25910 Thesis (subject continues)
- 25908 Futures and Options (4cp)
- 25909 Advanced Corporate Finance (4cp)
- 34028 Stochastic Optimal Control (4cp)
- 34029 Nonlinear Dynamical Systems (4cp)
- 34066 Nonlinear Statistical Models (4cp)

Note: This program applies only for the 1995 academic year as some of the subjects mentioned here have been superseded, and some restructuring of the Honours program will take place for 1996.

POSTGRADUATE PROGRAMS

POSTGRADUATE RESEARCH DEGREES
The Master of Science (by thesis) (MSc) and Doctor of Philosophy (PhD) degrees provide the opportunity for graduates to extend and deepen their knowledge in specialised areas of mathematics by undertaking research under the supervision of a member of the academic staff.

The main interests within the School of Mathematical Sciences are in applied and computational mathematics, operations research and statistics. Particular interests and specialisations exist in the following areas.

Clinical Trials and the Modelling of Medical Data
Inversion of Raman spectra of living cells; stability and uniqueness in compartmental models for medical applications; diabetic control; insulin sensitivity; modelling of glucose and C-peptide response curves.

Computational Mathematics and Computing
Lattice rules for numerical multiple integration; development of AMPL (A Mathematical Programming Language); database management system for diabetes; computer performance modelling; mathematical foundations of computing; computer-aided instruction in mathematics.

Differential Geometry
Topology and Ricci curvature; integral formulas on submanifolds of a Riemannian manifold.

Geophysical Applications of Mathematics
Seismic ray theory for slightly heterogeneous structures; properties of normal rays; seismic wave propagation; seismic velocity inversion; inverse problems; radio frequency propagation in coal seams.
Mathematics Education
PhD education of industrial mathematicians; mathematical education of engineers; tertiary education in applied mathematics; statistical education.

Number Theory
Recurring sequences; odd perfect numbers and related numbers; arithmetical functions.

Operations Research
Simulation techniques; scheduling; discrete optimisation; neural networks; finance theory and modelling.

Optics and Electromagnetic Diffraction Theory
Diffraction properties of one-dimensional and two-dimensional periodic structures; optics of thin films.

Statistics
Medical applications of statistics; measurement and test design; permissible statistics; stationary Markov sequences; simulation and density estimation.

Research projects that are focused on biomedical applications are conducted through the Centre for Biomedical Technology which was formed in 1990. The Centre is an inter-faculty network of research and education teams working in the field of biomedical technology. It integrates the University's diverse expertise and resources to enhance the scientific and technological base for biomedical technology research and training for industry, health-care providers and government. Other schools and faculties involved with the Centre are the School of Biological and Biomedical Sciences, the School of Physical Sciences, the School of Electrical Engineering, the School of Mechanical Engineering, the School of Computing Sciences and the Faculty of Nursing.

FEES
The exemption of research students from HECS fees is currently under review. Information will be available in early 1995.

RECENT THESES
PhD theses
Ollerton R L, Adaptive Control and the Insulin Dependent Diabetic, 1990
Dobson R J, Modelling Host Regulation of Trichostrongyulus Colubriformis, a Nematode Parasite of Sheep, 1992

MSc theses
Reuben A J, Mathematical Models of Erythrocyte Sedimentation, 1990
Lee J K, Strategies for Inversions for Some Geophysical and Medical Applications, 1991

Doctor of Philosophy (PhD)
Course code MM54
The PhD program provides an opportunity for graduates to acquire high level research skills and substantially deepen their knowledge in an area of the mathematical sciences by working under the guidance of supervisors. The research program entails survey and mastery of a large body of literature in the chosen topic together with a substantial body of high level original work by the candidate. Students are also required to present seminars during the time of their enrolment and at the completion of their program.

The course is offered in full-time and part-time modes. For full-time enrolments the normal duration of the program is three years; for part-time enrolments it is six years. It is expected that part-time students will be able to devote 20 hours per week to work towards the degree. All students are expected to maintain regular contact (at least weekly) with their supervisor.
Master of Science (by thesis) (MSc)

Course code MM51

The Master of Science program provides an opportunity for graduates to acquire research skills and deepen their knowledge in some areas of the mathematical sciences by working under the guidance of a supervisor who is a member of the full-time academic staff of the School. The research program entails survey and mastery of a substantial body of literature in the chosen topic together with original work from the candidate. The degree is examined through the presentation of a thesis. Students are also required to present seminars during the time of their enrolment and at the completion of the program.

The course is offered in full-time and part-time modes. For full-time enrolments the normal duration of the program is two years; for part-time enrolments it is four years. It is expected that part-time students will be able to devote 20 hours each week to the work towards the degree. All students are expected to maintain regular contact (at least weekly) with their supervisor.

POSTGRADUATE COURSEWORK PROGRAMS

Master of Science in Operations Research (by coursework) (MSc)

Course code MM53

Operations research may be defined as the application of the methods of science to complex problems arising in the direction and management of large systems of people, machines, materials and money in industry, business, government and defence. This course aims to prepare graduates for high level professional work in the application of operations research techniques to the problems of modern society.

The subjects in the program provide students with a suite of advanced techniques, together with the theoretical background for these methods. Studies in the fields of optimisation, mathematical programming, stochastic processes and the theory of finance, together with a broad survey of applications having industrial and social importance, will enable graduates to deal with high-level professional work in operations research in business and industry.

FEES

The Master’s degree in Operations Research is offered with a fixed quota of student places and the course fees have been set in accordance with University policy. In 1994, the tuition fees were $1,900 for each semester of equivalent full-time study. Fees for part-time students are levied on a pro rata basis. Course fees are revised from year to year in accordance with University and Government policy. Students paying tuition fees will not be liable for HECS (the Higher Education Contribution Scheme).

COURSE STRUCTURE

The course has a length of 48 credit points and consists of six core subjects (24 credit points), 12 credit points of elective subjects (incorporated to enable
students to develop complementary
skills) and a substantial project of
12 credit points (requiring students to
undertake a survey and a modest level
of research in some area of application
of the discipline). The normal attend­
ance pattern involves two years of part­
time study. However, it is possible to
complete the degree through one year of
full-time study.

Applicants for this course must be
graduates who have high level skills in
the mathematical sciences. In particular,
you must have:

• a knowledge of statistics equivalent
to 35252 Statistics 2;
• completed studies in operations
research corresponding to the
Graduate Diploma in Operations
Research, the Operations Research
major of the BSc in Mathematics, or
its equivalent; and
• completed prerequisites in math­
ematics which are presumed in the
core subjects of the degree.

Applicants not satisfying these prerequi­
sites are advised to consider enrolling in
the Graduate Diploma in Operations
Research or the Graduate Certificate
programs offered by the School. Applic­
ants should discuss their eligibility for
entry with the Director, Postgraduate
Studies.

The course is composed of the following
elements.

**A sequence of subjects**
The subjects are taught through lectures,
tutorials and reading.

**A seminar subject**
Students are required to perform a
survey of current literature and present
a discussion of current and prospective
research in operations research.

**A major report**
Students are required to investigate an
approved topic in operations research.
They are required to present a written
report and to give an oral presentation
in the form of a seminar.

**Three electives**
The electives have been included within
the program to enable students to round
out their education in an appropriate
manner. It is intended that these subjects
be of senior undergraduate standard or
higher. Typical choices will include
additional studies in operations re­
search, statistics or possibly subjects
from some area of business or manage­
ment. The electives will be chosen by
the student and an academic adviser
who will be appointed by the Director,
Postgraduate Studies.

Students will have their registration
discontinued for failure to complete the
course in three years from the time of
registration in the case of a full-time
student, or in four-and-a-half years in
the case of a part-time student (not
inclusive of periods of leave of absence),
or for recording any three failures in the
course (unsatisfactory progress as
defined by the Faculty Board resolution,
FBMC/92/70).

**Part-time program**
Credit point values are shown in paren­
theses.

**Semester 1**
34033 Dynamic Optimisation (4cp)
34040 Operations Research Models and
Methodology (4cp)
Electives (approx 4cp)

**Semester 2**
34031 Large-scale Mathematical
Programming (4cp)
34038 Corporate and Financial
Decisions and Investment
Analysis (4cp)
Electives (approx 4cp)

**Semester 3**
34036 Stochastic Models in Operations
Research (4cp)
34039 Seminar: Applications in
Operations Research (4cp)
34097 Report (12cp)

**Semester 4**
34097 Report (subject continues)
Electives (approx 4cp)

It should be noted that 34097 Report is a
year-long subject. Students are expected
to devote approximately three hours
each week to the Report in Semester 3
and six hours each week in Semester 4.
Graduate Diploma in Operations Research (GradDipOR)

Course code MMS2

This course is designed to train professional people in the application of operations research principles and methods. It may be regarded as a training or retraining course for graduates from a wide range of disciplines, provided they have a sound foundation in mathematics, statistics and computing to approximately second-year level. It is ideally suited for subsequent entry into the Master of Science in Operations Research, provided a suitable standard is attained.

The subjects in the Graduate Diploma cover standard operations research techniques and their theoretical foundations. The range of topics and the level of presentation are commensurate with those found in senior undergraduate studies in this discipline.

The length of the course is 48 credit points comprising 36 credit points of coursework (six subjects) and a project worth 12 credit points.

Applicants for this course will be graduates from a variety of disciplines who satisfy the basic entry requirements. These consist of a knowledge of pure and applied mathematics and statistics that is sufficient to satisfy the prerequisites of the program's subjects, and a knowledge of computer programming equivalent to the content of the subject 35170 Introduction to Computing.

Applicants not satisfying these prerequisites are advised to consider enrolling in a Graduate Certificate course. Applicants for the Graduate Diploma program should discuss their eligibility with the Director, Postgraduate Studies.

This course is offered with both full-time and part-time attendance patterns. The normal time to complete the course is one year for full-time students and two years for part-time students.

Students will have their registration discontinued for failure to complete the course in two years from the time of registration in the case of a full-time student, or in four years from the time of registration in the case of a part-time student (not inclusive of periods of leave of absence), or for failure in any subject three times (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/92/71).

Students should be aware that the Faculty Board in Mathematical and Computing Sciences has amended the definition of unsatisfactory progress, which will take effect from Autumn semester 1996 (FBMC/94/80). The new definition will be:

1. failure to complete the course in eight semesters from the time of registration in the case of a part-time student, or four semesters from that time in the case of a full-time student, not inclusive of periods of leave of absence; or
2. any three failures in the course.

It is expected that the normal pattern of attendance will be part-time. Shown below is the course structure for part-time attendance over a period of two years.

FEES

The Graduate Diploma in Operations Research is offered with a fixed quota of student places and the course fees have been set in accordance with University policy. In 1994, the tuition fees were $1,900 for each semester of equivalent full-time study. Fees for part-time students are levied on a pro rata basis. Course fees are revised from year to year in accordance with University and Government policy. Students paying tuition fees will not be liable for HECS (the Higher Education Contribution Scheme).
COURSE PROGRAM

Part-time program
Credit point values are shown in parentheses.

Semester 1
35241 Mathematical Programming 1 (6cp)
35252 Statistics 2 (6cp)

Semester 2
35342 Mathematical Programming 2 (6cp)
35361 Probability and Stochastic Processes (6cp)

Semester 3
35363 Stochastic Methods in Operations Research (6cp)
35596 Project (12cp)

Semester 4
35340 Operations Research Practice (6cp)
35596 Project (subject continues)

It should be noted that 35596 Project is a year-long subject. Students are expected to devote approximately four hours each week to the Project in both semesters.

Graduate Diploma in Statistics (GradDipStats)

Course code MM65

The Graduate Diploma in Statistics aims to train graduates in the methods and principles of applied statistics. The course provides access to training or retraining in statistics to at least the level of skill attained by students completing the BSc in Mathematics degree with the Statistics major. Students will be expected to have some statistical and mathematical background.

A knowledge of statistical methodology is becoming ever more important for graduates in many disciplines. Degree courses in the sciences, in engineering and in business often do not provide the exposure to statistics which graduates find they need in employment. This course is suitable for such graduates and also for those who have completed degrees in pure or applied mathematics without a major in statistics.

The subjects in the Graduate Diploma cover standard statistical techniques and their theoretical foundations. The range of topics and the level of presentation are commensurate with those found in senior undergraduate studies in this discipline.

The length of the course is 48 credit points.

Applicants for this course will be graduates from a variety of disciplines who satisfy the basic entry requirements. These consist of a knowledge of statistics and pure and applied mathematics that is sufficient to satisfy the prerequisites of the program’s subjects, and a knowledge of computer programming equivalent to the content of the subject 35170 Introduction to Computing.

Prospective applicants will be assessed by the Director, Postgraduate Studies, and those who have not completed the necessary prerequisites will be required to enrol in appropriate subjects, either in a miscellaneous mode of study or as part of a Graduate Certificate program.
It is expected that the normal pattern of attendance will be part-time. The course structure for part-time attendance over a period of two years is shown below. Students will have their registration discontinued for failure to complete the course in two years from the time of registration in the case of a full-time student, or in four years from the time of registration in the case of a part-time student (not inclusive of periods of leave of absence), or for failure in any subject three times (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/92/71).

Students should be aware that the Faculty Board in Mathematical and Computing Sciences has amended the definition of unsatisfactory progress, which will take effect from Autumn semester 1996 (FBMC/94/80). The new definition will be:

1. failure to complete the course in eight semesters from the time of registration in the case of a part-time student, or four semesters from that time in the case of a full-time student, not inclusive of periods of leave of absence; or
2. any three failures in the course.

FEES
At present there are no government-funded student places for this course and it is necessary to charge full fees. In 1994, the total cost of the course was $7,600. The fees are subject to annual review.

### COURSE PROGRAM

#### Part-time program
Credit point values are shown in parentheses.

<table>
<thead>
<tr>
<th>Semester 1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>35252</td>
<td>Statistics 2 (6cp)</td>
</tr>
<tr>
<td>35353</td>
<td>Regression Analysis and Experimental Design (6cp)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 2</th>
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<tbody>
<tr>
<td>35354</td>
<td>Statistical Inference (6cp)</td>
</tr>
<tr>
<td>35361</td>
<td>Probability and Stochastic Processes (6cp)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>35363</td>
<td>Stochastic Methods in Operations Research (6cp)</td>
</tr>
<tr>
<td>34065</td>
<td>Time Series Analysis (4cp)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>35355</td>
<td>Quality Control (6cp)</td>
</tr>
<tr>
<td>35592</td>
<td>Project (8cp)</td>
</tr>
</tbody>
</table>

#### Course Program

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>35252</td>
<td>Statistics 2</td>
</tr>
<tr>
<td></td>
<td>35353</td>
<td>Regression Analysis and Experimental Design</td>
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<tr>
<th>Semester 2</th>
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<tbody>
<tr>
<td></td>
<td>35354</td>
<td>Statistical Inference</td>
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<td></td>
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<td>Probability and Stochastic Processes</td>
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<th>Semester 3</th>
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<tr>
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<td>35363</td>
<td>Stochastic Methods in Operations Research</td>
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<tr>
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<td>34065</td>
<td>Time Series Analysis</td>
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<table>
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<th>Semester 4</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td></td>
<td>35355</td>
<td>Quality Control</td>
</tr>
<tr>
<td></td>
<td>35592</td>
<td>Project</td>
</tr>
</tbody>
</table>
Graduate Certificate in Mathematical Sciences

Course code MM56

The Graduate Certificate in Mathematical Sciences has been developed in response to a demand for short courses in mathematics, statistics, operations research, and computational mathematics. It provides those employed in industry with access to additional training or retraining in quantitative disciplines.

The course has a flexible structure and the wide range of subjects offered in the other postgraduate and undergraduate courses of the School of Mathematical Sciences would be available to intending students. Students may undertake any sequence of subjects offered by the School with a total value of 12 credit points, provided that individual subject prerequisites are satisfied.

Applicants will normally be expected to hold a Bachelor's degree, or higher qualification, from a recognised tertiary institution. Applicants who do not possess such qualifications will be considered on an individual basis. Prior to their admission, all applicants will be required to discuss their preferred program of study with the Graduate Certificate Coordinator in order to ensure that they have the requisite background knowledge for their chosen subject sequences. In 1995, a fee of $900 per subject is payable. This fee is subject to annual review.

A number of coherent subject sequences in the areas of mathematics, computational mathematics, operations research and statistics are possible. Samples of these are listed below. Some computing subjects require extra attendance for laboratory work. Details are given in the 'Subject Descriptions' section. Credit point values are shown in parentheses.

COMPUTATIONAL MATHEMATICS

Sequence A
Theme: Numerical Analysis

Presumed knowledge
Equivalent to introductory courses in calculus, linear algebra and differential equations, and an elementary knowledge of the C language.

Program of study
35281 Numerical Analysis 1 (6cp)
35382 Numerical Analysis 2 (6cp)

Sequence B
Theme: Mathematical Cryptology

Presumed knowledge
Equivalent to an introductory course in linear algebra, and an intermediate-level knowledge of a modern procedural language.

Program of study
35314 Pure Mathematics 3B (6cp)
35376 Advanced Topics in Computing A (6cp)
(Modules: Cryptology, High Performance Computing)

Sequence C
Theme: Neural Networks

Presumed knowledge
Equivalent to introductory courses in calculus, matrix algebra and statistics, and an intermediate-level knowledge of a modern procedural language.

Program of study
35232 Advanced Calculus (6cp)
35376 Advanced Topics in Computing A (6cp)
(Modules: Neural Networks, High Performance Computing)

MATHEMATICS

Sequence A
Theme: Differential Equations

Presumed knowledge
Equivalent to introductory courses in calculus and linear algebra.
Program of study
35102  Mathematics 2 (6cp)
35231  Differential Equations (6cp)

Sequence B
Theme: Modern and Linear Algebra
Presumed knowledge
Equivalent to introductory courses in matrix algebra and discrete mathematics.

Program of study
35212  Linear Algebra (6cp)
35314  Pure Mathematics 3B (6cp)

Sequence C
Theme: Analysis with Applications to Probability Theory
Presumed knowledge
Equivalent to introductory courses in calculus, differential equations and linear algebra.

Program of study
35321  Analysis 1 (6cp)
35322  Analysis 2 (6cp)

OPERATIONS RESEARCH

Sequence A
Theme: Financial Modelling
Presumed knowledge
Equivalent to intermediate courses in calculus, linear algebra and statistics.

Program of study
35241  Mathematical Programming 1 (6cp)
35340  Operations Research Practice (6cp)

Sequence B
Theme: Techniques of Mathematical Programming
Presumed knowledge
Equivalent to intermediate courses in calculus and linear algebra.

Program of study
35241  Mathematical Programming 1 (6cp)
35342  Mathematical Programming 2 (6cp)

Sequence C
Theme: Simulation and Decision Support
Presumed knowledge
Equivalent to intermediate courses in calculus and statistics.

Program of study
35361  Probability and Stochastic Processes (6cp)
35363  Stochastic Methods in Operations Research (6cp)

STATISTICS

Sequence A
Theme: Analysis of Experimental Data
Presumed knowledge
Equivalent to introductory courses in calculus and statistics.

Program of study
35252  Statistics 2 (6cp)
35353  Regression Analysis and Experimental Design (6cp)

Sequence B
Theme: Industrial Applications of Statistics
Presumed knowledge
Equivalent to intermediate courses in calculus and statistics.

Program of study
35355  Quality Control (6cp)
35361  Probability and Stochastic Processes (6cp)

Sequence C
Theme: Mathematical Statistics
Presumed knowledge
Equivalent to intermediate courses in calculus and statistics.

Program of study
35354  Statistical Inference (6cp)
35361  Probability and Stochastic Processes (6cp)
NUMERICAL LISTING OF SUBJECTS

The following table indicates the number and name of each subject, the semester or semesters in which it is offered (these are subject to change), the credit point value, the number of contact hours, and prerequisites and corequisites (indicated by c). The letters A and S refer to Autumn and Spring semesters, respectively, and Y is used for a year-long subject. As a general guide, four contact hours suggests three hours of lectures and one tutorial hour per week, and six contact hours suggests a further two hours of laboratory work per week.

<table>
<thead>
<tr>
<th>Subject Number</th>
<th>Subject Name</th>
<th>Semester Offered</th>
<th>Credit Points</th>
<th>Contact Hours</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>22105</td>
<td>Accounting A</td>
<td>A, S</td>
<td>5</td>
<td>3</td>
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<td>25110</td>
<td>Microeconomics</td>
<td>A, S</td>
<td>5</td>
<td>3</td>
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<td>Macroeconomics</td>
<td>A, S</td>
<td>5</td>
<td>3</td>
<td>25110</td>
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<td>25210</td>
<td>Microeconomic Policy</td>
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<td>3</td>
<td>25110</td>
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<tr>
<td>25308</td>
<td>Financial Institutions and Markets</td>
<td>A, S</td>
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<td>3</td>
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<td>25314</td>
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<td>22105, 35151, 25308 c</td>
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<td>Current Issues in Finance</td>
<td>S</td>
<td>5</td>
<td>3</td>
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<td>25905</td>
<td>Asset Pricing and Capital Market</td>
<td>S</td>
<td>5</td>
<td>3</td>
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<td>25906</td>
<td>Investment Analysis and Portfolio</td>
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<td>Advanced Microeconomics</td>
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<td>3</td>
<td>By consent</td>
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<td>4</td>
<td>3</td>
<td>By consent</td>
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<td>25909</td>
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SUBJECT DESCRIPTIONS

Guide to subject descriptions

The subject descriptions shown below indicate the subject number and name, the number of credit points for the subject (e.g. 4cp), and the number of formal contact hours per week (e.g. 3hpw). Also shown are the prerequisites or corequisites, if any, and a brief outline of the content.

Prerequisites are subjects which must be completed before taking the subject to which they refer. Corequisites may be completed before or be taken concurrently with the subject to which they refer. Certain subject descriptions refer to prerequisite subjects which are not described in this handbook. Descriptions of these subjects may be found in the 1994 Faculty of Mathematical and Computing Sciences Handbook.

Subjects offered by the School of Mathematical Sciences are listed first, followed by those offered by other faculties. Subjects offered by the School of Computing Sciences are described elsewhere in this handbook.

34013
MODERN ANALYSIS (HONOURS)
4cp; 3hpw
prerequisites: 34802 Algebra 2; 34812 Analysis 2


34014
MEASURE THEORY (HONOURS)
4cp; 3hpw
prerequisite: 34013 Modern Analysis (Honours)


34019
FUNCTIONAL ANALYSIS
4cp; 3hpw
prerequisite: 34014 Measure Theory (Honours)


34023
PARTIAL DIFFERENTIAL EQUATIONS 3
4cp; 3hpw
prerequisite: 34922 Partial Differential Equations 2


34026
FRACTAL GEOMETRY
4cp; 3hpw
prerequisite: 34014 Measure Theory (Honours)

34028
STOCHASTIC OPTIMAL CONTROL
4cp; 3hpw
prerequisites: 34927 Deterministic Optimal Control; 34062 Stochastic Processes 2

34029
NONLINEAR DYNAMICAL SYSTEMS
4cp; 3hpw
prerequisites: 34815 Ordinary Differential Equations; 34013 Modern Analysis (Honours)

34031
LARGE-SCALE MATHEMATICAL PROGRAMMING
4cp; 3hpw
prerequisite: 34932 Optimisation Techniques
Theory and computational methods for optimising large-scale linear and nonlinear programs; variance of the simplex method and approximation approaches to the solution of large-scale linear programs, decomposition (Dantzig-Wolfe and Bender’s), exploitation of sparsity, combinatorial problems, methodology.

34033
DYNAMIC OPTIMISATION
4cp; 3hpw
prerequisites: 34790 Numerical Computing; 34931 Linear Programming; 34961 Stochastic Processes

34036
STOCHASTIC MODELS IN OPERATIONS RESEARCH
4cp; 3hpw
prerequisites: 34931 Linear Programming; 34961 Stochastic Processes 1; 34033 Dynamic Optimisation
Stochastic linear programming (two-stage linear programming formulations and change-constrained programming). Finite horizon probabilistic dynamic programming. Markov chains and Markovian decision processes and probabilistic inventory models (infinite horizon continuous review).
34038
CORPORATE AND FINANCIAL DECISIONS AND INVESTMENT ANALYSIS
4cp; 3hpw
prerequisite: 34938 Financial Modelling Techniques

34039
SEMINAR: APPLICATIONS IN OPERATIONS RESEARCH
4cp; 3hpw
prerequisite: by consent
Recognition of problem areas suited to the application of operations research techniques such as simulation, queuing theory, mathematical programming and inventory control. Human resources planning and scheduling in companies and facilities. Cohort analysis, Markov-based examples, effects of computerisation and technological change. Application to areas of the public sector including location of emergency services, capacity planning over time and service level decisions. Class discussion of ongoing and prospective applications of operations research.

34040
OPERATIONS RESEARCH MODELS AND METHODOLOGY
4cp; 3hpw
prerequisite: by consent
Critical analysis of recent studies from the literature, from the point of view of the operations research methodology used. Development of alternative formulations of problems and their solutions. Case studies of the basic model prototypes (linear, network, dynamic and stochastic). At least one case study will involve the use of continuous and/or discrete event simulation using a high level language such as SimScript II.5.

34062
STOCHASTIC PROCESSES 2
4cp; 3hpw
prerequisites: 34960 Probability, 34961 Stochastic Processes 1; 34014 Measure Theory (Honours)

34065
TIME SERIES ANALYSIS
4cp; 3hpw
prerequisites: 34960 Probability; 34961 Stochastic Processes 1
Model identification, estimation, diagnostic examination and forecasting for time series. Nonseasonal/seasonal, stationary/nonstationary and linear/nonlinear time series are considered. Models covered are Box-Jenkins, time series regression, exponential smoothing, transfer functions and classical regression.

34066
NONLINEAR STATISTICAL MODELS
4cp; 3hpw
prerequisites: 34955 Regression Analysis; 34065 Time Series Analysis
Nonlinear regression; least squares estimation; hypothesis testing. Use of SAS. Multivariate nonlinear regression. Nonlinear simultaneous equation models; method of moment estimators.

34067
MULTIVARIATE STATISTICS
4cp; 3hpw
prerequisites: 34953 Statistical Inference; 34955 Regression Analysis
Multivariate normal distribution: definition; moments; characteristic function; estimation of mean and covariance matrices; Wishart

34068
STATISTICAL MODELLING
4cp; 3hpw
prerequisites: 34956 Design of Experiments

34069
LINEAR MODELS AND EXPERIMENTAL DESIGN
4cp; 3hpw
prerequisites: 34956 Design of Experiments; 34067 Multivariate Statistics
Linear models; the linear model of less than full rank, the analysis of variance, completely randomised and randomised block designs. Response surfaces. Incomplete block designs. Repeated measures designs.

34087
ANALYTIC NUMBER THEORY
4cp; 3hpw
prerequisites: 34803 Algebra 3; 34818 Complex Variables
Divisibility, prime numbers and the fundamental theorem of arithmetic; arithmetical functions and Dirichlet multiplication; some asymptotic analysis involving arithmetical functions. Characters of finite Abelian groups; Dirichlet’s theorem on primes in arithmetic progressions. The Riemann zeta function; analytic proof of the prime number theorem.

34091
HONOURS SEMINAR 1
4cp; 3hpw
prerequisite: by consent
This subject will provide an opportunity for students to benefit from the specialist knowledge of a visitor to the School or to undertake a course in an area of specific staff research or knowledge.

34092
HONOURS SEMINAR 2
4cp; 3hpw
prerequisite: by consent
As for 34091.

34096
CONVEXITY AND OPTIMISATION (HONOURS)
4cp; 3hpw
prerequisite: 34013 Modern Analysis (Honours)

34097
REPORT
12cp
prerequisite: by consent
An applied or theoretical study in an area chosen in consultation with the project supervisor who will be appointed by the Head of School. This is a year-long subject. Students are expected to spend three hours per week on their project in Autumn semester and six hours per week in Spring semester.
34098

PROJECT (HONOURS)

12cp

prerequisite: by consent

Students will perform an independent investigation of an area of the mathematical sciences chosen in consultation with a supervisor who will be appointed by the Head of School. This is a year-long subject. Students are expected to spend three hours per week on their project in Autumn semester and six hours per week in Spring semester.

34927

DETERMINISTIC OPTIMAL CONTROL

4cp; 3hpw

prerequisites: 34815 Ordinary Differential Equations; 34817 Vector Calculus


35100

MATHEMATICAL PRACTICE

3cp; 3hpw

prerequisite: nil


35101

MATHEMATICS 1

6cp; 6hpw

prerequisite: nil


35102

MATHEMATICS 2

6cp; 6hpw

prerequisite: 35101 Mathematics 1

Methods of integration; improper integrals. Ordinary differential equations; first order linear and variable separate equations; higher-order linear equations, undetermined coefficients. Sequences and series; tests for convergence; power series; radius of convergence; Taylor series. Application of matrix exponentials to systems of linear differential equations. Series solution of linear differential equations; ordinary and regular singular points; Bessel functions. Partial derivatives, directional derivative and gradient; maxima and minima, Lagrange multipliers.

35111

DISCRETE MATHEMATICS

3cp; 3hpw

prerequisite: nil

35151
STATISTICS 1
6cp; 6hpw
prerequisite: nil

35170
INTRODUCTION TO COMPUTING
6cp; 7hpw
prerequisite: nil
An introduction to computer systems by providing skills in the use of editors, user interfaces and operating systems. Three approaches to simple numerical and business problems will be developed: imperative programming, functional programming and the utilisation of spreadsheets, illustrating the complementary nature of these approaches to computing.

35171
COMPUTING 1
6cp; 7hpw
prerequisite: 35170 Introduction to Computing
corequisite: 35111 Discrete Mathematics

35205
HISTORY OF MATHEMATICS
6cp; 4hpw
prerequisite: nil

35212
LINEAR ALGEBRA
6cp; 4hpw
prerequisite: 35102 Mathematics 2

35231
DIFFERENTIAL EQUATIONS
6cp; 4hpw
prerequisites: 35102 Mathematics 2; 35212 Linear Algebra

35232
ADVANCED CALCULUS
6cp; 4hpw
prerequisite: 35102 Mathematics 2
Vector calculus: calculus of several variables, partial derivatives, Taylor's theorem, critical points, Hessians;

multiple integrals, line integrals. Complex variables: analytic functions, Cauchy-Riemann equations, complex integrals, Cauchy’s theorem, contour integrals, residues.

35241
MATHEMATICAL PROGRAMMING 1
6cp; 4hpw
Prerequisites: 35212 Linear Algebra; 35232 Advanced Calculus

35252
STATISTICS 2
6cp; 4hpw
Prerequisite: 35151 Statistics I

35272
COMPUTING 2
6cp; 6hpw
Prerequisites: 35111 Discrete Mathematics; 35171 Computing 1

35281
NUMERICAL ANALYSIS 1
6cp; 4hpw
Prerequisites: 35170 Introduction to Computing; 35212 Linear Algebra; 35231 Differential Equations
Introduction to numerical analysis, including the study of: solution methods for nonlinear equations, systems of linear equations (LU factorisation and iterative methods), interpolation, numerical differentiation and integration, orthogonal polynomials and approximation theory, the Euler and Runge-Kutta methods for initial value problems, and finite difference methods for boundary value problems. Further work on the use of spreadsheet modelling including coverage of command macros.

35292-6
PROJECT
2–6cp; 1–4hpw
Prerequisite: by consent
Corequisite: by arrangement
A supervised investigation of a topic in an area of interest providing the student with additional skills of direct use in employment or in further academic studies.

35313
PURE MATHEMATICS 3A
6cp; 4hpw
Prerequisites: 35231 Differential Equations; 35232 Advanced Calculus
Projective geometry: Euclidean and non-Euclidean geometry, Pappus’s and Desargues’s theorems, transformations in the plane, collineations, projectivities, incidence matrices, Latin squares. Differential geometry: vector fields, vector fields on surfaces, Gauss map, Weingarten map, curvature of curves and surfaces.
35314
PURE MATHEMATICS 3B
6cp; 4hpw
prerequisite: 35111 Discrete Mathematics
Generators. Quotient semigroups.

35321
ANALYSIS 1
6cp; 4hpw
prerequisites: 35102 Mathematics 2; 35212 Linear Algebra

35322
ANALYSIS 2
6cp; 4hpw
prerequisite: 35321 Analysis 1

35333
APPLIED MATHEMATICS 3A
6cp; 4hpw
prerequisites: 35232 Advanced Calculus
corequisite: 35335 Mathematical Methods
Modelling mechanical properties: force, work, energy, power, projectiles, oscillation, orbits. Modelling electromagnetic properties: electric fields, magnetic fields, Coulomb’s law, Biot-Savart law, Ampère’s circuit law, Faraday’s law, Maxwell’s equations.

35334
APPLIED MATHEMATICS 3B
6cp; 4hpw
prerequisites: 35333 Applied Mathematics 3A; 35335 Mathematical Methods

35335
MATHEMATICAL METHODS
6cp; 4hpw
prerequisite: 35231 Differential Equations
35340
OPERATIONS RESEARCH PRACTICE
6cp; 4hpw
prerequisites: 35241 Mathematical Programming I; 35252 Statistics 2
Financial modelling: mathematics of finance, compound interest, various types of annuities, perpetuities, bond pricing, contingent payments; consumption and investment decisions under certainty; investment decisions under uncertainty; utility theory and risk analysis, Markowitz portfolio theory; single index model; capital asset pricing model. Inventory control: economic order quantity; production lot size model; quantity discounts; shortage models; single period model; safety stock approach; service level approach; periodic review system; ABC classification; simulation models; dynamic EOQ; Wagner-Whitin algorithm and Silver-Meal heuristic; classical optimisation methods; materials requirements planning; manufacturing resource planning; Just-in-Time approach; exchange curves, forecasting models.

35342
MATHEMATICAL PROGRAMMING 2
6cp; 4hpw
prerequisite: 35241 Mathematical Programming I

35344
NETWORK OPTIMISATION
6cp; 4hpw
prerequisite: 35241 Mathematical Programming I
Transportation problems; the transportation simplex method; assignment problems; trans-shipment problems; shortest path problems; maximum flow problems; project planning and scheduling; CPM cost models; network simulation models; minimum cost network flow problems; network simplex method; out-of-kilter algorithm; algorithm analysis; auction algorithm; solution of problems using commercially available software.

35353
REgression analysis and experimental design
6cp; 4hpw
prerequisite: 35252 Statistics 2

35354
STATISTICAL INference
6cp; 4hpw
prerequisite: 35252 Statistics 2

35355
QUALITY CONTROL
6cp; 4hpw
prerequisite: 35361 Probability and Stochastic Processes
Reliability and life testing. Total Quality Control. The eight tools of TQC. Shewhart control charts. CUSUM and EWMA control charts. Economic design

**35361**
PROBABILITY AND STOCHASTIC PROCESSES
6cp; 4hpw
prerequisite: 35252 Statistics 2

**35363**
STOCHASTIC METHODS IN OPERATIONS RESEARCH
6cp; 4hpw
prerequisite: 35321 Analysis I
corequisite: 35361 Probability and Stochastic Processes
Bayesian statistics and Bayesian decision making. Monte Carlo simulation, prior distributions, decision trees and influence diagrams, conjugate distributions. Various queuing models and applications. Simulation studies, modelling systems and various representations, statistical modelling, input data analysis, verification and validation, output analysis, comparison of systems designs, random number generation and tests, random variate generation, variance reduction techniques.

**35373**
COMPUTING 3
6cp; 4hpw
prerequisite: 35272 Computing 2
The characteristics of large complex software systems and design strategies for reducing complexity. Important object-oriented approaches to software construction and their application to substantial modern projects in industry, commerce and science. The use of functional languages for prototyping, including advanced interactive and graphical programming techniques. Computational complexity and the design of efficient data structures and algorithms in functional and imperative languages. A survey of work profiles in the computing industry and review of influential social and ethical issues in its evolution.

**35376**
ADVANCED TOPICS IN COMPUTING A
6cp; 4hpw
prerequisites: see individual modules listed below, prerequisites for both modules must be satisfied.
The content of this subject will be drawn from two modules, each focusing on a particular specialist area. The modules to be offered will vary from semester to semester, depending on demand and staff availability. Modules may include: Computer Graphics, Computing Machinery, Cryptology, Formal Analysis of Business Processes, Formal Specification, High Performance Computing, Language Translation, Neural Networks.

*Module: Computer Graphics*
prerequisites: 35212 Linear Algebra; 35272 Computing 2

*Module: Computing Machinery*
prerequisite: 35272 Computing 2
Historical and social context of computing. Digital logic and digital systems. Finite state machines and their implementation in hardware. Representation of basic data types and associated machine level operations. Structure of processor units and design of a simple central processor unit. Organisation of memory and control of peripherals.
Module: Cryptology
prerequisite: 35272 Computing 2
Divisibility and prime numbers. Congruences, Fermat’s theorem. Application to primality testing and factorisation; Fermat’s and Pollard’s methods. Multiplicative functions; Euler’s function. Block ciphers, exponential ciphers, public key cryptology, knapsack ciphers.

Module: Formal Analysis of Business Processes
prerequisites: 31434 Database Design; 35272 Computing 2
Aspects of database techniques, structured system analysis and design methods, mathematical modelling and certain techniques from formal methods of specification. Applications to the analysis and design of selected business processes, including financial processes. Effective work practices and communication skills.

Module: Formal Specification
prerequisite: 35373 Computing 3
Formal linguistic systems and the mathematical basis of algebraic and model-based methods of formal specification. Software development by linguistic transformations. Notations, general principles and practical applications of methods of specification and refinement, including Z and the refinement calculus, the Vienna Development Method, the OBJ* and Larch systems, and rapid prototyping. Effective work practices and communication skills.

Module: High Performance Computing
prerequisites: 35212 Linear Algebra; 35272 Computing 2
Overview of vector and parallel computer architectures. Case studies in the application of high performance computing to industrial and research problems. Modified algorithms tailored to high performance computing: example applications drawn from linear algebra, number theory and searching.

Module: Language Translation
prerequisite: 35272 Computing 2

Module: Neural Networks
prerequisites: 35151 Statistics 1; 35171 Computing 1; 35232 Advanced Calculus; 35281 Numerical Analysis 1

35377
ADVANCED TOPICS IN COMPUTING B
6cp; 4hpw
prerequisites: as for 35376 Advanced Topics in Computing A
The content of this subject will be drawn from two of the modules described above. The modules chosen by a student for this subject shall not include a module already studied as part of 35376 Advanced Topics in Computing A. The modules to be offered will vary from semester to semester, depending on demand and staff availability.

35382
NUMERICAL ANALYSIS 2
6cp; 4hpw
prerequisite: 35281 Numerical Analysis 1
Numerical linear algebra: the algebraic eigenvalue problem, the singular value decomposition and least squares methods. Extrapolation and multistep methods for initial value problems, stiff problems. Boundary value problems: variational and finite element methods. Symbolic computation: programming styles in Mathematica (imperative, functional and rule-based), the evaluation engine, use of pattern matching,
implementation of standard symbolic and numerical packages.

**35391
SEMINAR (MATHEMATICS)**

*6cp; 4hpw
prerequisite: by arrangement*

Group studies in mathematics. The topics will vary from year to year and will be chosen in accordance with the interests of students and staff and the availability of staff.

**35392
SEMINAR (OPERATIONS RESEARCH)**

*6cp; 4hpw
prerequisite: by arrangement*

Group studies in operations research. The topics will vary from year to year and will be chosen in accordance with the interests of students and staff and the availability of staff.

**35393
SEMINAR (STATISTICS)**

*6cp; 4hpw
prerequisite: by arrangement*

Group studies in statistics. The topics will vary from year to year and will be chosen in accordance with the interests of students and staff and the availability of staff.

**35394
SEMINAR (COMPUTING)**

*6cp; 4hpw
prerequisite: by arrangement*

Group studies in computing. The topics will vary from year to year and will be chosen in accordance with the interests of students and staff and the availability of staff.

**35592–6
PROJECT**

*8–12cp
prerequisite: by arrangement*

A supervised investigation of a topic in an area of interest providing the student with additional skills of direct use in employment.

**Subjects offered by other faculties**

Students should consult the relevant faculty and its handbook for any late changes to subject information.

**22105
ACCOUNTING A**

*5cp; 3hpw
prerequisite: nil*

Introduction, setting out the nature of accounting and its relationships together with double entry bookkeeping's unique ability to record market activity. The body of the course, dealing with the accounting process (journals to ledger), double entry bookkeeping, definition of the elements of financial statements, using control accounts, control of cash, using accrual accounting, inventory, non-current assets, preparation of financial statements and the so-called limitations of the historical cost model.

**25110
MICROECONOMICS**

*5cp; 3hpw
prerequisite: nil*

25209
MACROECONOMICS
5cp; 3hpw
prerequisite: 25110 Microeconomics

25210
MICROECONOMIC POLICY
5cp; 3hpw
prerequisite: 25110 Microeconomics

25308
FINANCIAL INSTITUTIONS AND MARKETS
5cp; 3hpw
prerequisite: 25209 Macroeconomics

25314
BUSINESS FINANCE 1
5cp; 3hpw
prerequisites: 22105 Accounting A; 35151 Statistics I
corequisite: 25308 Financial Institutions and Markets
Consumption/investment decision; investment decision and techniques for evaluation. Factors affecting investment; the concept of risk, the pricing of risk, investment decisions under risk, the financing decision. Sources of finance, leasing. Capital structure theories, dividend policy.

25421
INTERNATIONAL FINANCIAL MANAGEMENT
5cp; 3hpw
prerequisites: 25308 Financial Institutions and Markets; 25314 Business Finance I
International financial management; mechanics and functions of foreign exchange markets, exchange rate determination and parity relationships, forecasting, measurement of foreign exchange risk, multi-national working capital management, trade finance, financing foreign operations, long-term asset and liability, international taxation management.

25502
CURRENT ISSUES IN FINANCE
5cp; 3hpw
prerequisite: 25314 Business Finance I

25606
FINANCIAL TIME SERIES ANALYSIS
5cp; 3hpw
prerequisites: 35232 Advanced Calculus; 35353 Regression Analysis and Experimental Design
25905
ASSET PRICING AND CAPITAL MARKET STUDIES (HONOURS)
5cp; 3hpw
prerequisite: 25314 Business Finance
The contribution of Markowitz and others to modern portfolio theory and the CAPM, including market equilibrium and efficient market assumptions; empirical tests. Relating to the CAPM and its derivatives. Arbitrage pricing theory. Pricing models for contingent claims, options and futures. Efficient capital markets, theory and evidence.

25906
INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT (HONOURS)
5cp; 3hpw
prerequisite: 25905 Asset Pricing and Capital Market Studies (Honours)

25907
ADVANCED MICROECONOMICS
4cp; 3hpw
prerequisite: by consent

25908
FUTURES AND OPTIONS
4cp; 3hpw
prerequisite: by consent

25909
ADVANCED CORPORATE FINANCE
4cp; 3hpw
prerequisite: by consent
A selection of the classic papers in corporate finance. Current research work, Australian empirical work. Major issues involved in the firm’s investment and financing decisions, the interaction of these activities and investor behaviour in the markets for the firm’s securities.

25910
THESIS
12cp
prerequisite: by consent
A thesis on a topic chosen by the student in consultation with his/her supervisor.

79101
LAW FOR BUSINESS
5cp; 3hpw
prerequisite: nil
Legal philosophy. Legal history. Constitutional law, torts, crime, property, contracts, consumer protection.
SCHOOL OF COMPUTING SCIENCES

The School offers the following courses:

UNDERGRADUATE COURSES
Bachelor of Science in Computing Science
Bachelor of Information Technology
Bachelor of Science in Computing Science/Bachelor of Laws

POSTGRADUATE COURSES
Graduate Diploma in Information Technology
Graduate Diploma in Information Technology Management
Master of Business in Information Technology Management
Master of Science in Computing (by coursework)
Master of Science (by thesis)
Doctor of Philosophy

Graduate Certificates
Graduate Certificate in Advanced Information Technology
Graduate Certificate in Applied Computing
Graduate Certificate in Computer Science
Graduate Certificate in Human–Computer Interaction
Graduate Certificate in Information Systems
Graduate Certificate in Information Technology Management
Graduate Certificate in Programming Practice
Graduate Certificate in Software Quality Assurance

ACADEMIC ADVISERS FOR 1995

UNDERGRADUATE COURSES

<table>
<thead>
<tr>
<th>Course</th>
<th>Room</th>
<th>Ext</th>
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</thead>
<tbody>
<tr>
<td>Bachelor of Science in Computing Science</td>
<td></td>
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</tr>
<tr>
<td>Mr John Colville</td>
<td>524</td>
<td>1854</td>
</tr>
<tr>
<td>Mr Jim Underwood</td>
<td>356</td>
<td>1831</td>
</tr>
<tr>
<td>Bachelor of Information Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr David Wilson</td>
<td>354</td>
<td>1832</td>
</tr>
<tr>
<td>Projects Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr Chris W Johnson</td>
<td>522</td>
<td>1855</td>
</tr>
<tr>
<td>Academic Liaison Officer (Special conditions, disability)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dr Bruce Howarth</td>
<td>530</td>
<td>1859</td>
</tr>
<tr>
<td>Electives Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr Chris W Johnson</td>
<td>522</td>
<td>1855</td>
</tr>
</tbody>
</table>

POSTGRADUATE COURSES

All Graduate Certificates
Ms Jean Robb                                                          364  1836
Graduate Diploma in Information Technology
Ms Jean Robb                                                          364  1836
Graduate Certificate, Graduate Diploma and Master of Business in Information Technology Management
Ms Jean Robb                                                          364  1836

Master of Science in Computing and Research Degrees
Professor John Debenham                                               437  1837

Each adviser has specific consultation times. These are displayed on the Ground Floor noticeboards.

COMPUTING FACILITIES

UNIVERSITY COMPUTING FACILITIES

General computing facilities available to students at UTS are offered by the Information Technology Division (ITD). The ITD facilities provide an Ethernet network which inter-connects the computing facilities available on each campus.
SCHOOL COMPUTING FACILITIES

All laboratory computing equipment within the School of Computing Sciences is inter-connected via an Ethernet Local Area Network (LAN). The communication protocol used is Transmission Control Protocol / Internet Protocol (TCP/IP).

The School is equipped with a number of network servers. Each server is uniquely named, with the principal servers within the School managing a variety of fundamental tasks. They are:

<table>
<thead>
<tr>
<th>Server</th>
<th>Type</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>linus</td>
<td>Sun 4/670MP</td>
<td>Login, X-Window, print</td>
</tr>
<tr>
<td>Schroeder</td>
<td>Sun SparcStation 10</td>
<td>Research, transputer link</td>
</tr>
<tr>
<td>Sally</td>
<td>Sun SparcStation 10</td>
<td>CPU server, X-Windows, Unikix</td>
</tr>
<tr>
<td>Charlie</td>
<td>Sun SparcStation 10</td>
<td>CPU server, X-Windows, Unikix</td>
</tr>
<tr>
<td>Woodstock</td>
<td>Sun SparcStation NEWS</td>
<td>NEWS server</td>
</tr>
</tbody>
</table>

The diverse range of computing equipment available to students within the School includes:

- Unix workstations – Sun Microsystems and Silicon Graphics
- PC compatible microcomputers
- Applix 1616 microcomputers
- Unikix OLTP

INTERFACE ROOM (ROOM 4/447)

To ensure users are able to obtain direct access to services, the Programmer on duty provides the primary point of contact for user enquiries. This person is available on a consultative basis during normal operating hours. Further information may be obtained by telephoning the Interface Room on 330 1869.

ACCESS TO COMPUTING LABORATORIES

Access to the School’s computing laboratories is directly related to courses undertaken by students or specific research activities as determined by the coordinating supervisor and the student’s research requirements.

Access privileges in respect of the School’s computing laboratories can be categorised as follows:

- General Access
- Limited Access
- Restricted Access

To ensure maximum utilisation of the School’s computing laboratories and to provide students extended hours of access, numerous laboratories have been equipped with electronic security doors, commonly referred to as E-Doors. To gain access to these laboratories a special card, referred to as an E-Card, is required. It is similar to the student identification card.

E-Cards are issued to everyone who is required to utilise the School’s computing laboratories. These can be obtained at the commencement of each semester from the Interface Room.

Students should note that it is an offence to eat or drink in the laboratories. Students found doing so will be asked to leave the laboratory and disciplinary action may be initiated by the School for repeated offences.

Hours of access to computing laboratories

Teaching and tutorial weeks

During teaching weeks and tutorial weeks the normal hours of access to computing laboratories are between 9.00 a.m. and 9.00 p.m.
Vacation and examination weeks
During vacation, and following the first week of each semester examination period, the normal hours of access to computing laboratories are between 9.00 a.m. and 6.00 p.m.

Extended hours
Extended hours of access can be obtained by using the E-Card system. Extended access is available between the hours of 7.30 a.m. and 9.00 a.m. and 9.00 p.m. and 9.45 p.m. during teaching weeks and tutorial weeks. Security staff monitor the computing laboratories during this period, and may check that occupants of a School of Computing Sciences laboratory are carrying their E-Card with them.

Access privileges for students to all computing laboratories are determined each semester by the courses undertaken. Special privileges are extended to students on an individual basis in consultation with their supervisor and the Operations Manager. The School reserves the right to restrict access to laboratories at any time.

General access computing laboratories
General access computing laboratories are available for general use by all students registered in the School of Computing Sciences.

<table>
<thead>
<tr>
<th>Level</th>
<th>Room</th>
<th>Laboratory Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>442</td>
<td>PC Laboratory 386 PC-NFS</td>
</tr>
<tr>
<td>4</td>
<td>443</td>
<td>Sun Laboratory - X-Terminals</td>
</tr>
<tr>
<td>4</td>
<td>443</td>
<td>PC Laboratory 386 PC-NFS</td>
</tr>
<tr>
<td>2</td>
<td>230</td>
<td>PC Laboratory 486 PC-NFS</td>
</tr>
</tbody>
</table>

As equipment is upgraded this may change.

Limited access computing laboratories
Limited access computing laboratories are available to students undertaking courses specifically requiring the facilities of those laboratories. These laboratories are frequently booked by teaching staff presenting specialised computing courses and are unavailable for general student activity during this period.

<table>
<thead>
<tr>
<th>Level</th>
<th>Room</th>
<th>Laboratory Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>229</td>
<td>Sun 386i Laboratory</td>
</tr>
<tr>
<td>2</td>
<td>233</td>
<td>Sun SLC Laboratory</td>
</tr>
</tbody>
</table>

Restricted access computing laboratories
Access to restricted access computing laboratories is offered to students on an individual basis as determined by teaching staff coordinating courses specifically requiring the facilities of the laboratory. These laboratories are generally restricted to research students and students undertaking special projects. They have been developed and equipped in conjunction with the Key Centre for Advanced Computing Sciences.

<table>
<thead>
<tr>
<th>Level</th>
<th>Room</th>
<th>Laboratory Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>235</td>
<td>Parallel Processing Laboratory</td>
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<tr>
<td>2</td>
<td>237</td>
<td>Distributed Database Laboratory</td>
</tr>
<tr>
<td>2</td>
<td>239</td>
<td>Computer Graphics Laboratory</td>
</tr>
</tbody>
</table>

ITD computing laboratories
The ITD maintains two laboratories within the School of Computing Sciences. Support staff of the School manage the consumables and deliver printouts. Equipment maintenance and similar services are provided by the ITD.

<table>
<thead>
<tr>
<th>Level</th>
<th>Room</th>
<th>Laboratory Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>440</td>
<td>Sun Colour Workstation Laboratory</td>
</tr>
<tr>
<td>4</td>
<td>444</td>
<td>Computer Centre PC Laboratory</td>
</tr>
</tbody>
</table>
### STAFF CONTACT LIST

All staff in the School of Computing Sciences are located in Building 4, City campus, with the exception of those with room numbers starting with 'K' (located at Kuring-gai campus).

For calls made from outside the University all extension numbers should be prefixed with the digits 330.

<table>
<thead>
<tr>
<th>Name</th>
<th>Ext</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Peter Bebbington</td>
<td>1828</td>
<td>353</td>
</tr>
<tr>
<td>Mr Jeff Clark</td>
<td>1827</td>
<td>355</td>
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<tr>
<td>Mr John Colville</td>
<td>1854</td>
<td>524</td>
</tr>
<tr>
<td>Professor John Debenham</td>
<td>1837</td>
<td>437</td>
</tr>
<tr>
<td>Director, Postgraduate Studies, and Director, Key Centre for Advanced Computing Sciences</td>
<td></td>
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<tr>
<td>Assoc Prof Jenny Edwards</td>
<td>1844</td>
<td>340</td>
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<tr>
<td>Head of School</td>
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<tr>
<td>Mr Jamal El-Den</td>
<td>1830</td>
<td>366</td>
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<tr>
<td>Dr George Feuerlicht</td>
<td>1835</td>
<td>363</td>
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<tr>
<td>Assoc Prof Michael Fry</td>
<td>1821</td>
<td>G30</td>
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<tr>
<td>Director, External Development</td>
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<tr>
<td>Mrs Judy Hammond</td>
<td>1822</td>
<td>359</td>
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<tr>
<td>Professor</td>
<td></td>
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<tr>
<td>Igor Hawryszkiewycz</td>
<td>1809</td>
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<tr>
<td>Professor Brian Henderson-Sellers</td>
<td>1189</td>
<td>338</td>
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<tr>
<td>Director, COTAR</td>
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<tr>
<td>Assoc Prof Tom Hintz</td>
<td>1865</td>
<td>548</td>
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<tr>
<td>Deputy Head of School</td>
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<tr>
<td>Dr Bruce Howarth</td>
<td>1859</td>
<td>530</td>
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<tr>
<td>Director, Undergraduate Studies</td>
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<tr>
<td>Dr Barry Jay</td>
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<td>514</td>
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<tr>
<td>Mrs Sharyn Jenner</td>
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<tr>
<td>School Administrator</td>
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<tr>
<td>Mr Sanjay Jha</td>
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<tr>
<td>Ms Deidrie Jinks</td>
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<tr>
<td>Mr Chris S Johnson</td>
<td>1834</td>
<td>360</td>
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<tr>
<td>Mr Chris W Johnson</td>
<td>1855</td>
<td>522</td>
</tr>
<tr>
<td>Mrs Elaine Lawrence</td>
<td>5482</td>
<td>K2.127</td>
</tr>
<tr>
<td>Dr Tom Osborn</td>
<td>1852</td>
<td>519</td>
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<td>Dr Robert Rist</td>
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<tr>
<td>Miss Jean Robb</td>
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<td>Mr Des Saunders</td>
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<td>Mr Lin Smith</td>
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<td>Dr Kevin Suffern</td>
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<tr>
<td>Mr Ury Szewcow</td>
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<td>Director, Australian Transputer Centre</td>
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<td>Mr John Tu</td>
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<tr>
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<td>Mr David Wilson</td>
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<tr>
<td>Mr Bernard Wong</td>
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<tr>
<td>School Office</td>
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<td>Key Centre</td>
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</tr>
<tr>
<td>Interface Room</td>
<td>1869</td>
<td>447</td>
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</table>
PRIZES
The School of Computing Sciences awards the following prizes on a yearly basis.

CABS Information Systems Case Study Prize
Established by Computer Automated Business Systems Pty Ltd, this prize is awarded annually to the group of final year students who produce the best Information Systems Case Study. The cash award of $1,000 is shared amongst all students in the group.

CSC Australia Prize for Communications
Since 1971 Computer Services Corporation Australia Pty Ltd (formerly Computer Sciences of Australia Pty Ltd) has made available an award in the interest of furthering education and knowledge in the field of information sciences. The prize is awarded to the student who achieves the best combined performance in the subjects Communications and Networks and Communications Software. The prize is a cash award of $200.

Oracle Database Prize
Established in 1994, the Oracle Database prize is awarded to the Bachelor of Science (Computing Science) student who achieves the highest aggregate mark in the subjects 31854 Distributed Databases and 31631 Database. The prize has a cash value of $400.

Westpac Information System Award
This prize was established in 1987 by the Westpac Banking Corporation. It is awarded annually to the Computing Sciences student who obtains the highest aggregate mark in Database. The successful student must be an Australian resident. The prize has a cash value of $500.

Note: The award criterion for this prize will be changed subject to approval by the Faculty Board.

UNDERGRADUATE PROGRAMS

Bachelor of Science in Computing Science (BSc)
Course code MC02
The aim of the course is to provide a sound education in all aspects of computing for students who intend to make a career in the profession. It is intended that the course will provide a suitable background covering all aspects of computing science, short of the actual design and construction of 'hardware' systems.

The course has been designed to provide for an in-depth study of computing science and its applications, and, in addition, support subjects are included to enable the graduate to fulfiil an appropriate function in the sphere of business activity. It is intended that the formal studies will be treated in a manner which will encourage initiative. Not only will the course provide a suitable framework for a professional career, it will also form a basis from which postgraduate studies may begin.

The course consists of six academic semesters of full-time study or the equivalent in part-time attendance and a period of Industrial Training.

Holders of the degree are granted exemption from the Associate examinations of the Australian Computer Society.

GRADING OF AWARDS
The School of Computing Sciences grades students for awards by a two-stage process involving first qualifying, and then grading students.

The subjects to be included in the grading process are the core subjects, excluding those normally taken during Stages 1 and 2 of the part-time course or first year of the full-time course. All core subjects must be passed. Any of those subjects which have been failed and subsequently passed will be included with a raw mark of 50 per cent.
Qualifying
Pass degree
A student with an average raw mark of 50 per cent or greater will qualify for a Pass degree.

Grading
Honours degree
The average raw marks required to achieve the Honours grades in 1993 and 1994 were:
- First Class Honours 75 per cent
- Second Class Honours 68 per cent

The grading of qualifying students is carried out by the School's Examination Review Committee on an individual basis. The Committee is provided with the following information on each qualifier:
- any failures, including subject details and whether or not a failure was of a technical nature;
- the subject details and marks for all electives undertaken;
- the time taken to complete the course in terms of stages, excluding periods of leave of absence; and
- the average mark for each stage during the course.

The policy for awarding Honours is currently under review.

INDUSTRIAL TRAINING
All students in the BSc in Computing Science are required to pass two Industrial Training subjects. There are a substantial number of prerequisites for Industrial Training which are noted in the ‘Subject Descriptions’ section. Full-time students normally undertake Industrial Training after completing Year 2 of the course, part-time students, after completing Year 4.

To gain credit for Industrial Training, students are required to obtain an approved, full-time job within the information industry. The duration of Industrial Training is a minimum of nine months for full-time students or 18 months for part-time students. During Industrial Training, students are required to behave in a professional manner, and to keep the School informed of the status of their employment at all times so that the School is able to assess their experience. Each year the School of Computing Sciences publishes an Industrial Training Student Guide (for full-time students) which sets out in detail what is required to pass the subject. Students are advised to obtain a copy of this Guide from the School Office and to study it carefully.

Although the securing of suitable employment during Industrial Training is the student's responsibility, the School provides assistance to all Industrial Training students. Students who wish to benefit from the direct assistance of the School in finding an Industrial Training position should refer to the Industrial Training Student Guide (available in April) for the procedure to be followed.

Students who wish to seek an Industrial Training position without the direct assistance of the School should first make an appointment to see the School's Cooperative Education Officer, who will provide a description of the requirements of an Industrial Training position. If a student finds employment, a second appointment must be made to see the School's Cooperative Education Officer to obtain certification that the employment is suitable for Industrial Training.

Full-time Industrial Training students are assessed by members of the academic staff who normally visit students during the first semester of their employment.

In general, students find Industrial Training extremely beneficial in relating the final year of coursework to the practical needs of the information industry, and this experience can be cited when applying for graduate career positions.

LABORATORY SESSIONS
Laboratory sessions are designed to give students formal tuition in using computer systems and to give practical experience of the coursework. Every laboratory session is attached to a specific subject. (For example, Communications
Software involves six hour’s attendance each week, lectures and tutorials for three hours and the laboratory session for three hours.) Full-time students normally have laboratory sessions totalling six hours per week scheduled in each semester, excluding the Industrial Year; and part-time students normally have laboratory sessions of three hours per week scheduled in each semester. Laboratory hours are under review.

EXEMPTIONS

Exemptions may be granted on the basis of recent academic study (within the last five years) towards a degree. Students must be able to demonstrate that the knowledge is current. Exemption from core subjects may be granted where subjects successfully completed previously coincide with BSc subjects.

Exemptions are usually processed by the School immediately following enrolment.

Exemptions for holders of TAFE Associate Diplomas

Holders of TAFE Associate Diplomas who are admitted to the course will be eligible for the following exemptions. These exemptions are currently under review.

Associate Diploma of Business
(Commercial Data Processing)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>31611</td>
<td>Information Systems (4cp)</td>
</tr>
<tr>
<td>2402C</td>
<td>Systems Analysis and Design 1</td>
</tr>
<tr>
<td>2402D</td>
<td>Computing 1</td>
</tr>
<tr>
<td>51370</td>
<td>Human Communication (3cp)</td>
</tr>
<tr>
<td>8559C</td>
<td>Business Communication</td>
</tr>
<tr>
<td>31669</td>
<td>Social Implications of Computers (3cp)</td>
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<tr>
<td>2402Y</td>
<td>Computers in Business and Society</td>
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Associate Diploma of Business
(Microcomputer Systems)

<table>
<thead>
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<th>Course Code</th>
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<tr>
<td>31611</td>
<td>Information Systems (4cp)</td>
</tr>
<tr>
<td>8519K</td>
<td>Business Systems</td>
</tr>
<tr>
<td>2403AG</td>
<td>Data Fundamentals</td>
</tr>
<tr>
<td>31648</td>
<td>Business Tools and Applications (4cp)</td>
</tr>
<tr>
<td>2403AA</td>
<td>Microcomputer Systems Usage</td>
</tr>
<tr>
<td>2403AC</td>
<td>Single-user Operating Systems</td>
</tr>
<tr>
<td>2403AD</td>
<td>Electronic Spreadsheets</td>
</tr>
<tr>
<td>2403AE</td>
<td>Database Packages</td>
</tr>
<tr>
<td>51370</td>
<td>Human Communication (3cp)</td>
</tr>
<tr>
<td>8559H</td>
<td>Business Communication Writing</td>
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<tr>
<td>8559J</td>
<td>Business Communication Organisational</td>
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Unspecified electives (24cp)

TOTAL 35cp

Associate Diploma of Business
(Records and Information Systems)

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<tr>
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<td>Information Systems (4cp)</td>
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<tr>
<td>2402H</td>
<td>Microcomputing</td>
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<tr>
<td>2421M</td>
<td>Business Information Flows</td>
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<td>2421P</td>
<td>Information Retrieval</td>
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<tr>
<td>2421U</td>
<td>Data Collection and Analysis</td>
</tr>
<tr>
<td>51370</td>
<td>Human Communication (3cp)</td>
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<tr>
<td>8559H</td>
<td>Business Communication Writing</td>
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<td>8559J</td>
<td>Business Communication Organisational</td>
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Unspecified electives (24cp)

TOTAL 31cp

Associate Diploma of Engineering
(Electrical Engineering)

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<tr>
<td>31613</td>
<td>Computer Systems Architecture 1 (4cp)</td>
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<tr>
<td>2840BC</td>
<td>Computer Principles</td>
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<tr>
<td>2840CN</td>
<td>Digital Computers 1</td>
</tr>
<tr>
<td>2840CP</td>
<td>Digital Computers 2</td>
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</tbody>
</table>
31632 Communications and Networks (4cp)
2840AL Electronic Communications Systems
2840BB Computer and Data Communications 1
2840CG Computer and Data Communications 2
31888 Logic Design (4cp)
2840AE Digital Electronics 1
2840BG Digital Electronics 2
51370 Human Communication (3cp)
6990R Vocational Communication
6990S Industrial Communication

Unspecified electives (24cp)
TOTAL 39cp

**Elective exemptions**

Exemption from electives may only be granted on the basis of recent academic study towards a degree, except for TAFE award holders. Students must be able to demonstrate to the Subject Coordinators that their knowledge is current.

At the discretion of the Director, Undergraduate Studies, exemption from some electives may be granted where a student has successfully completed:

- specific computing elective subjects where either the subject was previously completed at UTS, or the subject is substantially the same as a UTS subject in content and level;
- subjects which correspond in content and level to some subjects in a formal UTS sub-major provided that the remaining subjects in the sub-major are taken to a total of 24 credit points;
- subjects which correspond in content and level to some subjects in a coherent staged group of UTS subjects in another discipline, provided that the remaining subjects in the group are taken to a total of 20 credit points in the discipline; or
- a coherent staged group of elective subjects to which there is no equivalent at UTS.

**PROGRAM FOR STUDENTS WHO COMMENCED BEFORE 1995**

**Recommended full-time program**

Credit point values are shown in parentheses. It should be noted that these subjects are progressively being replaced by new BSc subjects.

**Year 1**

**Autumn semester**

31611 Information Systems (4cp)
31613 Computer Systems Architecture 1 (4cp)
31614 Programming Principles (5cp)
31615 Discrete Mathematics (4cp)
31617 Accounting Fundamentals (4cp)
51370 Human Communication (3cp)

**Spring semester**

31621 Systems Analysis (4cp)
31622 Commercial Programming Development (4cp)
31623 Computer Systems Architecture 2 (4cp)
31624 Data Structures and Algorithms (4cp)
31625 Software Engineering (4cp)
31626 Probability and Statistics (4cp)

**Year 2**

**Autumn semester**

31631 Database (4cp)
31632 Communications and Networks (4cp)
31633 Operating Systems (4cp)
31636 Simulation and Modelling (4cp)
CS/IS Elective 1 (4cp)
Elective 1 (4cp)

**Spring semester**

31641 Systems Design (4cp)
31642 On-line Systems (4cp)
31647 Management Control Systems (4cp)
31648 Business Tools and Applications (4cp)
CS/IS Elective 2 (4cp)
Elective 2 (4cp)

**Year 3**

**Autumn semester**

31696 Industrial Training (0cp)

**Spring semester**

31697 Industrial Training (0cp)
### Year 4

#### Autumn semester
- 31653 Communications Software (4cp)
- 31655 Theory of Computer Science (4cp)
- 31658 Project Management (4cp)
  - CS/IS Elective 3 (4cp)
  - Elective 3 (4cp)
  - Elective 4 (4cp)

#### Spring semester
- 31662 Information Systems Case Study (5cp)
- 31666 Performance Evaluation (4cp)
- 31669 Social Implications of Computers (3cp)
  - CS/IS Elective 4 (4cp)
  - Elective 5 (4cp)
  - Elective 6 (4cp)

**Recommended part-time program**

| Credit point values are shown in parentheses. It should be noted that these subjects are progressively being replaced by new BSc subjects. |

### Year 1

#### Autumn semester
- 31611 Information Systems (4cp)
- 31615 Discrete Mathematics (4cp)
- 31617 Accounting Fundamentals (4cp)

#### Spring semester
- 31613 Computer Systems Architecture 1 (4cp)
- 31614 Programming Principles (5cp)
- 51370 Human Communication (3cp)

### Year 2

#### Autumn semester
- 31621 Systems Analysis (4cp)
- 31622 Commercial Programming Development (4cp)
- 31623 Computer Systems Architecture 2 (4cp)

#### Spring semester
- 31624 Data Structures and Algorithms (4cp)
- 31625 Software Engineering (4cp)
- 31631 Database (4cp)

### Year 3

#### Autumn semester
- 31632 Communications and Networks (4cp)

- CS/IS Elective 1 (4cp)
- Elective 1 (4cp)

#### Spring semester
- 31626 Probability and Statistics (4cp)
- 31648 Business Tools and Applications (4cp)
- 31633 Operating Systems (4cp)

### Year 4

#### Autumn semester
- 31641 Systems Design (4cp)
- 31642 On-line Systems (4cp)
  - CS/IS Elective 2 (4cp)

#### Spring semester
- 31636 Simulation and Modelling (4cp)
- 31647 Management Control Systems (4cp)
  - Elective 2 (4cp)

### Year 5

#### Autumn semester
- 31655 Theory of Computer Science (4cp)
- 31658 Project Management (4cp)
  - CS/IS Elective 3 (4cp)
- 31698 Industrial Training (0cp)

#### Spring semester
- 31653 Communications Software (4cp)
  - Elective 3 (4cp)
  - Elective 4 (4cp)
- 31698 Industrial Training (0cp)

### Year 6

#### Autumn semester
- 31669 Social Implications of Computers (3cp)
- 31666 Performance Evaluation (4cp)
  - CS/IS Elective 4 (4cp)
- 31699 Industrial Training (0cp)

#### Spring semester
- 31662 Information Systems Case Study (5cp)
- 31699 Industrial Training (0cp)
  - Elective 5 (4cp)
  - Elective 6 (4cp)

### Pre-1989 course

Students who commenced the BSc prior to 1989 should consult the School Office to determine their course program.
ELECTIVES

Electives provide the opportunity for students to include in their program some advanced computing subjects, subjects of personal interest which need not be related to computing, or subjects to form a sub-major in another discipline. A total of 40 credit points is allocated to elective subjects.

A student is required to take:

- A computing elective stream of 16 credit points. These may be chosen from Information Systems, Computer Science, or both. However, a strand taken predominantly from a single area is preferred over a collection of unrelated subjects.

- A further stream of 24 credit points which will be one of the following:
  a) a formal sub-major of 24 credit points from a UTS faculty;
  or
  b) at the discretion of the Director, Undergraduate Studies or the Electives Coordinator, a number of subjects from another UTS discipline or another institution, at least 20 credit points of which form a coherent staged group. A staged group is one where there is a pattern of prerequisites between the subjects that shows progression of at least three levels. A coherent group is one in which all subjects are from the one area of knowledge. This may leave the student with four credit points to take a ‘free’ subject from any discipline. A list of projects nominated by various staff members may be viewed on the Suns, by logging in as projects and following the instructions. Students should also fill out a Project Registration form, available from the Projects Coordinator, who will answer any enquiries.
  or
  c) at least 16 credit points of electives from the School of Computing Sciences (in addition to the 16 compulsory School of Computing Sciences elective credit points referred to above). This choice will leave students with up to eight ‘free’ credit points to complete the 24 credit points of ‘other’ electives required to complete Part 2.

Electives from other universities

Students wishing to do electives outside the University must see the Electives Coordinator to discuss the proposal. Special approval must be sought well before the intended semester of study. Students may undertake subjects outside the University as electives only if no comparable subject is offered by the University.

PROJECTS

In lieu of elective(s) students may take one four-credit-point project, two four-credit-point projects, or one eight-credit-point project over one, or two, semesters. In many cases, these projects may be completed over the Christmas or between-semester breaks, if desired. Please note that a maximum of eight credit points may be taken as projects.

A list of projects nominated by various staff members may be viewed on the Suns, by logging in as projects and following the instructions. Students should also fill out a Project Registration form, available from the Projects Coordinator, who will answer any enquiries. Students who have their own ideas for projects may approach relevant staff members to be their supervisors and must also see the Projects Coordinator for approval. Enrolment will not be approved without a completed Project Registration form.

Students may not use as a project work done in the normal course of duties as an Industrial Training student or as a part-time student. However, a student may do a project which is related to work if it is done outside of normal work hours. In this case, the student’s work supervisor would probably become a joint supervisor of the project.

As a general guide, a student doing a four-credit-point project is expected to spend a minimum of eight hours a week on the project.

Students should refer to the Pre-1995 Bachelor of Science prerequisite chart.
A horizontal arrow Subject 2 from Subject 1 means that Subject 2 cannot be done before Subject 1.

**Prerequisites for Industrial Training** are that four full-time semesters or equivalent should have been completed and, before registering, students must have passed (or been exempted from) a minimum of 13 core subjects including Systems Analysis, Commercial Programming Development, Operating Systems, Data Structures & Algorithms, Human Communication and all their prerequisites.
TRANSFER ARRANGEMENTS

The programs that students should undertake, according to their year of commencement and attendance pattern, are shown in the table below:

**Full-time**

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<td>new 4F</td>
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**Part-time**

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<td>old 6P</td>
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<tr>
<td>1992</td>
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<td>new 5P</td>
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<tr>
<td>1995</td>
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<td>new 2P</td>
<td>new 3P</td>
<td>new 4P</td>
<td>new 5P</td>
<td>new 6P</td>
</tr>
</tbody>
</table>

Note: 1F indicates the first year of full-time study, 2P indicates the second year of part-time study etc.

1 These students will take an elective instead of 31447 Accounting Information Systems.
2 These students will take 31425 Principles of Software Development B instead of 31424 Systems Modelling.

**APPROXIMATE EQUIVALENTS BETWEEN PRE-1995 AND 1995 BSc SUBJECTS**

<table>
<thead>
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<th>From 1995</th>
<th>Pre-1995</th>
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<tr>
<td>31414 Information Systems</td>
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<td>31621 Systems Analysis</td>
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<td>31415 Principles of Software Development A</td>
<td>31614 Programming Principles</td>
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<td>31615 Discrete Mathematics</td>
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<tr>
<td>31416 Computer Systems Architecture</td>
<td>31613 Computer Systems Architecture 1</td>
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<td>31623 Computer Systems Architecture 2</td>
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<td>31417 Computing Practice</td>
<td>No Equivalent</td>
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<td>31621 Systems Analysis</td>
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<td>31641 Systems Design</td>
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<td>31858 Object-oriented Analysis and Design</td>
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<td>31425 Principles of Software Development B</td>
<td>31624 Data Structure and Algorithms</td>
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<td>31464 IT Planning and Design</td>
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PROGRAM FOR STUDENTS WHO COMMENCE IN 1995

Recommended full-time program
Credit point values are shown in parentheses.

<table>
<thead>
<tr>
<th>Year</th>
<th>Autumn semester</th>
<th>Spring semester</th>
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<td>31414 Information Systems (6cp)</td>
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Recommended part-time program
Credit point values are shown in parentheses.

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<th>Spring semester</th>
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**Spring semester**
31455 Software Development Case Study (5cp) (subject continues)  
Elective (4cp)  
31698 Industrial Training (0cp)

**Year 6**

**Autumn semester**
31454 Project Management and the Professional (8cp)  
Elective (4cp)  
31699 Industrial Training (0cp)

**Spring semester**
31464 Information Technology Planning and Design (6cp)  
Electives (8cp)  
31699 Industrial Training (0cp)

**ELECTIVES**

Students must do a minimum of 44 credit points of electives, of which 16 credit points must be taken from the School of Computing Sciences. The remaining elective credit points (minimum 28) may also be taken from the School of Computing Sciences. Alternatively, a student may opt to take a coherent staged group of subjects, normally a formally approved sub-major from another school or faculty. Typically, these are from the Faculties of Business, Engineering and Humanities and Social Sciences and the Schools of Mathematical Sciences and Physical Sciences. (It should be noted that the norm for electives is 44 credit points, but as subjects in other faculties have a variety of credit points, a student's elective credit points may exceed 44.)

Students should refer to the Post-1995 Bachelor of Science prerequisite chart on page 65.

**PROJECTS**

Refer to Pre-1995 project information on page 61.

**SUB-MAJORS**

**Mathematics**
Credit points: 24  
Contact person: Mr J Hogg  
Phone: 330 2238; Room: 1522, Building 1

**· Operations Research**

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<td>35340</td>
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**Statistics**

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<td>35353</td>
<td>Regression Analysis and Experimental Design</td>
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<td>35361</td>
<td>Probability and Stochastic Processes</td>
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With the exception of the subject pair 33401 Mathematics (Computing Science) and 35241 Mathematical Programming 1, students are not permitted to take individual subjects from the School of Mathematical Sciences but must enrol for a sub-major.

**Humanities**

Credit points: 24 (minimum)  
Contact person: Ms K Fry  
Phone: 330 2291; Room: 408, Building 3

Students entering or completing a sub-major in Humanities should seek academic advice from the School of Humanities concerning their progression. Owing to course reviews in the School of Humanities, some listed subjects may not be available. New Humanities sub-majors for Computing Science students are currently being developed. Initial enquiries should be directed to Kate Wilson, phone 330 2277.

The School of Humanities offers the following sub-majors to Computing Science students. These sub-majors are structured into two levels. Students
Prerequisites for Industrial Training are: Systems Design and Development and its prerequisites, and Systems Software and Networks and its prerequisites.
must take the compulsory introductory three-credit-point unit, and at least 24 credit points drawn from Level 200 and Level 300. At least six credit points must be at Level 200 and at least six credit points must be at Level 300.

Students who commenced Humanities sub-majors before 1993 should consult the School of Humanities concerning equivalents.

- **Communication, History, Politics and Society**

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<td>50712</td>
<td>Communication Skills in English</td>
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<td>59326</td>
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<td>59325</td>
<td>Science, Technology and Human Values</td>
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<td>53203</td>
<td>Communication and Control</td>
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<td>53204</td>
<td>Social and Political Theory</td>
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<td>53205</td>
<td>Australian Politics</td>
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<td>53208</td>
<td>Energy and Environment</td>
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<td>53209</td>
<td>Culture, Race and Ethnicity</td>
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<td>53211</td>
<td>Urban Culture</td>
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<td>Australian History</td>
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- **Public Relations**

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<td>51370</td>
<td>Human Communication</td>
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<td>53240</td>
<td>PR: Process and Practice (compulsory unit)</td>
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<td>PR: Research and Communication</td>
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<td>50357</td>
<td>Community Relations</td>
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<td>PR: Issues and Management</td>
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As part of the course requirements in Public Relations, students undertake an internship, under the guidance of a public relations professional, during the course of study for a sub-major in Public Relations. Details of this should be
discussed with the Public Relations Coordinator in the School of Humanities.

Business

The following sub-majors are offered to Computing Science students by the Faculty of Business. Note that Computing Science students are not permitted to take the Business Information Systems sub-major.

Students are advised to check the Faculty of Business timetable, at the time of enrolment, for any changes in subject numbers/names. Prerequisites are shown in parentheses.

- **Advertising Management**

Credit points: 25
Coordinator: Dr P Emerson
Phone: 330 3530; Room: C216, Building 5

Students undertaking the Advertising sub-major will be aiming to develop their managerial skills for careers in marketing and advertising. There are specific applications to product management, advertising and advertising planning/strategy for agency executives.

The subjects included in this sub-major take students from an understanding of Buyer Behaviour through Advertising Management, to research applications in the form of Advertising Research Methods. This is followed by the Advertising Project, in which a student as part of a small team, undertakes a complete brief from an advertising agency or client and uses all the tools learnt in this major in real-life application.

It also proposes a model by which advertising can be more predictable and successful.

**Subject Subject number name CP HPW**

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<th>Compulsory subjects</th>
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<tr>
<td>24202 Buyer Behaviour (24105) 5 3</td>
</tr>
<tr>
<td>24210 Advertising Management (24202) 5 3</td>
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<tr>
<td>24510 Advertising Research Methods (26122, 24210) 5 3</td>
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- **Banking**

Credit points: 25
Coordinator: Mr R Trayler
Phone: 330 3617; Room: C414, Building 5

**Subject Subject number name CP HPW**

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<th>Compulsory subjects</th>
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<tr>
<td>25308 Financial Institutions and Markets 5 3</td>
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<tr>
<td>25314 Business Finance 1 (31428, 25106, corequisite 25308) 5 3</td>
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<tr>
<td>25409 Commercial Banking and Finance 5 3</td>
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<tr>
<td>25503 Bank Lending (25314) 5 3</td>
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</table>

- **Economics**

Credit points: 25
Coordinator: Associate Professor H Pritchard
Phone: 330 5451; Room: 4.415, Kuring-gai campus

**Subject Subject number name CP HPW**

<table>
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<th>Compulsory subjects</th>
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<td>25110 Microeconomics 5 3</td>
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<tr>
<td>25209 Macroeconomics 5 3</td>
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**plus any three of the following (subject to prerequisite rules)**

| 25210 Microeconomic Policy (25110) 5 3 |
| 25303 Industry Economics (25210) 5 3 |
| 25304 Asian–Australian Economic Relations (25110, 25209) 5 3 |
| 25305 Labour Market Economics (25209) 5 3 |
| 25307 Public Finance (25209) 5 3 |
| 25309 Macroeconomic Policy (25209) 5 3 |
| 25315 International Economics (25209) 5 3 |
Note: The subject 25304 Asian–Australian Economics is only available at the City campus. The subject 25307 Public Finance is only available at the Kuring-gai campus.

• **Finance**

Credit points: 25
Coordinator: Mrs W Bui
Phone: 330 3614; Room: C411, Building 5

<table>
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<td>Advanced Financial Instruments (25308)</td>
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• **Human Resources Management**

Credit points: 25 (minimum)
Coordinator: Mr B Connor
Phone: 330 3645; Room: C438, Building 5

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<td>21306</td>
<td>Employment Relations 5</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

*Please note prerequisite rules*

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>21407</td>
<td>Strategic Human Resource Management (21306)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>21408</td>
<td>Employment Relations Skills (21306)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>21430</td>
<td>Advanced Industrial Relations (21306)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>79270</td>
<td>Industrial and Labour Law (79101)</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

• **International Business**

Credit points: 25
Coordinator: Mr R Fletcher
Phone: 330 3537; Room: C225, Building 5

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>24105</td>
<td>Principles of Marketing</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>25106</td>
<td>Economics</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

*plus any three of the following (subject to prerequisite rules)*

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>21591</td>
<td>International Management</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>24220</td>
<td>International Marketing (24105)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>25315</td>
<td>International Economics (25106)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>25304</td>
<td>Asian–Australian Economic Relations (25106)</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

• **International Marketing**

Credit points: 25
Coordinator: Mr R Fletcher
Phone: 330 3537; Room: C225, Building 5

The International Marketing Country Study is an elective subject offered over two semesters involving considerable commitment on the student's part. There are therefore two options within the International Marketing sub-major.

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>24105</td>
<td>Principles of Marketing</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>24220</td>
<td>International Marketing</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

*Prerequisites*

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>21405</td>
<td>Principles of Marketing</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>24220</td>
<td>International Marketing</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

**Option 1**

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>24517</td>
<td>Contemporary Issues in International Marketing</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>24518</td>
<td>International Marketing Country Study</td>
<td>10</td>
<td>3</td>
</tr>
</tbody>
</table>

*Compulsory subjects*
Option 2

<table>
<thead>
<tr>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory subjects</td>
<td></td>
</tr>
<tr>
<td>24517</td>
<td>Contemporary Issues in International Marketing</td>
</tr>
<tr>
<td>24607</td>
<td>International Marketing Management Project</td>
</tr>
</tbody>
</table>

**plus one elective subject from the following**

<table>
<thead>
<tr>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>21517</td>
<td>International Management</td>
</tr>
<tr>
<td>25304</td>
<td>Asian–Australian Economic Relations</td>
</tr>
<tr>
<td>25315</td>
<td>International Economics</td>
</tr>
</tbody>
</table>

**or any other International subject approved by the Head, School of Marketing, including a language.**

Note: The subject 24518 International Marketing Country Study is a full-year subject, commencing in the Autumn semester and extending till the end of the Spring semester in the same year.

- **Leisure Studies**

Credit points: 25
Coordinator: Mr B Hayllar
Phone: 330 5111; Room: 5.218 Kuring-gai campus

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
</tr>
</thead>
<tbody>
<tr>
<td>27126</td>
<td>Leisure in Australia</td>
</tr>
<tr>
<td>27216</td>
<td>Leisure Services Management</td>
</tr>
</tbody>
</table>

**plus any three of the following (subject to prerequisite rules)**

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
</tr>
</thead>
<tbody>
<tr>
<td>27132</td>
<td>Community Fitness and Lifestyle 1</td>
</tr>
<tr>
<td>27223</td>
<td>Leisure Program Planning</td>
</tr>
<tr>
<td>27323</td>
<td>Leisure and Public Policy</td>
</tr>
<tr>
<td>27523</td>
<td>Leisure and Tourism Planning</td>
</tr>
<tr>
<td>27610</td>
<td>Recreation Facility Design and Management</td>
</tr>
<tr>
<td>27628</td>
<td>Law for Leisure, Sport and Tourism</td>
</tr>
</tbody>
</table>

- **Management**

Credit points: 25
Coordinator: Mr N Barnwell
Phone: 330 3612; Room: C409, Building 5

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
</tr>
</thead>
<tbody>
<tr>
<td>21125</td>
<td>Australian Business Environment</td>
</tr>
<tr>
<td>21130</td>
<td>Organisational Behaviour</td>
</tr>
</tbody>
</table>

**plus any three of the following (subject to prerequisite rules)**

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
</tr>
</thead>
<tbody>
<tr>
<td>21131</td>
<td>Operations Management</td>
</tr>
<tr>
<td>21306</td>
<td>Employment Relations</td>
</tr>
<tr>
<td>21210</td>
<td>Business and Government (21125)</td>
</tr>
<tr>
<td>21221</td>
<td>Organisational Design and Change (21130)</td>
</tr>
<tr>
<td>21591</td>
<td>International Management</td>
</tr>
</tbody>
</table>

- **Law**

- **Business Law**

Credit points: 28
Coordinator: Associate Professor K Cutbush-Sabine
Phone: 330 3442; Room: B336, Building 5

The purpose of this sub-major is to enable students to gain recognition for acquiring detailed knowledge in a group of specialist subjects with direct relevance to business. Such a concentrated course of learning develops a better understanding of intricate legal issues and facilitates planning of current and future commercial strategy.
### Compulsory subjects

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>79101</td>
<td>Law for Business</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>79267</td>
<td>Commercial Law</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

plus any three of the following (subject to prerequisite rules)

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>79263</td>
<td>Marketing and Consumer Protection</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79265</td>
<td>Administrative Law 1</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79266</td>
<td>Administrative Law 2</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79270</td>
<td>Industrial and Labour Law (79101)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79360</td>
<td>Insurance Contracts</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79363</td>
<td>Life Insurance Law (79101)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79364</td>
<td>Advanced Industrial and Labour Law</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79365</td>
<td>Company Law (79267)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79366</td>
<td>Banking Law (79101)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79368</td>
<td>Commercial Contracts</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79369</td>
<td>Elements of Contract</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79411</td>
<td>Advanced Companies and Securities Law</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79466</td>
<td>Trade Law (79101)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79468</td>
<td>Equity and Trusts</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79612</td>
<td>Corporate Control and Power (79101)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79666</td>
<td>Advanced Income Tax Law</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79667</td>
<td>Indirect Taxation (79101)</td>
<td>6</td>
<td>3</td>
</tr>
</tbody>
</table>

### Finance Law (Faculty of Law and Legal Practice and School of Finance and Economics)

Credit points: 26  
Coordinator: Mr M Adams  
Phone: 330 3451; Room: C314, Building 5

The objectives of the Finance Law sub-major are:

- to develop specialist knowledge of the legal framework regulating the finance industry;
- to provide students with a practical knowledge of existing regulations and an understanding of the legal ramifications of financial transactions to enable them to fulfil their legal responsibilities with the finance industry; and
- to appreciate the dynamic nature of the development of laws and regulations within the finance industry in a practical context and to enable informed discussion in respect of future reforms.

In addition to 7910! Law for Business students are required to take the following four units:

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>HPW</th>
</tr>
</thead>
<tbody>
<tr>
<td>25607</td>
<td>Securities Market Regulation (25314)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>School of Finance and Economics, and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>79101 School of Law</td>
<td></td>
<td></td>
</tr>
<tr>
<td>79366</td>
<td>Banking Law (79101)</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>79462</td>
<td>Revenue Law (79101)</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>79502</td>
<td>Law and Finance</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

### Physics

Credit points: 24 (minimum)  
Coordinator: Dr G Anstis  
Phone: 330 2193; Room: 1118, Building 1

Students who commenced Physics sub-majors before 1993 should contact Dr G Anstis in the Department of Applied Physics, Faculty of Science, for details of transitional arrangements due to the introduction of credit points. Remember that four credit points will be awarded for every three hours of electives completed up to the end of 1992. The Department of Applied Physics offers two sub-majors to Computing Science students. Interested students should first study this section and then, if further advice is needed, consult Dr Anstis.

**Registration** At the beginning of each semester in which a student takes a Physics subject, he/she should register with the Department of Applied Physics by completing a form on or before re-enrolment day at the office of Dr G Anstis.

**Students will also need to officially enrol in the subject(s); this is done on re-enrolment day through the School of Computing Sciences.**

Students should remember when planning ahead that some subjects are available in one semester only.
• **Physics (General)**

This sub-major provides the grounding in general physics or the possibility of advanced study in a specialised area such as materials physics or solid state physics. It is of benefit to students contemplating a career in programming of scientific and engineering problems.

The minimum of 24 credit points may be made up as follows:

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>68711</td>
<td>Physics 1 S</td>
<td></td>
<td>A,S</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>68721</td>
<td>Physics 2 S</td>
<td></td>
<td>A,S</td>
<td>8</td>
<td>6 Physics 1 or permission</td>
</tr>
</tbody>
</table>

*plus at least eight credit points from the following*

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>68731</td>
<td>Physics 3 S</td>
<td></td>
<td>A</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>68732</td>
<td>Applied Optics S</td>
<td></td>
<td>A</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>68743</td>
<td>Thermodynamics and Energy S</td>
<td></td>
<td>S</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>68741</td>
<td>Quantum Physics 1 S</td>
<td></td>
<td>S</td>
<td>4</td>
<td>3 Quantum Physics 1 S Mathematics</td>
</tr>
<tr>
<td>68751</td>
<td>Nuclear Physics S</td>
<td></td>
<td>A</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

• **Electronics**

This sub-major enables students to complement knowledge of software with a knowledge of hardware. It is useful to students contemplating a career in the areas of microprocessors and computer interfacing.

The minimum of 24 credit points may be made up as follows:

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>68713</td>
<td>Physics for Electronics S</td>
<td></td>
<td>A</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>68734</td>
<td>Electronics 1 S</td>
<td></td>
<td>A</td>
<td>8</td>
<td>6 Physics 2 S or Eng Physics (Civil) S</td>
</tr>
</tbody>
</table>

*plus at least eight credit points to be chosen from the following*

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>68744</td>
<td>Electronics 2 S</td>
<td></td>
<td>S</td>
<td>4</td>
<td>3 Electronics 1 S</td>
</tr>
<tr>
<td>68754</td>
<td>Microprocessors in Instrumentation S</td>
<td></td>
<td>A</td>
<td>4</td>
<td>3 Electronics 2 S or Electronics 1 S and Logic Design 1</td>
</tr>
<tr>
<td>68764</td>
<td>Principles of Instrumentation S</td>
<td></td>
<td>S</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: 68744 Electronics 2 S is the preferred subject because it emphasises hardware. Full-time students with an average mark below 55 can only do 68744 Electronics 2 S in their Industrial year.
Electrical Computer Systems

Credit points: 19
Contact person: Ms E With
Phone: 330 2432; Room: 2423, Building 1

The School of Electrical Engineering offers an Electrical Computer Systems sub-major to Computing Science students.

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Compulsory subjects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33401</td>
<td>Mathematics (Computing Science)</td>
<td>A</td>
<td>4</td>
<td>3</td>
<td>31415, 31428</td>
</tr>
<tr>
<td>45113</td>
<td>Digital Techniques</td>
<td>A,S</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>45143</td>
<td>Computer Hardware</td>
<td>A,S</td>
<td>3</td>
<td>3</td>
<td>45113</td>
</tr>
<tr>
<td>45163</td>
<td>Real Time Software and Interfacing</td>
<td>A,S</td>
<td>3</td>
<td>3</td>
<td>45143</td>
</tr>
<tr>
<td>45364</td>
<td>Digital Systems</td>
<td>A,S</td>
<td>3</td>
<td>3</td>
<td>45143</td>
</tr>
<tr>
<td>45372</td>
<td>Computer-Systems Analysis</td>
<td>S</td>
<td>3</td>
<td>3</td>
<td>45143, 33401</td>
</tr>
</tbody>
</table>

Note: One of the subjects in this sub-major is 33401 Mathematics (Computing Science) offered by the School of Mathematical Sciences.

The normal program for a full-time student would be:

**Autumn** | **Spring**
---|---
Year 2 | Mathematics (Computing Sciences) Digital Techniques Computer Hardware
Year 4 | Real Time Software and Interfacing Digital Systems Computer-Systems Analysis

The normal program for a part-time student would be:

**Autumn** | **Spring**
---|---
Year 3 | Mathematics (Computing Sciences) Digital Techniques
Year 4 | Computer Hardware Computer Hardware (Alternative)
Year 5 | Real Time Software and Interfacing Digital Systems
Year 6 | Computer-Systems Analysis Digital Systems (Alternative)
The School of Information Studies at the Kuring-gai campus offers the following sub-majors to Computing students.

**Information Studies**

- **Credit points:** 24
- **Contact person:** Ms J Houghton
- **Phone:** 330 5462; **Room:** 2.330, Kuring-gai campus

<table>
<thead>
<tr>
<th>Subject</th>
<th>Subject name</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>55040</td>
<td>Information Science 1: Foundations of Information Science</td>
<td>6</td>
</tr>
<tr>
<td>55041</td>
<td>Information Science 2: User Behaviour</td>
<td>6</td>
</tr>
</tbody>
</table>

*plus one of the following groups of subjects*

- 55043 Information Science 4: Information Retrieval
- 55042 Information Science 3: Organisation of Information

*or*

- 55024 Information Production
- 55075 Information Resources and Collections

**Communication Studies**

- **Credit points:** 24
- **Contact person:** Ms C Bailey
- **Phone:** 330 5221; **Room:** 2.467 Kuring-gai campus

<table>
<thead>
<tr>
<th>Subject</th>
<th>Subject name</th>
<th>CP</th>
</tr>
</thead>
<tbody>
<tr>
<td>56001</td>
<td>Communication 1: Foundations of Communication</td>
<td>6</td>
</tr>
<tr>
<td>56002</td>
<td>Communication 2: Group Communication</td>
<td>6</td>
</tr>
</tbody>
</table>

*plus one of the following groups of subjects*

- 56004 Communication 4: Public Communication
- 56003 Communication 3: Organisational Communication

*or*

- 55010 Psychology
- 55023 Communication and Information Skills

*or*

- 55090 Publishing
- 56010 Video Production
Bachelor of Information Technology (BInfTech)

Course code MC03

This course is a cooperative education program in computer information systems and has been developed by the School of Computing Sciences in cooperation with a group of private and public sector employers. The course is of three years’ duration and involves four semesters of full-time study at the University and two semesters of full-time study and practical experience in industry. The industry-based semesters are of 24 weeks’ duration, and a 42-week academic year is the norm for the course.

<table>
<thead>
<tr>
<th>Year</th>
<th>Semester 1</th>
<th>Semester 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UTS</td>
<td>Industry</td>
</tr>
<tr>
<td>2</td>
<td>UTS</td>
<td>UTS</td>
</tr>
<tr>
<td>3</td>
<td>Industry</td>
<td>UTS</td>
</tr>
</tbody>
</table>

The program differs from existing cooperative education courses in that, during the industry-based semesters, students will follow a structured program designed jointly by the University and the employer group, including formal coursework taught in industry. This coursework is assessed to University and business standards and familiarises students with business needs and requirements. During the industry-based semesters students will be exposed to real problems within an environment quite different from that of the University. The resources of industry will be available to support the education of students.

The central curriculum of the course is information systems; this is supported by studies in management, accounting, finance and marketing as well as the necessary background subjects in computing science and programming. The active participation of industry practitioners in course design and course delivery will further ensure that graduates of the course are well equipped with skills relevant to present and future industry needs.

The two industry-based semesters will be spent with two different companies. Students are not employees of the company, and will not be obliged to find employment with a given company on completion of their studies. Nevertheless students are encouraged to find employment within the group of sponsoring employers.

The number of students admitted each year will be limited by the number of sponsorship commitments secured from employers, to a maximum of 50 places.

Each student admitted to the course will receive a scholarship for the duration of the course, subject to satisfactory performance and to certain conditions detailed further in this handbook. Each of the industry partners undertakes to sponsor a stated number of students, and contributes the full amount of their scholarship to a fund administered by the University.

The industry partners also provide the industry-based semester facilities for each of the students that they sponsor.

Selection to the course is based on HSC results and on performance at an interview. Interviews are conducted by panels comprising representatives of the University and the industry group. Applicants will be assessed for their suitability to the industrial as well as the academic components of the course.

GRADING OF AWARDS

The School of Computing Sciences grades students for awards by a two-stage process involving first qualifying and then grading students.

Only core subjects, with the exception of the industry-based semester and Contemporary Information Technology 1 and 2, are included in the grading process.

Grading of degree

A student with an average raw mark of 50 per cent or greater will qualify for a pass degree, degree with credit, or degree with distinction, depending on their overall raw mark and performance in the final industry-based semester.

The grading of qualifying students is carried out by the School’s Examination
Review Committee on an individual basis. This committee takes account of input from the BIniTech Course Steering Committee. The Examination Review Committee is provided with the same information as that made available for the grading of BSc in Computing Science students, with one important addition:

- overall assessment, by industry, of the final industry-based semester.

PROGRAM FOR STUDENTS WHO COMMENCED BEFORE 1995

Credit point values are shown in parentheses. It should be noted that these subjects are being progressively replaced.

**Year 1**

**Autumn semester—UTS**
- 31611 Information Systems (4cp)
- 31613 Computer Systems Architecture 1 (4cp)
- 31614 Programming Principles (5cp)
- 31615 Discrete Mathematics (4cp)
- 31617 Accounting Fundamentals (4cp)
- 31621 Systems Analysis (4cp)

**Spring semester—Industry**
- 31722 Commercial Programming (5cp)
- 31770 Industry Project 1 (5cp)
- 31771 Business Requirements Analysis (5cp)
- 31779 Applications of Information Technology 1 (5cp)

**Year 2**

**Autumn semester—UTS**
- 25106 Economics (5cp)
- 24105 Principles of Marketing (5cp)
- 31631 Database (4cp)
- 31632 Communications and Networks (4cp)
- 31633 Operating Systems (4cp)
- 31738 Management Principles for IT Professionals (4cp)

**Winter**
- 31780 Industry Studies (6cp)

**Spring semester—UTS**
- 31725 Software Engineering (4cp)
- 31626 Probability and Statistics (4cp)
- 31641 Systems Design (4cp)
- 31642 On-line Systems (4cp)
- 31647 Management Control Systems (4cp)
- 31788 Organisation Theory for IT Professionals (4cp)

**Year 3**

**Autumn semester—industry**
- 31756 Project Management (5cp)
- 31781 Business Systems Design (5cp)
- 31789 Applications of Information Technology 2 (5cp)
- 31790 Industry Project 2 (5cp)

**Spring semester—UTS**
- 25301 Financial Management (5cp)
- 31762 Technology Planning (5cp)
- 31766 Performance Modelling and Management (4cp)
- 31902 Auditing the Computer (4cp)
- 31768 Business Planning for IT Professionals (4cp)
- 31669 Social Implications of Computers (3cp)

Note: The subject 31780 Industry Studies requires a commitment of time over the winter period (Year 2) in order to complete the 42-week requirement of the course.

TRANSFER ARRANGEMENTS

Students who commenced the course in 1993 or 1994 will remain in the old course.

PROGRAM FOR STUDENTS WHO COMMENCE IN 1995

Credit point values are shown in parentheses.

**Year 1**

**Autumn semester—UTS**
- 31414 Information Systems (6cp)
- 31415 Principles of Software Development A (6cp)
- 31416 Computer Systems Architecture (6cp)

**Spring semester—UTS**
- 31722 Commercial Programming (5cp)
- 31770 Industry Project 1 (5cp)
- 31771 Business Requirements Analysis (5cp)
- 31779 Applications of Information Technology 1 (5cp)
Summer
31729 Information Systems Practice (2cp)

Year 2

Autumn semester–UTS
31434 Database Design (6cp)
31436 Systems Software and Networks (6cp)
31734 Information Systems and Organisations (4cp)
31737 Business Process Transformation (4cp)
31447 Accounting Information Systems (4cp)

Spring semester–UTS
25301 Financial Management (5cp)
31424 Systems Modelling (6cp)
31444 Systems Design and Development (10cp)
31443 Distributed Databases and Client–Server Computing (4cp)
Elective (4cp)

Year 3

Autumn semester–Industry
31756 Project Management (5cp)
31781 Business Systems Design (5cp)
31789 Applications of Information Technology 2 (5cp)
31790 Industry Project 2 (5cp)

Spring semester–UTS
24105 Principles of Marketing (5cp)
31464 Information Technology Planning and Design (6cp)
31764 Information Technology Strategy (4cp)
31769 Contemporary Information Technology 2 (4cp)
Elective (4cp)

Note: The subject 31729 Information Systems Practice requires a commitment of time over the summer period between Years 1 and 2 in order to complete the 42-week requirement of the course.

ELECTIVES
Electives may be taken from the Faculty of Business or the School of Computing Sciences, subject to the approval of the BlinfTech Coordinator.

SPECIAL CONDITIONS
There are special conditions relating to students enrolled in the Bachelor of Information Technology.

Leave of absence will not normally be granted to students, except under extraordinary circumstances and subject to satisfactory arrangements being possible. Likewise, withdrawal from the course and subsequent re-admission is not normally granted. Students are reminded that withdrawal without penalty from any course at the University is only possible up to the deadlines imposed by the University. After such deadlines, students will be expected to complete all assessment tasks for subjects in which they are enrolled.

Variations to the approved program of study for the Bachelor of Information Technology are restricted. No industry-based subject may be deleted from the program, except under extraordinary circumstances and at the discretion of the Course Steering Committee and the School of Computing Sciences. No industry-based subject can be taken during a university-based semester. The taking of additional subjects during an industry-based semester is seen as unusual and may only be done at the discretion of the Course Steering Committee and the School.

The School will not recommend probation for unsatisfactory academic performance. Instead, the School will recommend to the Faculty Board that a student be excluded under any of the following circumstances:

- a student fails any subject for the second time;
- a student gains less than 50 per cent of the credit points for which he or she is enrolled in that assessment period;
- a student fails any subject that is part of the program of an industry-based semester (there is provision for a supplementary examination to be taken in these subjects following a failure on the first attempt) or a student performs unsatisfactorily during an industry-based semester; or
- a student, immediately prior to the commencement of an industry-based semester, has still to complete more than one subject in the normal program of the course to that stage.
Bachelor of Information Technology Prerequisite Chart

Subjects with no formal prerequisites
- IS and Organisations
- Business Process Transformation
- Contemporary IT2
- Marketing
- Applications of IT1
- Applications of IT2

Computer Systems Architecture

Principles of Software Development A

Contemporary IT 1

Information Systems

Business Requirements Analysis

Accounting Information Systems

Industry Project 1

Commercial Programming

Information Systems Practice

Systems Modelling

Database Design

Financial Management

Distributed Databases & Client/Server Computing

Systems Design and Development

Project Management

Business Systems Design

Industry Project 2

IT Planning & Design

IT Strategy
Appeals against exclusion will be dealt with by the University's Appeals Committee (of the Academic Board), which will take into account the recommendation of the Course Steering Committee.

INDUSTRY SEMESTERS
The dates of the industry-based semesters for 1995 are as follows:
Autumn semester (3rd-year students)
Spring semester (1st-year students)
Monday 3 July 1995 – Friday 15 December 1995
Students are expected to attend their assigned sponsoring company on a full-time basis throughout these periods. Students cannot expect any absences to be approved during the industry-based semesters.

PERSONAL DETAILS
Students must inform the University should their name or address details change. BlnfTech students must also inform Des Saunders, Cooperative Education Officer, of any changes to personal details. Students who wish to change the method of payment of the scholarship should contact the Salaries Office, Smail Street on 330 2896.

SCHOLARSHIP
The scholarship will be paid at three different and increasing levels; all first year students will start at Level 1. At the end of each year all BlnfTech students with satisfactory progress will move from their current level to the next level.

The levels for 1995 are as follows:
Level 1 $9,000 per annum
Level 2 $9,450 per annum
Level 3 $9,900 per annum

The scholarship paid to BlnfTech students has been ruled as tax exempt. The reference for the ruling by the Australian Tax Office is 6/SCHOLS/24 dated 29 February 1988.

Bachelor of Science in Computing Science/ Bachelor of Laws (BSc LLB)

Course code LL06
The BSc LLB is offered jointly with the Faculty of Law and Legal Practice. The course is of five years' duration and is offered only on a full-time basis. The Law component satisfies the requirements of the Supreme Court of New South Wales for admission purposes. For admission as a barrister, two additional optional Skills subjects must be completed. For admission as a solicitor, successful completion of the Practical Legal Training Program at the College of Law is also required, unless an exemption has been granted.

The course will be submitted to the Australian Computer Society as satisfying the requirements of the Society for admission as an affiliate member.

Students will enrol with the Faculty of Law and Legal Practice, and will be required to complete 240 credit points, 94 in Computing Science and 146 in Law. Additionally, students must complete a period of industrial training before graduation. Students will be awarded one degree and therefore receive one testamur on graduation.

Students who elect not to complete the joint degree may be permitted to complete a Bachelor of Science in Computing Science or a Bachelor of Laws as a stand-alone degree.

Full details of the course are contained in the Handbook of the Faculty of Law and Legal Practice, which administers this course.
POSTGRADUATE PROGRAMS

Application forms for all postgraduate courses may be obtained from the UTS Information Service. General enquiries should be directed to either the Postgraduate Studies and Scholarships Office, telephone 330 1523, or the Faculty Graduate Assistant, telephone 330 1806. All prospective applicants should contact the Faculty Graduate Assistant before submitting an application. Applicants for research degrees should discuss their proposed research with either the Director, Postgraduate Studies, or their chosen supervisor before submitting applications.

POSTGRADUATE RESEARCH DEGREES

Research areas

Areas of particular interest for work towards research degrees in the School of Computing Sciences include:

- artificial intelligence, expert systems, knowledge bases
- computer graphics
- computer performance evaluation
- databases
- distributed multimedia
- distributed systems
- image processing
- information processing strategy, systems management
- intelligent office automation systems
- local networks and network interface technology
- microprocessors and their applications
- neural networks
- object-oriented systems development and methodologies
- object-oriented metrics
- office automation systems
- parallel processing and transputers
- quality and usability of systems/software
- semantics and design of programming languages
- usability and human-computer interaction

Computing Sciences research laboratories

Within the School, support for a wide range of computing and information technology research is provided by a variety of laboratories. Graduate research students, academics, visiting researchers and research assistants undertake collaborative research within the laboratories. The research quality and relevance of all laboratories is enhanced by well-established links, both with industry and overseas institutions.

The major laboratories are:

Parallel Processing Laboratory – examines and applies transputer technology to real world tasks, distributed operating systems and compilation. The laboratory is part of the Australian Transputer Centre (supported by Inmos) that has a configuration of over 40 transputer systems. (Contact: Mr Ury Szewcow)

Computer Graphics Laboratory – using seven Silicon Graphics workstations, this laboratory develops realistic images and computer animation. Other areas include efficient contour algorithms, human movement image animation and textual modelling. (Contact: Dr Kevin Suffern)

Distributed Database Laboratory – implementation and data modelling of distributed databases client-server computing and cooperative workgroup systems. Development of methods for integrating database with expert systems, modelling of constraints and development of design tools. Integration of groupware with databases. (Contact: Dr George Feuerlicht)

Software Research Laboratory – includes three groups:

Programming Research Group – investigates programming languages and paradigms, concurrency, software engineering and formal methods, category theory;

Artificial Intelligence Group – interests include AI in design, Case-based Reasoning, cognitive modelling, Knowledge Engineering, PROLOG and LISP;
Adaptive Methods Group – applies neural networks, genetic programming and other machine learning methods to problems of varying complexity including image analysis, forecasting and natural language. (Contact for all three groups: Dr Tom Osborn)

CRC Distributed Systems Technology Laboratory – the primary focus is management security and performance for controlled and efficient access to the resources of distributed systems such as database, collaboration software and distributed software tools. (Contact: Associate Professor Mike Fry)

Distributed Multimedia Laboratory – examines technology, protocols and implementation issues for very high band-width multimedia technology over computer networks. Work includes distance interaction of design editing and performance groups and network traffic performance, supporting diverse components. (Contact: Associate Professor Mike Fry)

Usability Laboratory – investigates the methods and measurement techniques for developing effective and usable human-computer interaction methods, for different kinds of operating environments including design and system development. (Contact: Mr David Wilson or Mrs Judy Hammond)

COTAR Laboratory – conducts research in object-oriented software engineering, object-oriented information systems and object-oriented computing. It also provides a focus for collaborative work with industry. (Contact: Professor Brian Henderson-Sellers)

Doctor of Philosophy (PhD)

Course code MC54

The Doctor of Philosophy is intended for students who wish to pursue research at the highest level; such research is expected to demonstrate significant originality and to make a substantial contribution to computing knowledge.

For specific areas of interest in research in the School of Computing Sciences refer to the ‘Research Areas’ section.

ATTENDANCE PATTERN

The Doctor of Philosophy degree is available on both a full-time and a part-time basis. Candidates who already possess a degree at the Master’s level may be permitted to complete in two years if full-time, and three years if part-time. The maximum duration of enrolment is four years for full-time students and six years for part-time students. The School of Computing Sciences has a strong preference for research work which proceeds at a full-time pace. This preference should not be seen as a deterrent to those students who wish to remain in employment. Students who are working in a full-time job are encouraged to select a topic for their research which is closely aligned with their professional work. Once such a topic has been selected, the School usually requires that the student’s employer provide a statement to the effect that at least half of the student’s working week will be devoted to work which is directly relevant to the research. The student is then expected to contribute some of his or her own time to the project which brings the total number of hours devoted to research within that expected of full-time attendance.

HOW TO APPLY

Applicants should hold a First Class, or Second Class (Division One), Bachelor’s degree with a major computing component, or should hold a Master’s degree in an appropriate area, or should have previously undertaken other postgraduate studies in computing. Prospective applicants are expected to have developed interests in a specific area of research, and should have one or more outline proposals for research work in that area. Before submitting a formal application for admission to this degree course, applicants should first seek the approval of the School for their proposed research work. To gain this approval, applicants should initially:
Either send a summary proposal of at least 1,000 words to the Director, Postgraduate Studies, School of Computing Sciences, containing references to seminal works in the area of proposed research. If the proposal is appropriate for the School, the Director will then refer the applicant to a suitable member of staff for further detailed discussion; or approach a suitable member of the School's academic staff directly and discuss the proposed research area.

Every Doctor of Philosophy student at UTS is required to have two supervisors for his or her research work, one of whom should be an academic staff member of the University and, normally, one of whom should hold a Doctoral degree.

When the applicant's proposed research has been approved by a member of the School's academic staff, and if two members of staff are prepared to supervise the research, then the applicant may formally apply for admission, by completing an 'Application for Candidature Doctoral Degrees' form. This form must be signed by both the applicant and the Director, Postgraduate Studies.

COURSE FEES
The exemption of research students from HECS fees is currently under review. Information will be available in early 1995.

PROGRESS REPORTS
All thesis students are required to submit, in consultation with their supervisors, a progress report at the end of each semester. The Postgraduate Studies and Scholarships Office contacts each student to initiate this process.

SUBMISSION OF THESIS
Each candidate for the degree of Doctor who is required to submit a thesis should give the Academic Registrar two months' written notice of intention to submit. Appropriate forms and the information brochure Presentation and Submission of Theses for Higher Degrees are available from the Postgraduate Studies and Scholarships Office.

There is a different set of rules for Master's and Doctoral students.

RECENT THESES
Ma X W, A Design and Analysis Aid Environment for Parallel Computations, 1994

Master of Science (by thesis) (MSc)
Course code MC51
The Master of Science (by thesis) degree enables graduates to extend and deepen their knowledge of a specialised area in computing by undertaking research under the supervision of a member of the academic staff. For specific areas of interest in research work in the School of Computing Sciences refer to the 'Research Areas' section.

ATTENDANCE PATTERN
This degree is available on a full-time and part-time basis. The normal duration of enrolment for this degree is two years of full-time attendance or three years of part-time attendance. The maximum time to complete the course is three years for full-time students and four-and-a-half years for part-time students. The School of Computing Sciences has a strong preference for research work which proceeds at a full-time pace. This preference should not be seen as a deterrent to those students who wish to remain in employment. Students who are working in a full-time job are encouraged to select a topic for their research which is closely aligned with their professional work. Once such a topic has been selected, the School usually requires that the student's employer provide a statement to the effect that at least half of the student's working week will be devoted to work which is directly relevant to the research. The student is then expected to contribute some of his or her own time to the
project which brings the total number of hours devoted to research within that expected of full-time attendance.

HOW TO APPLY
Applicants should hold a First Class or Second Class (Division 1) degree with a major computing component or should have previously undertaken other postgraduate studies in computing. Prospective applicants are expected to have developed interests in a specific area of research, and should have one or more outline proposals for research work in that area. Before submitting a formal application for admission to this degree course, applicants should first seek the approval of the School for their proposed research work. To gain this approval, applicants should initially:

*Either* send a summary proposal of at least 1,000 words to the Director, Postgraduate Studies, School of Computing Sciences, containing references to seminal works in the area of proposed research. If the proposal is appropriate for the School, the Director will then direct the applicant to a suitable member of staff for further detailed discussion;

*or* approach a suitable member of the School’s academic staff directly and discuss the proposed research area.

When the applicant’s proposed research has been approved by a member of the School’s academic staff, and if that member of staff is prepared to supervise the research, then the applicant may formally apply for admission. Formal application for admission should consist of a completed ‘Application For Admission – Graduate Courses’ form, and a completed ‘Details of Proposed Study’ form which should be signed by both the applicant and the proposed supervisor.

It should be noted that all prospective applicants should obtain approval for their proposed research work either from the Director, Postgraduate Studies or from their chosen supervisor before submitting an application form for admission to this course.

COURSE FEES
The exemption of research students from HECS fees is currently under review. Information will be available in early 1995.

PROGRESS REPORTS
All students are required to submit, in consultation with their supervisor, a progress report at the end of each semester. The Postgraduate Studies and Scholarships Office contacts each student to initiate this process.

SUBMISSION OF THESIS
Each candidate for the degree of Master who is required to submit a thesis should give the Academic Registrar two months’ written notice of intention to submit. Appropriate forms and the information brochure Presentation and Submission of Theses for Higher Degrees are available from the Postgraduate Studies and Scholarships Office. There is a different set of rules for Master’s and Doctoral students.

RECENT THESES
Horn K A, Garvan-ESI: An Expert System for the Interpretation of Thyroid Laboratory Tests, 1991
Huang Y X, Knowledge-based Support for Office Procedures, 1991
Blair A, Managing Business Rules and Integrity Constraints in Relational Database Applications, 1992
Wilson D N, Project Management for a Prototyping Environment, 1993
Phillips M T, Dynamic Load Sharing: A Prototype, 1993
Hargreave G D, Aspects of Computer Security Modelling, 1994
Linn C N, A Performance Model for Loosely Coupled Heterogeneous Distributed Information Systems, 1994
POSTGRADUATE COURSEWORK PROGRAMS

Master of Science in Computing (by coursework) (MSc)

Course code MC53

The Master of Science in Computing (by coursework) enables graduates to select a program of study which suits individual career goals. For example, a program may be chosen which develops specialised expertise in computer systems; provides a general update of information science technology; or equips the student for a position in corporate management as an information scientist.

ATTENDANCE PATTERN

The course is offered on a part-time basis only, over six semesters (three years), as it is considered important that students remain in professional employment while undertaking their graduate studies in computing. Attendance is required at lectures for at least two evenings each week. As the course is only available part-time, all timetabled sessions are held in the evenings. These sessions are usually between 6.00 p.m. and 9.00 p.m.

HOW TO APPLY

The course is intended for computing professionals. Applicants should have both:

• a Bachelor’s degree from the University of Technology, Sydney or equivalent, preferably with a major computing component. Applicants are required to submit evidence to the effect that the extent of their formal knowledge of computing is equivalent to that of a graduate from the UTS Bachelor of Science in Computing Science; and

• an established professional career within the Information industry. As a guide, the extent of the applicant’s professional experience should be equivalent to that of an Associate Member of the Australian Computer Society of at least two years’ standing.

Each semester the School publishes the MSc in Computing (by coursework) Course Guide. This Guide contains much administrative information as well as a detailed statement of the course regulations. Students and prospective applicants are advised to obtain a copy of this Guide and to study it carefully. From August an ‘Admission package’ containing a copy of the Guide, the application forms and other relevant information is available from either the UTS Information Service, the Faculty Graduate Assistant, or the University’s Postgraduate Studies and Scholarships Office. Please note that completed application forms must be submitted to the University by the last week of October in the year prior to that in which admission is sought. Applicants may be required to attend an interview.

COURSE FEES

In 1995 tuition fees will be charged for students in the Master of Science in Computing by coursework. These fees have been set at $1,000 per semester for a normal attendance pattern. Students who pay tuition fees will not be liable for HECS (i.e. the Higher Education Contribution Scheme).

PREREQUISITE KNOWLEDGE

All subjects in the MSc course are presented at the postgraduate level. Students are expected to be familiar with the undergraduate material which lies behind the postgraduate work.

For the subjects offered by the School of Computing Sciences, before the start of each semester a set of references to the presumed undergraduate material is given by each lecturer. It is important to note that these references are not ‘pre-reading’, but are a summary of the undergraduate knowledge required for each subject. Students are responsible
for ensuring that they are completely familiar with the undergraduate knowledge implied by those references. If they are not, then they should defer their enrolment in that subject and should attend suitable remedial undergraduate lectures; the Director, Postgraduate Studies, will advise students on suitable remedial lectures.

For a subject offered by schools other than the School of Computing Sciences, students are advised to contact that subject's Coordinator, before the start of semester, to determine whether they possess the prerequisite knowledge for that subject. If students do not possess the prerequisite knowledge for subjects offered by other schools or faculties then they should seek advice from those schools or faculties on the feasibility of a remedial program; the Director, Postgraduate Studies, will assist in obtaining this advice.

In addition, there are prerequisite requirements within the structure of the course itself (see 'Subject Descriptions' section).

COURSE STRUCTURE

Students are required to complete a total of 72 credit points consisting of 60 credit points from coursework and 12 credit points from the Project subject. The Project subject is normally taken in the sixth semester and must be completed by all students. In special circumstances, the Director, Postgraduate Studies, may approve a program in which out of the total of 72 credit points, 48 credit points come from coursework and 24 credit points come from the Project subject. Students should seek this approval in writing. Students who are allowed to undertake such a 24-credit-point project must have the strong support of their Project Supervisor as a part of these 'special circumstances'.

Each student's program of study will be subject to approval by the Director, Postgraduate Studies. The subjects chosen by a student must form a coherent plan of study and must be consistent with the student's professional career goals. When approving a student's program of study, the Director, Postgraduate Studies, will not permit a student to enrol in a subject in the MSc in Computing if that student has already completed a corresponding subject in another course.

Principal subjects in the Master's are subjects offered by the School of Computing Sciences on a regular basis as subjects in the course. Elective subjects in the Master's are subjects offered by the School of Computing Sciences on a periodic basis as subjects in the course; the elective subjects may vary from year to year depending on the availability of specialist staff.

To gain their credit points from coursework (normally amounting to 60 credit points), students are required to gain at least 36 credit points by passing a selection of principal subjects, with the balance, which will thus be at most 24 credit points, to be made up as follows:

- by passing postgraduate subjects which are made available to students in the MSc in Computing course by the School of Mathematical Sciences or by other faculties; or
- by passing elective subjects up to a total of 12 credit points only. All electives should be postgraduate subjects, with the exception of 32507 Performance Evaluation, 32501 Computer Graphics and 32502 Advanced Computer Graphics Techniques, which are based on undergraduate subjects. (In special cases, when the student has specific requirements, the Director, Postgraduate Studies, may extend this to a total of 18 credit points of elective subjects but no further.) Further principal subjects may be taken to accumulate the required credit points.
Subject outline timetable

The principal subjects are as follows:

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>Semester offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>32901</td>
<td>Recent Advances in Computer Science</td>
<td>6</td>
<td>All Autumns</td>
</tr>
<tr>
<td>32106</td>
<td>Object-oriented Software Development</td>
<td>6</td>
<td>A95, A97</td>
</tr>
<tr>
<td>32107</td>
<td>Formal Reasoning for Software Development</td>
<td>6</td>
<td>S95, S97</td>
</tr>
<tr>
<td>32108</td>
<td>Specialist Topics in Artificial Intelligence</td>
<td>6</td>
<td>S96</td>
</tr>
<tr>
<td>32306</td>
<td>Capacity Management</td>
<td>6</td>
<td>A96</td>
</tr>
<tr>
<td>32307</td>
<td>Operating Systems</td>
<td>6</td>
<td>S96</td>
</tr>
<tr>
<td>32308</td>
<td>Computer Architecture</td>
<td>6</td>
<td>S95, S97</td>
</tr>
<tr>
<td>32902</td>
<td>Recent Advances in Information Systems</td>
<td>6</td>
<td>All Autumns</td>
</tr>
<tr>
<td>32204</td>
<td>Advanced Data Management</td>
<td>6</td>
<td>A96</td>
</tr>
<tr>
<td>32205</td>
<td>Computer Communication Systems</td>
<td>6</td>
<td>S96</td>
</tr>
<tr>
<td>32206</td>
<td>Advanced Information Systems Modelling</td>
<td>6</td>
<td>S95, S97</td>
</tr>
<tr>
<td>32207</td>
<td>Information Management</td>
<td>6</td>
<td>A95, A97</td>
</tr>
<tr>
<td>32208</td>
<td>Information Processing Strategy</td>
<td>6</td>
<td>S95, S97</td>
</tr>
<tr>
<td>32402</td>
<td>Information Technology Environment</td>
<td>6</td>
<td>S96</td>
</tr>
<tr>
<td>32912</td>
<td>Project</td>
<td>12</td>
<td>All</td>
</tr>
<tr>
<td>32924</td>
<td>Project</td>
<td>24</td>
<td>All</td>
</tr>
</tbody>
</table>

Each principal subject is of one semester's duration. Principal subjects are offered once every two years with the exception of 32901 Recent Advances in Computer Science and 32902 Recent Advances in Information Systems which are offered each year. At present the intention is to offer the above principal subjects on a two-year cycle; however the Master's program is constantly under review, and it is expected that the list of principal subjects offered will be expanded, and that the contents and sequence of existing principal subjects may be modified.

The elective subjects in the proposed course will present specialised material and so will depend on the availability of specialist staff. At present it is proposed to offer the following elective subjects (credit point values are shown in parentheses).

**ELECTIVE SUBJECTS**

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>Semester offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>32501</td>
<td>Computer Graphics (6cp)</td>
<td></td>
<td></td>
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<tr>
<td>32502</td>
<td>Advanced Computer Graphics Techniques (6cp)</td>
<td></td>
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<tr>
<td>32503</td>
<td>Distributed Databases and Client/Server Computing (6cp)</td>
<td></td>
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<tr>
<td>32504</td>
<td>Tool-based Systems Development (6cp)</td>
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<td></td>
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<tr>
<td>32505</td>
<td>Advanced Object-oriented Analysis and Design (6cp)</td>
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<tr>
<td>32506</td>
<td>Knowledge Systems (6cp)</td>
<td></td>
<td></td>
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<tr>
<td>32507</td>
<td>Performance Evaluation (6cp)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32508</td>
<td>Software Quality Management Systems (6cp)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32509</td>
<td>Human–Computer Interaction in Information Systems (6cp)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Subjects from other schools or faculties

The following subjects from other schools or faculties are available to students in the MSc in Computing. Students should contact the relevant School/Faculty for prerequisites.

School of Mathematical Sciences

34013 Modern Analysis (Honours) (4cp)
34014 Measure Theory (Honours) (4cp)
34031 Large-scale Mathematical Programming (4cp)
34033 Dynamic Optimisation (4cp)
34038 Corporate and Financial Decisions and Investment Analysis (4cp)
34062 Stochastic Processes 2 (4cp)
34065 Time Series Analysis (4cp)
34067 Multivariate Statistics (4cp)
34069 Linear Models and Experimental Design (4cp)

Faculty of Business

21702 Industrial Relations (6cp)
21710 Quantitative Methods (6cp)
21718 Organisation Analysis and Design (6cp)
21719 Organisational Behaviour (6cp)
21720 Employment Relations (6cp)
21722 Management 1 (6cp)
21723 Management 2 (6cp)
21724 Human Resource Management (6cp)

21741 Operations Management (6cp)
22726 Accounting and Financial Administration (6cp)
22727 Information for Management Decisions (6cp)
22751 Corporate Accounting Issues (6cp)
24734 Managerial Marketing (6cp)
24737 Marketing Information Management (6cp)
25706 Economics for Management (6cp)
25707 Government Business Relations (6cp)
25741 Capital Markets (6cp)
25742 Financial Management (6cp)

Faculty of Law and Legal Practice

77727 Design Law (12cp)
77756 Copyright Law (12cp)
79729 Legal Environment of Business (6cp)
Choosing a program in 1995

Students may find this presentation of planned subject offerings useful when choosing their program. It is usually easiest to choose the principal subjects first because most of these are only available every two years, and then to select the remaining subjects. Students should be sure to take the prerequisites into account, (see ‘Subject Descriptions’ section). Ideally, there should be two subjects chosen per semester for the first two years. During the final year, students normally take the Project subject and two more coursework subjects.

<table>
<thead>
<tr>
<th>Semester</th>
<th>Computing Methods</th>
<th>Computer Systems</th>
<th>Information Systems Technology</th>
<th>Information Systems Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 95</td>
<td>Object-oriented Software Development</td>
<td>Recent Advances in Computer Science</td>
<td>Recent Advances in Information Systems</td>
<td>Information Management</td>
</tr>
<tr>
<td>A 96</td>
<td>Recent Advances in Computer Science</td>
<td>Capacity Management</td>
<td>Advanced Data Management</td>
<td>Recent Advances in Information Systems</td>
</tr>
<tr>
<td>S 96</td>
<td>Specialist Topics in Artificial Intelligence</td>
<td>Operating Systems</td>
<td>Computer Commun. Systems</td>
<td>Information Technology Environment</td>
</tr>
<tr>
<td>A 97</td>
<td>Object-Oriented Software Development</td>
<td>Recent Advances in Computer Science</td>
<td>Recent Advances in Information Systems</td>
<td>Information Management</td>
</tr>
</tbody>
</table>

Note: The program shown for 1997 is provisional.

PROJECT

The project entails a substantial investigation of a topic, in an area of current research interest in information technology and related to the student's professional career goals. All students are required to enrol in and pass the project subject. The project is normally undertaken in the final year of study after the completion of at least two years of coursework.

The topic for the project should be of direct interest to the student, and of value to the student’s professional development.

Students may wish to select a topic which is closely related to their current employment or of value to their future career. The project should be a vehicle for importing the knowledge learned from the coursework to the student’s professional life and the topic should be chosen with this professional goal in mind. Students are advised to seek the assistance of the lecturing staff in finalising the topic for their project.

Before beginning the project work a student should obtain the agreement of a member of the lecturing staff to act as project supervisor, and deliver a 500-word description of the project to the Director, Postgraduate Studies, for approval.

Once approved, the project will proceed ‘in the manner of a Master’s thesis’, and students are advised to discuss their work with their project supervisor regularly. The role of the project supervisor is to:

- advise on the general direction of the investigation;
- advise on a work schedule;
• advise on a framework for writing up the work; and
• criticise draft sections of work.

Enrolment and assessment of project
It is usual for the project work to extend over more than one semester. Students should enrol in the project for the semester in which they expect to submit their completed project. Note the requirement, stated below, that the project be submitted before the end of the tenth week of the semester in which the student wishes his or her project to be examined. The examination of the project must be completed before the School’s Examination Review Committee meeting which takes place towards the end of each semester. If students are enrolled in the Project subject at the time of the School’s Examination Review Committee meeting, and if the examination of their project has not been completed in time for that meeting, then their enrolment in project for that semester will be cancelled.

The project will result in the preparation of an extensive written report. Three copies of this report should be lodged with the Director, Postgraduate Studies, before the end of the tenth week of the semester in which the student wishes to be examined. The School will retain three copies, one of which will be placed in the University Library. The final version of the report should be typed and bound in accordance with the University’s specification for theses (available from the Postgraduate Studies and Scholarships Office). Students may have their written reports bound before submitting them for examination; alternatively, to avoid the possible expense of rebinding, three copies of a typed but unbound report may be submitted for examination. When submitted, the written report should be accompanied by a ‘Certificate of Originality’ and a ‘Retention of Report’ form; these forms are available from the Director, Postgraduate Studies.

There will also be an oral presentation of 40 minutes followed by 20 minutes’ discussion with the examiners. A day will be set for the oral presentations each semester. The oral presentation day will usually be during the last two weeks of semester. The oral presentation should consist of a discussion of the more highly controversial or technical issues within the written report. When delivering the oral presentation, students should assume that their audience is familiar with the contents of their written report.

The project will be examined on the contents and standard of presentation of the written report and the oral presentation. The examiners of the project will be two members of the academic staff.

The result of the examination of the project shall be one of the following:
• outright pass;
• pass subject to minor corrections being made (without general re-typing) to the satisfaction of the project supervisor (or nominee) and without a formal re-examination;
• pass subject to major revisions being made (probably involving substantial re-typing); the student is responsible for making arrangements for these major revisions to be re-examined before the end of the twelfth week of the semester following the semester of the initial examination; (the result of such a re-examination shall be ‘outright pass’ or ‘outright failure’);
• outright failure.

In addition, the examiners will allocate marks to the project.

SUBJECT FAILURE
Students are permitted at the most two failures during the MSc in Computing. Note the resolution of the Faculty Board, FBMC/92/70, that any Master’s degree candidate enrolled in the MSc in Computing who records any three failures will be excluded from the course. In addition, students are bound by the Rules of the University, and are advised to refer to them.
MINIMUM AND MAXIMUM TIME

There are two important University Rules concerning minimum and maximum time of which students should be aware:

- A Master’s degree candidate shall not normally be eligible for the award of a Master’s degree by coursework until he/she has completed at least six semesters of a part-time course. A student who is specially qualified in a relevant discipline may, with the approval of the Academic Board, be allowed to complete the course in less than the minimum time.

- A student who fails to complete all of the work prescribed for the higher degree within nine semesters from the time of his/her registration as a part-time Master’s degree candidate will only be permitted to continue with the approval of the Faculty Board.

Master of Business in Information Technology Management (MBus)

Course code MC85

Graduate Diploma in Information Technology Management (GradDipInfTechM)

Course code MC75

Graduate Certificate in Information Technology Management (No abbreviation)

Course code MC63

Offered for the first time in 1994, these courses form a joint program between the School of Computing Sciences and the Faculty of Business. Administration of these courses is the responsibility of the School of Computing Sciences. All enquiries regarding these courses should be directed to Alison Stevens, Program Manager, on 330 1925 or Jean Robb, Director, Graduate Education, on 330 1836.

The courses aim to:

- develop professional skills necessary for successfully undertaking the role of manager in terms of people, resources and processes in a variety of organisational contexts (which may include business, community, public, manufacturing, consultancy or professional contexts);

- enable the acquisition of conceptual and analytical understanding of the corporate/organisational needs from the differing perspectives of individuals and groups within the organisation, necessary for successful management;

- provide a well-balanced selection of subjects from both advanced
information technology (IT) and management, in an integrated program which is relevant to the current and future demands of the IT industry;

- develop an understanding of the IT business environment and to extend the knowledge and skills in specialist areas of management related to management of IT in business; and

- enhance and develop a partnership between UTS and the IT industry.

ADMISSION REQUIREMENTS

Master's

- A recognised Bachelor's degree (or equivalent) in an appropriate discipline such as Business or Computing, plus a minimum of two years' experience in the IT industry or

- The prior successful completion of the Graduate Diploma in Information Technology Management (therefore exempt from Semester 1, 2, 3 and 4 subjects) or

- The successful completion of an approved bridging program for non-graduate entry; that is the Graduate Certificate in Information Technology Management with passes in all subjects, and a credit average over the entire course.

Graduate Certificate

- A recognised Bachelor's degree (or equivalent) in an appropriate discipline, plus a minimum of two years' experience in the IT industry or

- Evidence of general and professional qualifications, such as other post-secondary school qualifications which can establish their aptitude, knowledge and practical experience, that will satisfy the Faculty Board in Mathematical and Computing Sciences that the applicant possesses the educational preparation and capacity to pursue postgraduate studies. (Experience in the IT industry will be especially important in this regard e.g. five years' minimum vocational experience.)

It should be noted that applicants for these courses may be required to attend an interview.

PRESUMED KNOWLEDGE AND PREREQUISITES

Subjects in the Graduate Certificate, Graduate Diploma and Master’s courses are presented at postgraduate level. Students are expected to be familiar with the undergraduate material on which the postgraduate work is based. For the subjects offered by either the School of Computing Sciences or the School of Management, before the start of each semester, a set of references to the presumed undergraduate material is given by each lecturer. It is important to note that these references are not 'pre-reading', but are a summary of the undergraduate knowledge required for each subject. Students are responsible for ensuring that they are completely familiar with the undergraduate knowledge implied by those references. If they
are not, then they should seek advice from the Director, Graduate Education, in the first instance and may then be advised to contact the Subject Coordinator, before the start of semester, to determine whether they possess the prerequisite knowledge for that subject.

For subjects offered by schools other than the School of Computing Sciences and the School of Management, students are advised to contact that subject's coordinator, before the start of semester, to determine whether they possess the prerequisite knowledge for that subject. If students do not possess the prerequisite knowledge for subjects offered by other schools or faculties then they should seek advice from that school or faculty on the feasibility of a remedial program; the Director, Graduate Education, will assist in obtaining this advice.

In addition, there are prerequisite requirements within the structure of the course itself (see 'Course Structure' section).

**FEES**

Full tuition fees will be charged for students in the above courses. The fee is $1,500 per subject (module). The tuition fee for the research and development Project undertaken in the Master's course will be higher (subject to final determination).

**COURSE STRUCTURE**

All subjects will be assessed to the Master’s standard, regardless of the course in which a student is enrolled. Hence a student who takes several individual subjects, may later gain credit towards a Graduate Certificate.

The courses have been designed to allow freedom of choice at the individual subject level. The subjects at the Graduate Certificate level aim to teach the student skills and competencies for IT management. At the Graduate Diploma level, the subjects aim to focus on organisational strategies and planning. At the Master’s level, the subjects are related to organisational development and research for the IT industry.

The full Master's degree course is normally completed in three years (six semesters) of part-time study. The Project is normally commenced in the fifth semester, together with one subject related to research methodology and Master’s seminars on up-to-date issues in information technology.

Core subjects are to be offered by the Faculties of Mathematical and Computing Sciences, and Business on a regular basis. Additional subjects available on an elective basis will be offered depending on demand and the availability of specialist staff. There may be other postgraduate subjects available to students enrolled in the program, offered by other schools within the Faculties of Mathematical and Computing Sciences and Business, which may be selected by students with the approval of the Director, Graduate Education. The industrially linked Project must build on the core/elective subjects already taken by the student and should ideally be related to his/her place of work.

In all cases the subjects chosen must form a coherent plan of study and must be consistent with the student’s professional career goals. Each student’s program of study will be discussed with, and approved by, the Director, Graduate Education, at the time of entry into a course. If a student has already completed an equivalent core subject in another course, he/she will be required to do an alternate subject from the electives available. Exemptions may only be considered if based on successfully completed subjects from these courses at Level 1 or above.

**Level 1 – no formal qualification**

A student may take any number of subjects relevant to his/her professional needs (subject prerequisites, if any, will need to be taken into account).

All subjects will be presented and assessed to the Master’s level. Hence a student who takes several appropriate subjects may later gain credit towards a Graduate Certificate.
No formal qualification will be awarded by UTS.

**Level 2 – Graduate Certificate in Information Technology Management (24cp)**

Credit point values are shown in parentheses.

A student must complete the following three core subjects:

- 21788 Effective People Management (6cp)
- 32601 Advanced Project Management (6cp)
- 21789 Contemporary Management Practices (6cp)

A student must complete one elective subject selected from:

- 21809 Managerial Analysis and Evaluation of Information Systems (6cp)
- 24704 Managing Client Relations (6cp)
- 32602 Impact of Information Technology (6cp)
- 32603 Software Quality Management (6cp)
- 32604 Systems Integration (6cp)
- 32701 Advances in Information Technology (6cp)
- 32702 Contemporary Telecommunications (6cp)
- 32703 Information Technology Strategy (6cp)

or

an elective approved by the Director, Graduate Education.

**Level 3 – Graduate Diploma in Information Technology Management (48cp)**

Credit point values are shown in parentheses.

A student must complete the requirements for the Graduate Certificate in Information Technology Management (24cp);

**plus** complete the following three core subjects:

- 21806 Managing Organisational Change (6cp)
- 21807 Total Quality and Productivity Management (6cp)
- 21708 Strategic Business Management (6cp)

A student must complete one elective subject selected from the electives listed under level 2 or an elective approved by the Director, Graduate Education.

**Level 4 – Master of Business in Information Technology Management (72cp)**

Credit point values are shown in parentheses.

A student must complete the requirements for the Graduate Diploma in Information Technology Management (48cp);

**plus** complete the following subjects:

- 21751 Management Research Methods (6cp)
- 32818 Project (18cp)

The major Project must involve applied organisational research and development in the IT industry. It must be industrially linked and conducted in conjunction with the student's industry sponsor.

As part of the Project, a student must also attend associated Master’s seminars. Expert speakers may be available to run seminars on such topics as ‘Major Economic Trends’ or ‘International Competitiveness in the IT Industry’.

A student must make one oral presentation of his/her project work at a satisfactory standard during the final year of enrolment in the Master’s course.

A **typical outline** program of study for the Master’s level course is as follows:

**Year 1**

*Autumn semester*

Subject 1 (Core 1/Level 2) (6cp)
Subject 2 (Core 2/Level 2) (6cp)

*Spring semester*

Subject 3 (Core 3/Level 2) (6cp)
Subject 4 (Elective) (6cp)
Year 2

Autumn semester
Subject 5 (Core 1/Level 3) (6cp)
Subject 6 (Core 2/Level 3) (6cp)

Spring semester
Subject 7 (Core 3/Level 3) (6cp)
Subject 8 (Elective) (6cp)

Year 3

Autumn semester
Subject 9 (Core 1/Level 4) (6cp)
Project (Y)

Spring semester
Project (18cp)

Note: Project (Y) is a year-long subject.

An example of a selected program of study for the Master of Business in Information Technology Management:

Year 1
21788 Effective People Management (6cp)
21789 Contemporary Management Practices (6cp)
32601 Advanced Project Management (6cp)
elective (6cp)

Year 2
21708 Strategic Business Management (6cp)
21806 Managing Organisational Change (6cp)
21807 Total Quality and Productivity Management (6cp)
elective (6cp)

Year 3
21751 Management Research Methods (6cp)
32818 Project (18cp)

In all cases the subjects chosen must form a coherent plan of study and must be consistent with the student's professional career goals. Each student's program of study will be discussed with, and approved by, the Director, Graduate Education, at the time of entry into a course. If a student has already completed an equivalent core subject in another course, he/she will be required to do an alternative subject from the electives available.

PROJECT

The project entails a substantial investigation of a topic, in an area of current research interest in information technology and related to the student's professional career goals. The Project is normally taken in the last part of the Master's course and must be taken by all Master's students. All Master's students are required to enrol in and pass the project subject.

A student may wish to select a topic which is closely related to his/her current employment. Alternatively, a student may wish to choose a topic which should be of value to his/her future career. The project should be a vehicle for importing the knowledge learned from the coursework to the student's professional life. The topic should be chosen with this professional goal in mind. Students are advised to seek the assistance of the lecturing staff in finalising the topic for their project.
Graduate Diploma in Information Technology  
(GradDipInfTech)  
(Formerly known as Graduate Diploma in Data Processing)  

Course code MC52  
The Graduate Diploma in Information Technology is intended to provide students with the basic knowledge and skills required for a professional career in the computing and/or information systems area. It is designed for people who have already taken a first degree in which computing has not been included, or only covered lightly.  

It is anticipated that students entering the course will have previously studied courses from a wide range of disciplines. Some will have graduated with no previous contact with computing; for such, the course is essentially a retraining degree, aiming to lay the foundations for a new career in the computing and/or information systems area. Other students entering the course will have had some familiarisation with computing, while still others will be familiar with computing concepts in areas such as programming, systems analysis and information retrieval, and will be seeking to consolidate and extend their present knowledge by attaining a formal computing qualification. It is not intended that applicants have extensive computing experience, given the retraining emphasis in the course.  

Satisfactory completion of the course leads to the award of Graduate Diploma in Information Technology. It is anticipated that holders of this award will be granted exemption from the Associate examinations of the Australian Computer Society.  

Year of introduction  
This course will be introduced in Spring semester 1995. Subsequent intakes will be in Spring. There will be no initial intake to this course in Autumn semester.  

ADMISSION REQUIREMENTS  
Applicants should have a first degree, equivalent to an undergraduate three-year degree from the University of Technology, Sydney. Candidates who are unsure of the exact ranking of their degree should contact either the Postgraduate Studies and Scholarships Office on 330 1523, or write to the National Office of Overseas Skills Recognition, PO Box 25, Belconnen, ACT, 2616.  

The number of applicants for the Graduate Diploma is expected to be in excess of the number of places. In addition to the ‘Application for Admission Graduate Coursework’ form, applicants should complete a ‘Supplementary Application Form’, and support their application with whatever documentation they consider to be appropriate. The selection committee may invite some applicants for interview.  

For further information, applicants should contact the Faculty Graduate Assistant, Mr Bruce Irvine, on 330 1806, or the Course Coordinator, Ms Jean Robb, on 330 1836.  

FEES  
Australian citizens and permanent residents will contribute to the cost of the course through HECS (i.e. the Higher Education Contribution Scheme).  

In 1994, the fees for overseas students were set at $14,500 per annum. Fees are subject to annual review.  

ATTENDANCE PATTERN  
The course is normally taken on a part-time basis over two years, and will usually entail attending three evenings per week. Occasionally one afternoon per week (plus two evenings per week) may be required, depending on the choice of subjects. Some students may be unable to pursue the normal attendance pattern, or may wish, for some reason, to take longer to complete the course; this is allowable, but students must be aware of the University’s
Graduate Diploma in Information Technology
Prerequisite Chart (Commencing Spring 1995)

- Computing Practice
- Accounting Information Systems
- Auditing the Computer

- Introduction to Information Systems
- Systems Design & Development
- Project Management & The Professional

- Development Methodologies
- Distributed Databases and Client/Server Computing

- Introduction to Systems Modelling
- Database Design
- Object-Oriented Methodologies
- Object Bases

- Introduction to Procedural Programming
- Object-Oriented Programming and C++
- Network Management

- Principles of Computer Systems Architecture
- Systems Software
- Performance Modelling

- Principles of Software Development A
- Principles of Software Development B
- Quantitative Modelling

* Indicates either Introduction to Procedural Programming or Principles of Software Development A, but not both.
maximum time rule which is described in the 'Progression Rules' section.

EXEMPTIONS
Under normal circumstances, exemption from any core subject may be granted on the basis of equivalent study. A maximum of 16 credit points may be exempted. Students will not be granted exemption from elective subjects.

PROGRESSION RULES
All students enrolled in this course should be aware of the following University Rules under which a student’s registration will be discontinued:

Maximum time
Students will have their registration discontinued for failure to complete the course within four semesters from initial registration in the case of a full-time student, or within eight semesters from initial registration in the case of a part-time student.
This is not inclusive of periods of approved leave of absence.

Unsatisfactory progress
Unsatisfactory progress, as defined by the Faculty Board in Mathematical and Computing Sciences, is failure in any subject three times (FBMC/92/71).
Students should be aware that the Faculty Board in Mathematical and Computing Sciences has amended the definition of unsatisfactory progress, which will take effect from Autumn semester 1996 (FBMC/94/80). The new definition will be:
1. failure to complete the course in eight semesters from the time of registration in the case of a part-time student, or four semesters from that time in the case of a full-time student, not inclusive of periods of leave of absence;
or
2. any three failures in the course.

COURSE STRUCTURE
To complete the Graduate Diploma, students must gain a minimum of 48 credit points.
In the first academic year, students must take the following core subjects:

Spring
31940 Introduction to Systems Modelling 4
31942 Introduction to Computer Systems Architecture 4
31943 Introduction to Information Systems 4

Autumn
31934 Introduction to Database Design 4
and at least one of
31415 Principles of Software Development A 6
31941 Introduction to Procedural Programming 4

The only prerequisite in the core subjects is that 31940 Introduction to Systems Modelling must precede 31934 Introduction to Database Design.
The remaining 26 to 28 credit points are taken as electives. These electives may be taken from any undergraduate subjects offered by the School of Computing Sciences. Students must have completed the appropriate prerequisites for the electives chosen and the choice must be approved by the Director of Graduate Education. 31436 Systems Software and Networks is strongly recommended. Some suggestions are:

Subject CP
31140 Introduction to Computer Graphics 4
31163 Knowledge-based Systems 4
31240 Topics in Computer Graphics 4
31425 Principles of Software Development B 6
31428 Quantitative Modelling 6
31436 Systems Software and Networks 8
31443 Distributed Databases and Client Server Computing 4
31444 Systems Design and Development 10
31447 Accounting Information Systems 4
31454 Project Management and the Professional 8
31860 Object-oriented Programming and C++ 4
31875 Parallel Programming 4
31876 Operating Systems Facilities 4
31901 Artificial Intelligence Theory 4
31902 Auditing the Computer 4
31918 Development Methodologies 4
31919 Distributed Software Programming 4
31920 Network Management 4
31921 Objectbases 4
31923 Office and Group Support 4
31924 Performance Modelling 4
31925 Smalltalk 4

All students are permitted to take any modules they wish from the subject 31417 Computing Practice. These will not be part of their formal program.

Recommended part-time program

Credit point values are shown in parentheses.

Year 1

Spring semester
31940 Introduction to Systems Modelling (4cp)
31942 Introduction to Computer Systems Architecture (4cp)
31943 Introduction to Information Systems (4cp)

Autumn semester
31934 Introduction to Database Design (4cp)
Elective (4cp)
31941 Introduction to Procedural Programming (4cp)

Year 2

Spring semester
31436 Systems Software and Networks (8cp)
Elective (4cp)

Autumn semester
Two or three electives (12cp)

Note: A four-credit point subject will usually be scheduled as three hours per week (lecture and tutorial hours). Students should plan to spend at least the same amount of time on private study.

GRADUATE CERTIFICATES

The Graduate Certificates in Advanced Information Technology, Applied Computing, Computer Science, Information Systems and Programming Practice are currently under review. Information on revisions to course structure will be available in early 1995.

Graduate Certificate in Advanced Information Technology

Course code MC62

This course allows students to build upon foundations in information systems and/or computer science. The prerequisite for the course is the Graduate Certificate in Information Systems and/or the Graduate Certificate in Computer Science, or their equivalents. The course enables students to develop advanced skills in more specialised areas of information technology. The course is offered on a full-fee-paying basis; the fee is expected to be met by companies for selected employees. However, completion of the course leads to a general qualification, which is not intended to be restricted to the employees of any particular company.

LENGTH

This is a one-year, part-time course. Depending on demand, the course, or individual subjects, may be offered in flexible attendance modes.

ATTENDANCE PATTERN

The course is usually offered as part of the School’s normal programs, provided class space is available.

ADMISSION REQUIREMENTS

Applicants are normally expected to have completed the Graduate Certificate in Information Systems and/or the Graduate Certificate in Computer Science. Applicants with demonstrable, equivalent backgrounds may be considered, on a case-by-case basis.
COURSE STRUCTURE
The course consists of a coherent set of four subjects taken from the Graduate Diploma in Information Technology and approved by the School of Computing Sciences (see the 'Graduate Diploma in Information Technology - Course Structure' section). The total requirement for the Graduate Certificate is 16 credit points.

For further information about the course structure, contact Ms Jean Robb, Director, Graduate Education, on 330 1836.

FEES
In 1994 the fee for this course was $3,600. This fee is subject to annual review.

Graduate Certificate in Applied Computing
Course code MC57
This course provides students with the practical skills and knowledge that are necessary to operate effectively at entry level in a computing environment. On completion of the three subjects, graduates will have acquired sound knowledge of, and experience and skills in: Foundations of Computing and Programming; Systems Analysis and Design; and Database. It is anticipated that graduates may wish to further their knowledge by attending follow-on Graduate Certificates offered by the School of Computing Sciences.

LENGTH
The course is one year, part-time, that is, four semester hours per week per six-credit-point subject.

ATTENDANCE PATTERN
The course is usually offered as part of the School's normal program for Information Studies students.

PROJECTED ENROLMENT
Enrolment will be limited to 20 students for each offering.

ADMISSION REQUIREMENTS
The course is intended for non-computing professionals. Applicants should have, from a recognised university, a Bachelor's degree (or equivalent), with no major computing content. Consideration may be given to applicants whose background does not fit the above requirements, provided that a case can be made to establish that their knowledge and practical experience is equivalent to that which is implied by these requirements.

FEES
In 1994 the fee for this course was $1,800. This fee is subject to annual review.

COURSE STRUCTURE
The subjects to be taken are as follows:
31521 CIT 2 – Foundations of Computing and Programming (6cp);
31531 CIT 3 – Systems Analysis and Design (6cp)
31551 CIT 5 – Database (6cp)

Graduate Certificate in Computer Science
Course code MC60
This course provides students with a foundation in Computer Science. This foundation can later be consolidated via the Graduate Certificate in Advanced Information Technology, and/or complemented by the Graduate Certificate in Information Systems. The course is offered on a full-fee-paying basis; the fee is expected to be met by companies for selected employees. However, completion of the course will lead to a general qualification, which is not intended to be restricted to the employees of any particular companies.

LENGTH
This is a one-year, part-time course. Depending on demand, the course, or individual subjects, may be offered in flexible attendance modes.
ATTENDANCE PATTERN
The course is usually offered as part of the School’s normal programs, provided class space is available. The precise attendance pattern will be developed as part of the business plan for any given course offering. It will take a minimum of three semesters to complete the Graduate Certificate, this is subject to the student being a competent programmer in a language, such as Pascal or C.

ADMISSION REQUIREMENTS
Applicants with a recognised Bachelor’s degree (or equivalent) are normally deemed eligible for the course. Consideration may be given to applicants whose background does not fit this requirement provided that a case can be made to establish that their aptitude, knowledge and practical experience is sufficient. Experience in the information technology industry is especially important in this regard. Nonetheless, to achieve non-graduate entry, applicants may be asked to take an aptitude test or complete an approved bridging program.

FEES
In 1994, the fee for this course was $3,600. This fee is subject to annual review.

COURSE STRUCTURE
The course consists of a coherent set of four subjects taken from the Graduate Diploma in Information Technology and approved by the School of Computing Sciences (see the ‘Graduate Diploma in Information Technology – Course Structure’ section). The total requirement for the Graduate Certificate is 16 credit points.

For further information about the course, contact Ms Jean Robb, Director, Graduate Education, on 330 1836.

Graduate Certificate in Human–Computer Interaction
Course code MC65
This is a full-fee-paying course designed for professional upgrade. The course provides students with the required knowledge of human–computer interaction and the practical skills that are necessary to effectively achieve better usability in the software and systems design and development process. The course focuses on HCI principles and techniques for improving usability aspects of software and systems, and on operational issues associated with implementing HCI in organisations.

LENGTH
The course is one year part-time which has a total of 18 credit points made up of three subjects, each worth six credit points.

ATTENDANCE PATTERN
Students attend one evening per week in the first semester and two evenings per week in the second semester. In the second semester, for the subject 31863 HCI Tools and Techniques, students attend two evenings a week for six weeks, followed by the subject 31864 Implementation of HCI, for which students attend two evenings a week for the following six weeks.

This pattern is important and follows a natural sequence which culminates in the final subject of the Graduate Certificate. The subject 31864 Implementation of HCI integrates what has been studied in the subjects 31862 Fundamentals of HCI and 31863 HCI Tools and Techniques. It also requires students to complete a practical HCI project on a topic of interest to them.
ADMISSION REQUIREMENTS
The course is intended for information industry professionals, and applicants should have both:

- a Bachelor’s degree from UTS, or equivalent, preferably with a substantial information systems and/or computing component. Applicants whose degrees do not have a major information systems and/or computing component will be required to submit evidence to the effect that the extent of their formal knowledge of computing is equivalent to that of a graduate from the University’s Bachelor of Science in Computing Science and

- an established professional career within the information technology industry (as a guide, the extent of the applicant’s professional experience should be equivalent to that of an Associate Member of the Australian Computer Society of at least two years’ standing).

Consideration may be given to applicants whose backgrounds do not fit these requirements, provided that a case can be made to establish that their information systems and/or computing knowledge and practical experience are equivalent to the above.

COURSE STRUCTURE
The structure of the Graduate Certificate in Human-Computer Interaction is as follows:

**Autumn semester**
31862 Fundamentals of Human-Computer Interaction (6cp)

**Spring semester**
31863 Human-Computer Interaction Tools and Techniques (6cp)
31864 Implementation of Human-Computer Interaction (6cp)

FEES
In 1994, the fee for this course was $2,400. This fee is subject to annual review.

Graduate Certificate in Information Systems

Course code MC61

This course provides students with a foundation in information systems. This foundation can be later consolidated via the Graduate Certificate in Advanced Information Technology. The course is offered on a full-fee-paying basis; the fee is expected to be met by companies for selected employees. However, completion of the course leads to a general qualification, which is not intended to be restricted to the employees of any particular company.

LENGTH
This is a one-year, part-time course. Depending on demand, the course, or individual subjects, may be offered in flexible attendance modes.

ATTENDANCE PATTERN
The course is usually offered as part of the School’s normal programs, providing that class space is available. The precise attendance pattern will be developed as part of the business plan for any given course offering. Depending on the choice of subjects, and the attendance pattern, it may take a minimum of three semesters to complete this Graduate Certificate.

ADMISSION REQUIREMENTS
Applicants with a recognised Bachelor’s degree (or equivalent) are normally deemed eligible for the course. Consideration may be given to applicants whose background does not fit the above requirement provided that a case can be made to establish that their aptitude, knowledge and practical experience is sufficient. Experience in the information technology industry is especially important in this regard. Nonetheless, to achieve non-graduate entry, applicants may be asked to take an aptitude test or complete an approved bridging program.
COURSE STRUCTURE
The course consists of a coherent set of four subjects taken from the Graduate Diploma in Information Technology and approved by the School of Computing Sciences (see the 'Graduate Diploma in Information Technology - Course Structure' section). The total requirement for the Graduate Certificate is 16 credit points.

For further information about the course, contact Ms Jean Robb, Director, Graduate Education, on 330 1836.

FEES
In 1994, the fee for this course was $3,600. This fee is subject to annual review.

Graduate Certificate in Programming Practice
Course code MC64
This course addresses modern business programming theory and practice and the commercial issues of data communications. It has been designed as a follow-on from the Graduate Certificate in Applied Computing. Students will study Commercial Programming and Data Communications.

LENGTH
This is a one-year, part-time course, that is, six semester hours per week per six-credit-point subject.

ATTENDANCE PATTERN
The course is usually offered as part of the School's normal program for Information Studies students.

PROJECTED ENROLMENT
Enrolment will be limited to 20 students for each offering.

ADMISSION REQUIREMENTS
The course is intended for non-computing professionals. Applicants should have, from a recognised university, a Bachelor's degree (or equivalent), with no major computing content. Consideration may be given to applicants whose background does not fit the above requirements, provided that a case can be made to establish that their knowledge and practical experience is equivalent to the above.

FEES
In 1994, the fee for this course was $1,200. This fee is subject to annual review.

COURSE STRUCTURE
The subjects to be taken are as follows:
31541 CIT 4 - Commercial Programming (6cp)
31561 CIT 6 - Data Communications (6cp)

Graduate Certificate in Software Quality Assurance
Course code MC56
This is a full-fee-paying course designed to provide a professional upgrade. It will provide students with the practical knowledge and skills that are necessary to effectively measure and control the quality of software products. The course focuses on the procedures and disciplines of a software quality system and the operational issues associated with implementing such a system in an organisation. Students who are members of the Australian Computer Society will be credited with PCP points on completion of the certificate.

LENGTH
This is a one-year, part-time course.

ATTENDANCE PATTERN
Students undertake formal studies for two evenings per week in the first semester and one evening per week in the second.
RATIONALE AND AIMS
A primary objective of this course is to assist computing professionals to implement a software quality system that complies with Australian Standard AS3563.

On successful completion of this course, students will be able to:

• understand the need for quality assurance of software products;
• specify the role of the quality assurance function in software development and maintenance;
• understand the nature of software quality and the problems of assessing the level and presence of software quality;
• ensure adequate quality control of software development is achieved; and
• produce and implement a quality assurance plan for software.

PROJECTED ENROLMENT
Enrolment will be limited to 20 students for each offering.

ADMISSION REQUIREMENTS
The course is intended for information technology professionals and applicants should have both:

• a Bachelor’s degree from UTS, or equivalent, preferably with a major computing component. Applicants whose degrees do not have a major computing component will be required to submit evidence to the effect that the extent of their formal knowledge of computing is equivalent to that of a graduate from the University’s Bachelor of Science in Computing Science and
• an established professional career within the information technology industry (as a guide, the extent of the applicant’s professional experience should be equivalent to that of an Associate Member of the Australian Computer Society of at least two years’ standing).

Consideration may be given to applicants whose backgrounds do not fit these requirements, provided that a case can be made to establish that their computing knowledge and practical experience is equivalent to the above.

FEES
In 1994, the fee for this course was $2,100. This fee is subject to annual review.

COURSE STRUCTURE
The course consists of three subjects:

31855 Software Quality Assurance Principles (4cp)
31856 Quality and Software Engineering (4cp)
31857 Software Quality Techniques (4cp)

Each subject carries four credit points, three semester hours. Thus the total course requirement is 12 credit points.
NUMERICAL LISTING OF SUBJECTS (INCLUDING SEMESTER AND PREREQUISITE INFORMATION)

The following tables indicate the number and name of each subject, the semester or semesters in which it is offered, the credit point value, the number of contact hours and prerequisites and corequisites (indicated by c). The letters A and S refer to the Autumn and Spring Semesters respectively, and Y is used to indicate a year-long subject. An asterisk (*) indicates that a subject is no longer offered, but is a prerequisite for some current subjects.

In the case of some elective subjects, no ‘Semester offered’ is shown. Elective offerings will vary according to demand.

### CORE SUBJECTS FOR BSc

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
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<tbody>
<tr>
<td>31414</td>
<td>Information Systems</td>
<td>A</td>
<td>6</td>
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<tr>
<td>31415</td>
<td>Principles of Software</td>
<td>Development A</td>
<td>A</td>
<td>6</td>
<td>9 31417</td>
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<td>31416</td>
<td>Computer Systems Architecture</td>
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<tr>
<td>31417</td>
<td>Computing Practice</td>
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<tr>
<td>31424</td>
<td>Systems Modelling</td>
<td>S</td>
<td>6</td>
<td>3</td>
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<tr>
<td>31425</td>
<td>Principles of Software</td>
<td>Development B</td>
<td>A,S</td>
<td>6</td>
<td>9 31415</td>
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<td>31428</td>
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<td>31429</td>
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<td>31415, 31425 c</td>
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<tr>
<td>31611</td>
<td>Information Systems</td>
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<tr>
<td>31613</td>
<td>Computer Systems Architecture 1</td>
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<td>Programming Principles</td>
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<tr>
<td>31615</td>
<td>Discrete Mathematics</td>
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<td>31617</td>
<td>Accounting Fundamentals</td>
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<td>31621</td>
<td>Systems Analysis</td>
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<td>4</td>
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<tr>
<td>31622</td>
<td>Commercial Programming</td>
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<td>*</td>
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<td>5 31611, 31614, 31623</td>
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<td>31624</td>
<td>Data Structures and Algorithms</td>
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<td>31625</td>
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<td>31626</td>
<td>Probability and Statistics</td>
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<td>31631</td>
<td>Database</td>
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<td>31632</td>
<td>Communications and Networks</td>
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<td>31633</td>
<td>Operating Systems</td>
<td>A,S</td>
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<tr>
<td>31636</td>
<td>Simulation and Modelling</td>
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<tr>
<td>31641</td>
<td>Systems Design</td>
<td>A,S</td>
<td>4</td>
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<td>31642</td>
<td>On-line Systems</td>
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<td>4</td>
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<td>31622, 31632, 31641 c</td>
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<td>31647</td>
<td>Management Control Systems</td>
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<td>4</td>
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<tr>
<td>31648</td>
<td>Business Tools and Applications</td>
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<td>4</td>
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<tr>
<td>31653</td>
<td>Communications Software</td>
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<td>31632, 31633</td>
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<tr>
<td>31655</td>
<td>Theory of Computer Science</td>
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<tr>
<td>31658</td>
<td>Project Management</td>
<td>A</td>
<td>4</td>
<td>4.5</td>
<td>31696–7 or 31698–9</td>
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<tr>
<td>31662</td>
<td>Information Systems Case Study</td>
<td>S</td>
<td>5</td>
<td>6</td>
<td>31641, 31642, 31658 c, 31666 c</td>
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<td>31666</td>
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<td>4</td>
<td>6</td>
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<tr>
<td>31669</td>
<td>Social Implications of Computers</td>
<td>A,S</td>
<td>3</td>
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<td>31696–7 or 31698–9</td>
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### CORE SUBJECTS FOR BSc (cont)

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
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<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
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<tr>
<td>31696</td>
<td>Industrial Training (F/T)</td>
<td>A</td>
<td>0</td>
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<td>31621, 31622, 31624, 31633, 51370, plus^1</td>
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<tr>
<td>31697</td>
<td>Industrial Training (F/T)</td>
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<td>31698</td>
<td>Industrial Training (P/T)</td>
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<tr>
<td>31699</td>
<td>Industrial Training (P/T)</td>
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<tr>
<td>51370</td>
<td>Human Communication</td>
<td>A, S</td>
<td>3</td>
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Note: The subjects 31698 Industrial Training and 31699 Industrial Training, must be taken for two semesters. ^1 Indicates at least eight other core subjects from the BSc.

### UNDERGRADUATE ELECTIVES

<table>
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<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
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<th>HPW</th>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>31140</td>
<td>Introduction to Computer Graphics</td>
<td>A</td>
<td>4</td>
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<td>31163</td>
<td>Knowledge-based Systems</td>
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<td>4</td>
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<td>31240</td>
<td>Topics in Computer Graphics</td>
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<tr>
<td>31350</td>
<td>Project (2 semester)</td>
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<tr>
<td>31351</td>
<td>Project (1 semester)</td>
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<td>31352</td>
<td>Project</td>
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<tr>
<td>31654</td>
<td>Languages and Translators</td>
<td>S</td>
<td>4</td>
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<tr>
<td>31738</td>
<td>Management Principles for IT Professionals</td>
<td>A</td>
<td>4</td>
<td>3</td>
<td>51370</td>
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<tr>
<td>31768</td>
<td>Business Planning for IT Professionals</td>
<td>S</td>
<td>4</td>
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<td>31777</td>
<td>Human–Computer Interaction</td>
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<td>31778</td>
<td>Resource Management for IT Professionals</td>
<td>A</td>
<td>4</td>
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<tr>
<td>31788</td>
<td>Organisation Theory for IT Professionals</td>
<td>S</td>
<td>4</td>
<td>3</td>
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<tr>
<td>31853</td>
<td>Office Automation</td>
<td>S</td>
<td>4</td>
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<tr>
<td>31854</td>
<td>Distributed Databases</td>
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<td>31858</td>
<td>Object-oriented Analysis and Design</td>
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<td>31860</td>
<td>Object-oriented Programming and C++</td>
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<td>4</td>
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<td>Parallel Programming</td>
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<td>31876</td>
<td>Operating Systems Facilities</td>
<td>A</td>
<td>4</td>
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<td>31892</td>
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<td>31894</td>
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<td>31897</td>
<td>Computer Systems Architecture 3</td>
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<td>31901</td>
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<td>4</td>
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<td>31916</td>
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<td>31923</td>
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<td>4</td>
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<tr>
<td>31925</td>
<td>Smalltalk</td>
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<tr>
<td>31931</td>
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<td>31614</td>
<td>Programming Principles</td>
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<td>31615</td>
<td>Discrete Mathematics</td>
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<td>31617</td>
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### ALPHABETICAL LISTING OF SUBJECTS

#### UNDERGRADUATE SUBJECTS

Explanatory notes

1. Serviced by other faculties
2. BlinfTech only
3. GradDiplInfTech only
4. Elective subject for BSc
5. Not offered 1995
6. Graduate Certificate only
7. Not to be taken with 21130 Organisational Behaviour
8. Not to be taken with 21221 Organisational Design and Change
9. BSc only

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**SUBJECT DESCRIPTIONS**

**Guide to subject descriptions**

The subject descriptions shown below indicate the subject number and name, the number of credit points for the subject (e.g. 3cp), the duration of the subject, indicated as semester weeks, if applicable, and the number of formal contact hours each week (e.g. 4hpw). For some subjects, there may also be practical components off-campus, and this is indicated in the text. Also shown are the prerequisites or corequisites if any, the method of assessment and name of the subject coordinator, if known, and a brief outline of the content.

Prerequisites are subjects which must be completed before taking the subject to which they refer. Corequisites may be completed before or be taken concurrently with the subject to which they refer.

### 31022
**COMMERCIAL PROGRAM DEVELOPMENT**

4cp; 3hpw

**prerequisites:** 31071 Introduction to Information Systems

**coordinator:** Mr R Raban

Structured design techniques and their application to COBOL programming in an off line commercial environment.

Advanced program design techniques are presented to give the student a knowledge of how to address a wide range of programming tasks.

### 31025
**INTRODUCTION TO SOFTWARE ENGINEERING**

4cp; 3hpw

**prerequisite:** 31615 Discrete Mathematics

**coordinator:** Dr B Jay

An introduction to the formal aspects of modern software engineering. Topics: an overview of the software engineering environment, the practice of formal mathematical specification, program development via refinement of specifications, programs correctness, machine executable specifications, an overview of software testing and reliability.
31071
INTRODUCTION TO INFORMATION SYSTEMS
4cp; 3hpw
prerequisite: nil
coordinator: Mrs J Hammond
A foundation for understanding information systems and their applications to common computer-based practices and procedures used in organisations today. Elementary system models, typical business systems development life cycles and applications, and a range of techniques and resources used to develop and design information systems are examined.

31073
INTRODUCTION TO COMPUTER SYSTEMS
4cp; 3hpw
prerequisite: nil
coordinator: Mr J Tu
Provides students with a model of computer hardware they will be able to use as a basis for understanding the actual computer platform for the software they will study and develop in the remainder of the course.

31140
INTRODUCTION TO COMPUTER GRAPHICS
4cp; 3hpw
prerequisite: 31624 Data Structures and Algorithms
coordinator: Dr K Suffern
Provides a thorough introduction to the computer representation, manipulation and display of pictorial information. Topics covered include passive and interactive graphics hardware devices and programming; mathematical tools for two- and three-dimensional graphics; two- and three-dimensional graphics, algorithms; graphics standards; human–computer interaction, graphical design; application areas of computer graphics.

31163
KNOWLEDGE-BASED SYSTEMS
4cp; 3hpw
prerequisites: 31624 Data Structures and Algorithms; 31625 Software Engineering
coordinator: Dr S Prabhakar
An introduction to recent developments in artificial intelligence, based on the representation and manipulation of knowledge. The student will obtain an understanding of the principles of expert systems together with some experience constructing small knowledge-based systems with the aid of current development tools. Topics: representation of knowledge; plausible reasoning; knowledge acquisition; development: methodologies; evaluation of current tools.

31240
TOPICS IN COMPUTER GRAPHICS
4cp; 3hpw
prerequisite: 31140 Introduction to Computer Graphics
coordinator: Dr K Suffern
For students who have passed 31140, this subject provides a study of several additional computer graphics topics, with an emphasis on image synthesis techniques. Topics covered include fractals, illumination models, ray tracing, textures, antialiasing, halftoning and ordered dither, hidden line and surface removal algorithms, computer animation and radiosity.

31350
PROJECT (2 SEMESTER)
8cp; 6hpw
prerequisite: 31641 Systems Design
coordinator: Mr CW Johnson

31351
PROJECT (1 SEMESTER)
8cp; 6hpw
prerequisite: 31641 Systems Design
coordinator: Mr CW Johnson
31352
PROJECT
4cp; 3hpw
prerequisite: 31641 Systems Design
coordinator: Mr CW Johnson
A project is intended to give a student experience in working independently, and responsibility for scientific research or the development of a small system from initial analysis to user documentation. Projects may be drawn from any area of computer science or information systems. Each project is supervised by a member of academic staff.

31414
INFORMATION SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Mr J Underwood
This subject deals with information systems in their organisational context.
The effects of information systems on society, organisations and individuals are discussed. Examples from typical organisations are used to illustrate information systems concepts. Techniques for analysing and describing user requirements are introduced.

Throughout the subject there is an emphasis on human activities, the importance of the user in the analysis phase and the usability of systems. Another theme is communication skills, i.e. the ability of the analyst and designer of an information system to interview, to write reports and manuals, to design efficient and effective interfaces and to give presentations on the system.

31415
PRINCIPLES OF SOFTWARE DEVELOPMENT A
6cp; 9hpw
prerequisite: nil
corequisite: 31417 Computing Practice
coordinator: Dr K Suffern
The principles and practice of object-oriented software construction are introduced using the programming language Eiffel. Topics include the object-oriented concepts of classes, objects, clients and suppliers, inheritance, genericity, dynamic binding and polymorphism. The mathematics of discrete objects and models is discussed. Topics covered include propositional and predicate logic, methods of proof, sets, relations, functions. Functional programming is used to illustrate the mathematical concepts introduced. Program testing methods are emphasised throughout the subject, as are aspects of software quality such as usability.

31416
COMPUTER SYSTEMS ARCHITECTURE
6cp; 6hpw
prerequisite: nil
coordinator: Mr CW Johnson
Provides students with a model of computer hardware and data communications. This will help students understand the execution environment required by the software they will study and develop in the remainder of the course.

31417
COMPUTING PRACTICE
6cp; 6hpw
prerequisite: nil
coordinator: Mr J Colville
Principles of responsible computer use.

31424
SYSTEMS MODELLING
6cp; 6hpw
prerequisite: nil
coordinator: Professor I Hawryszkiewycz
Introduces information system concepts including their static and dynamic
components. It describes how these concepts can be used to model systems to correctly capture its structure and needs. It outlines how the ability to capture information about the system in ways understood by its eventual users will improve the final quality of the system.

Introduces analysis using various approaches found in contemporary system development including object-oriented methods, data flow diagrams and Entity-Relationship modelling and describe the relationships between these techniques and their application.

31425
PRINCIPLES OF SOFTWARE DEVELOPMENT B
6cp; 9hpw
prerequisite: 31415 Principles of Software Development A
coordinator: Dr K Suffern
The specification and implementation of stacks, queues, lists, and trees are discussed as abstract data types. Formal mathematical specification of software, and program correctness are discussed. Program testing methods are emphasised throughout the subject, as are aspects of software quality such as usability.

31428
QUANTITATIVE MODELLING
6cp; 3hpw
prerequisite: nil
coordinator: Dr T Osborn
Reasoning with data, descriptive statistics, probability theory, distributions, estimation, hypothesis testing, spreadsheet exercises, report writing, principles of modelling, queueing models, utility models, adaptive methods, case studies of some basic models.

31429
PROCEDURAL PROGRAMMING
6cp; 4hpw
prerequisite: 31415 Principles of Software Development A
corequisite: 31425 Principles of Software Development B
coordinator: Mr U Szewcow
Top-down structured program design techniques, and their application to the development of commercial programming applications. Emphasis will be on quality and usability of the resultant systems. Debugging and testing skills will be developed. The language used will be C.

31434
DATABASE DESIGN
6cp; 3hpw
prerequisite: 31424 Systems Modelling
coordinator: Dr G Feuerlicht
This subject introduces the students to basic database design and implementation concepts. Database design techniques including relational design and E-R analysis are presented. Relational databases and object-oriented databases are described and the applicability of each approach to various problem domains discussed.

31436
SYSTEMS SOFTWARE AND NETWORKS
8cp; 8hpw
prerequisites: 31425 Principles of Software Development B; 31429 Procedural Programming; 31416 Computer Systems Architecture
coordinator: Dr B Howarth
This subject builds on Computer Systems Architecture to provide an understanding of the operating system and communications hardware and software that provide support for user applications. Particular attention is paid to the role of systems software in distributed systems.
31443
DISTRIBUTED DATABASES AND CLIENT/SERVER COMPUTING
4cp; 3hpw
prerequisite: 31434 Database Design
coordinator: Dr G Feuerlicht
This subject introduces the students to basic distributed database and client/server concepts. The classical approach to distributed databases is described in detail, and supported with both theoretical and practical exercises. Modern client/server and database server techniques are introduced.

31444
SYSTEMS DESIGN AND DEVELOPMENT
10cp; 4hpw
prerequisite: 31434 Database Design
corequisite: 31436 Systems Software and Networks
coordinator: Mr C Richardson
Principles and techniques for designing a system (with system models and a user specification document as the starting point) and then for developing and implementing that system in such a way as to meet the users' original requirements. Emphasis will be placed on correct use of commercially applicable development methodologies and on ensuring that the end product exhibits a high degree of usability. Techniques for ensuring quality of design and review of systems development effectiveness will be covered. Comparison of different design and development techniques will be covered. The nature of the application systems will be transaction based, in a distributed environment. Some batch applications may also be covered.

31447
ACCOUNTING INFORMATION SYSTEMS
4cp; 3hpw
prerequisite: nil
coordinator: Mr B Wong
This subject presents a range of fundamental accounting principles. This subject is intended to provide basic skills in financial accounting and to apply this knowledge of accounting to evaluating computerised accounting systems. An accounting system is an example of an information system.

31454
PROJECT MANAGEMENT AND THE PROFESSIONAL
8cp; 3hpw
prerequisite: 31444 Systems Design and Development
coordinator: Mr D Wilson
This subject covers the management of the development and implementation of information technology solutions, with particular emphasis on information systems project management, managing software quality assurance and the professional ethics of software developers.

31455
SOFTWARE DEVELOPMENT CASE STUDY
10cp; 6hpw
prerequisites: 31436 Systems Software and Networks; 31444 Systems Design and Development, 4 electives
coordinator: to be advised
In the first semester lectures will run in two strands, devoted to projects, and to automata theory and new theory and skills. Laboratories will work on the projects.

The major project will incorporate the following stages: modular decomposition of the system, development of interfaces to the user (GUI's), between modules, to class libraries, and to other applications (code-wrapping), coping
with change of specification, detailed coding, verification, documentation and testing. This is a full-year subject.

31464
INFORMATION TECHNOLOGY PLANNING AND DESIGN
6cp; 5hpw
prerequisites: 31428 Quantitative Modelling; 31436 Systems Software and Networks; 31444 Systems Design and Development; 31454 Project Management and the Professional; 31696 Industrial Training; 31697 Industrial Training
coordinator: Mr C S Johnson

This subject is a capstone subject for the course and incorporates knowledge gained in previous subjects, including industrial experience. Students are required to work in groups to produce a large report based on case study material. The objective is to produce a strategic solution to the problem presented in the case study involving both planning and design. The subject emulates the commercial environment in that students work in project groups and hold weekly project review meetings. A presentation to management occurs at the end of the subject.

31521
CIT 2 – FOUNDATIONS OF COMPUTING AND PROGRAMMING
6cp; 4hpw
prerequisite: nil
coordinator: Mr L Smith

Provides an understanding of the basic concepts of hardware design, data storage and transmission, and introduces third generation language programming in file-processing and report-production applications.

31531
CIT 3 – SYSTEMS ANALYSIS AND DESIGN
6cp; 4hpw
prerequisite: nil
coordinator: Mr L Smith

Concerned with the systems development life cycle, and the tools and techniques used in the analysis of systems requirements and the determination of alternate implementation strategies.

31541
CIT 4 – COMMERCIAL PROGRAMMING
6cp; 6hpw
prerequisite: Graduate Certificate in Applied Computing
coordinator: Mr L Smith


31551
CIT 5 – DATABASE
6cp; 4hpw
prerequisite: 31531 CIT 3 – Systems Analysis and Design
coordinator: Mrs E Lawrence

Introduces database models and the principles of database design and management. Practical experience is given in designing and implementing a database using commercial packages such as Oracle.

31561
CIT 6 – DATA COMMUNICATIONS
6cp; 6hpw
prerequisite: Graduate Certificate in Applied Computing
coordinator: Ms D Jinks

Information coding and signal transmission codes. Voice and digital communications. Communications software. Data communications services. Network

31621
SYSTEMS ANALYSIS
4cp; 3hpw
prerequisite: 3161 Information Systems
coordinator: Mr J El-Den
Introduces systems concepts and a range of techniques used in systems analysis. Covers the techniques used to analyse all discrete systems data functions and flows inclusive of data flow diagrams, relational analysis and normalisation and E-R modelling. Describes systems' life cycles and the role of these techniques within life cycles in evaluating requirements and proposals and setting objectives for new systems.

31631
DATABASE
4cp; 4hpw
prerequisite: 31621 Systems Analysis
coordinator: Dr G Feuerlicht
Database design and implementation methodologies. Both entity-relationship and relational models are described and used to facilitate database design. The SQL language is described in detail, illustrating database query and update techniques. Traditional database approaches including coddasyl and hierarchical databases are described.

31632
COMMUNICATIONS AND NETWORKS
4cp; 5hpw
prerequisites: 31611 Information Systems; 31613 Computer Systems Architecture I
coordinator: Ms D Jinks
Introduces communication concepts and terminology, and describes the problems involved in the physical and data link layers of communication and their solutions. The subject discusses network architectures, topologies and carrier services.

31633
OPERATING SYSTEMS
4cp; 5hpw
prerequisite: 31613 Computer Systems Architecture I
coordinator: Mr U Szewcow
An introduction to the concepts and facilities available in computer operating systems. The subject includes scheduling, multi-programming, protection and resource control.

31636
SIMULATION AND MODELLING
4cp; 4hpw
prerequisites: 31624 Data Structures and Algorithms; 31626 Probability and Statistics
coordinator: Dr T Osborn
Principles and practice of modelling: analysis, data gathering, solution, validation, implementation. Modelling in and of computer systems, queueing theory, continuous simulation, languages, corporate modelling, and inventory.

31641
SYSTEMS DESIGN
4cp; 4hpw
prerequisite: 31631 Database
coordinator: Mr R Raban
Focuses on the user and business aspects of systems design. User interface issues cover dialogue, screen, report and forms design as well as designing and writing user documentation. Integration with business environment includes business procedures, security, control and implementation. A variety of design and implementation strategies are introduced, such as prototyping, CASE tools and 4GLs.
31642
ON-LINE SYSTEMS
4cp; 4hpw
prerequisites: 31622 Commercial Programming Development; 31632 Communications and Networks
corequisite: 31641 Systems Design
coordinator: Mr C Richardson
Aspects of systems development that are specific to on-line application systems. Real time and distributed systems are also covered with respect to their impact on the development of application systems. Practical work involves developing a series of programs in an on-line transaction processing environment. A research report is also included in the assessment for the subject.

31647
MANAGEMENT CONTROL SYSTEMS
4cp; 4hpw
prerequisite: 31617 Accounting Fundamentals
coordinator: Mr B Wong
The principles and techniques of cost accounting, budgeting and financial planning and their use in computer-based accounting and business decision-making systems.

31648
BUSINESS TOOLS AND APPLICATIONS
4cp; 5hpw
prerequisite: 31631 Database
coordinator: Mr B Wong
Gives students familiarity with microcomputers in the office and business environment and as stand-alone machines or workstations. The use of database and file management programs and the physical operation of microcomputers are discussed. Students will become familiar with specific packages such as business databases, spreadsheets and program development aids.

31653
COMMUNICATIONS SOFTWARE
4cp; 6hpw
prerequisites: 31632 Communications and Networks; 31633 Operating Systems
coordinator: Mr J Colville
Discusses the higher layer problems of communications systems using as a reference model the ISO definitions of OSI (Open Systems Interconnection) seven-layer protocols. Major emphasis is placed on presentation and application layer issues.

31654
LANGUAGES AND TRANSLATORS
4cp; 3hpw
prerequisites: 31613 Computer Systems Architecture I; 31624 Data Structures and Algorithms
coordinator: Mr J Colville

31655
THEORY OF COMPUTER SCIENCE
4cp; 4.5hpw
prerequisites: 31624 Data Structures and Algorithms; 31625 Software Engineering
coordinator: Dr B Jay
Topics from the theory of machines, the theory of languages – syntax and semantics, the theory of processes, the theory of data, the complexity of problems. Applications of the theory particularly in the area of language translation and compiler writing.
31658
PROJECT MANAGEMENT
4cp; 4.5hpw
prerequisite: 31696-7 or 31698-9 Industrial Training
coordinator: Mr D Wilson
Provides students with the practical knowledge and skills that are necessary to effectively manage project teams and software development projects. The major topics are: planning a software project, software time and cost estimation, controlling a software project, development aids and alternatives, leadership and people management. In summary, this subject will provide an essential understanding of project management issues and identify the knowledge required of a project manager in the IT industry.

31662
INFORMATION SYSTEMS CASE STUDY
5cp; 6hpw
prerequisites: 31641 Systems Design; 31642 On-line Systems
corequisites: 31658 Project Management; 31666 Performance Evaluation
coordinator: Mr J Underwood
This case study deals with the issues involved in strategic level analysis and design in a corporate wide information systems environment. It reinforces material previously studied while giving groups of students scope to use their own judgment in applying their knowledge. It stresses the development and assessment of alternative approaches to a system strategy. Senior management communication skills are also developed.

31666
PERFORMANCE EVALUATION
4cp; 6hpw
prerequisite: for BSc 31636 Simulation and Modelling
coordinator: Dr B Howarth
Reviews considerations involved in configuring, selecting or upgrading a computer system in the most cost-effective way. Operating systems and other software factors affecting computer performance are also studied. Measurement and modelling techniques are emphasised.

31669
SOCIAL IMPLICATIONS OF COMPUTERS
3cp; 3hpw
prerequisite: 31696-7 or 31698-9 Industrial Training
coordinator: Dr R Rist
Aims at identifying areas of society where the use of computer technology is of concern, and to apply an understanding of the social issues to the actual work situation. Topics include: history of computing (social and economic factors), effects on workforce, professionalism and ethics, social responsibility of computer practitioners, privacy, the DP workforce. These areas are discussed in the context of contemporary issues.

31696
INDUSTRIAL TRAINING (F/T)
0cp; 6hpw
prerequisites: 31621 Systems Analysis; 31622 Commercial Programming Development; 31624 Data Structures and Algorithms; 31633 Operating Systems; 51370 Human Communication plus at least eight other core subjects from the BSc program
coordinator: Associate Professor M Fry
For subject details see 31697 Industrial Training (F/T).
31697
INDUSTRIAL TRAINING (F/T)
0cp; 6hpw
prerequisites: 31696 Industrial Training (F/T first semester)
coordinator: Associate Professor M Fry
The first and second semesters of Industrial Training are a compulsory requirement for the course. All full-time students must enrol in these subjects and obtain a minimum of nine months' full-time employment. Students must normally have completed the equivalent of at least four full-time semesters before obtaining employment.

31698
INDUSTRIAL TRAINING (P/T)
0cp; 3hpw
prerequisites: 31621 Systems Analysis; 31622 Commercial Programming Development; 31624 Data Structures and Algorithms; 31633 Operating Systems; 51370 Human Communication plus at least eight other core subjects from the BSc program
coordinator: Associate Professor M Fry
For subject details see 31699 Industrial Training (P/T).

31699
INDUSTRIAL TRAINING (P/T)
0cp; 3hpw
prerequisite: 31698 Industrial Training (P/T first semester)
coordinator: Associate Professor M Fry
The first and second years Industrial Training are a compulsory requirement for the course, normally taken for a total of four semesters in Stages 5 and 6. All part-time students must enrol in these subjects and obtain a minimum of 18 months' full-time employment.

31718
CONTEMPORARY INFORMATION TECHNOLOGY 1
6cp; 6hpw
prerequisite: nil
coordinator: Mr D Wilson
This is a self-paced learning subject that provides basic skills that students will use in a variety of other subjects and in industry – skills include word processing, spreadsheets, graphics, e-mail etc. The self-paced learning will be complemented by lectures from partner organisations about the industry and the first industry semester.

31722
COMMERCIAL PROGRAMMING
5cp; 5hpw
prerequisites: 31611 Information Systems; 31614 Programming Principles
coordinator: Mr C Richardson
Commercial structured design techniques and commercial programming in either a batch or on-line environment. Students will be taught the design technique and language of the particular industry organisation using approved assignment work.

31725
SOFTWARE ENGINEERING
4cp; 6hpw
prerequisites: 31614 Programming Principles; 31615 Discrete Mathematics
coordinator: Dr B Jay
Introduces the formal aspects of modern software engineering. Topics: an overview of the software engineering environment, the practice of formal mathematical specification, program development via refinement of specifications, program correctness, machine executable specifications, an overview of software testing and reliability.
31729
INFORMATION SYSTEMS
PRACTICE
2cp; 2hpw
prerequisite: 31415 Principles of Software Development A
coordinator: Mr D Wilson
This subject covers entity-relationship modelling, structured programming techniques and the development of commercial programs in C. The emphasis is on the quality and usability of developed systems.

31734
INFORMATION SYSTEMS AND ORGANISATIONS
4cp; 3hpw
prerequisite: nil
coordinator: Mr D Wilson
The environment of business organisations and the challenges facing large and small businesses. Management theory, organisation theory, evolution and schools of thought. Management principles, management style, decision making, mechanistic and organic systems, structure and technology.

31737
BUSINESS PROCESS TRANSFORMATION
4cp; 3hpw
prerequisite: nil
coordinator: Mr D Wilson
This subject covers the restructuring of organisational processes through the innovative use of information systems and information technology. It provides a systematic approach to improving corporate performance and profitability through the application of information technology.

31738
MANAGEMENT PRINCIPLES FOR IT PROFESSIONALS
4cp; 3hpw
prerequisite: 51370 Human Communication or equivalent
coordinator: Mr J Clark
The environment of business organisations and the challenges facing large and small business. Management theory, evolution and schools of thought. Management principles, style, decision making, mechanistic and organic systems. Personnel management, planning, job analysis and design, selection and training, career planning, appraisal and counselling, compensation and incentives. Operations management.

31756
PROJECT MANAGEMENT
5cp; 3hpw
prerequisite: 31788 Organisation Theory for IT Professionals
coordinator: Mr D Wilson
Provides students with the practical knowledge and skills that are necessary to effectively manage project teams and software development projects. The major topics are: planning a software project, software time and cost estimation, controlling a software project, development aids and alternatives, leadership and people management. This subject will provide an essential understanding of project management issues and identify the knowledge required of a project manager in the IT industry.
31762
TECHNOLOGY PLANNING
5cp; 6hpw
prerequisites: 31642 On-line Systems; 31781 Business Systems Design
corequisite: 31766 Performance Modelling and Management
coordinator: Mr J Underwood
This case study deals with the issues involved in strategic level analysis and design in a corporate wide information systems environment. It reinforces material previously studied while giving groups of students scope to use their own judgment in applying their knowledge. It stresses the development and assessment of alternative approaches to a system strategy. Communication skills with senior management are developed.

31764
INFORMATION TECHNOLOGY STRATEGY
4cp; 3hpw
prerequisite: nil
coordinator: Mr D Wilson
This subject provides students with an awareness of the problems in developing corporate strategies, in general, and information strategies, in particular. It also develops skills in the selection and use of appropriate strategic planning techniques.

31766
PERFORMANCE MODELLING AND MANAGEMENT
4cp; 6hpw
prerequisites: 31626 Probability and Statistics; 31633 Operating Systems
coordinator: Dr B Howarth
Understanding the basic techniques of system performance modelling and the application of systems modelling techniques to the assessment of present and future required system capacity; basic principles of capacity management and its importance to IS management and senior management. Simple queueing theory and operational analysis modelling techniques; systems performance analysis – measurement and models; modelling and analysis of on-line systems; workload characterisation; workload forecasting; relations between capacity planning, IS management, corporate planning and corporate management.

31768
BUSINESS PLANNING FOR IT PROFESSIONALS
4cp; 3hpw
prerequisite: 51370 Human Communication or equivalent
coordinator: Mr J Underwood
Provides students with an awareness of the problems in developing corporate strategies, in general, and information technology strategies, in particular; also, develops skills in the selection and use of appropriate techniques. Major topics are: business planning/strategic planning, analysing business priorities and objectives, long-term planning, models, tools and techniques; information technology planning, major tools and techniques and the changing role of the information systems manager; corporate needs for information technology.

31769
CONTEMPORARY INFORMATION TECHNOLOGY 2
4cp; 3hpw
prerequisite: 31718 Contemporary Information Technology 1
coordinator: Mr D Wilson
This subject covers topical issues in the development and implementation of information systems and the professional ethics of software developers.

31770
INDUSTRY PROJECT 1
5cp; 14hpw
prerequisite: nil
coordinator: Mr B Wong
Provides students with an understanding of the function of the Information Systems Department in an organisation
and also of at least one user business function serviced by IS. Understanding is via a number of strategies such as interviewing, observation and work experience. Students will be taught human communication skills in conjunction with the project work, with special emphasis on oral and written communication. Training will also be provided in a variety of development tools used in the information systems development process in order to build up a defined skills profile in conjunction with the subject Industry Project 2.

31771
BUSINESS REQUIREMENTS ANALYSIS
5cp; 3hpw
prerequisite: 31621 Systems Analysis
coordinator: Mr J Clark
Applications of systems analysis (data flow diagrams, relational modelling etc.) in a business setting; the roles of the business analyst and the systems analyst; systems research and requirements analysis (interviewing, document analysis etc.) for data processing, management information systems etc; top-down enterprise-wide perspective; evolution of the business environment; business, product and other life cycles. Industry case studies.

31777
HUMAN–COMPUTER INTERACTION
4cp; 3hpw
prerequisite: 31641 Systems Design
coordinator: Mrs J Hammond
Focuses on human factors and management aspects of user-centred systems development and design. It provides students with HCI principles, concepts, tools and techniques needed to build user-centred systems, particularly in terms of the design of interfaces that satisfy user needs and create usable products that support user tasks and goals. Major topics include: role and scope of HCI, methodologies such as requirements analysis, task analysis and usability testing, usability evaluation, user-centred design support and user interface management systems.

31778
RESOURCE MANAGEMENT FOR IT PROFESSIONALS
4cp; 3hpw
prerequisite: 51370 Human Communication
coordinator: Mr P Bebbington
Aims to instil the knowledge and skills required for effective management of hardware and software resources within an information system organisation. The major topics: resource acquisition, developing software, workplace environment, hardware and software security, operations management, EDP accounting.

31779
APPLICATIONS OF INFORMATION TECHNOLOGY 1
5cp; 3hpw
prerequisite: 31611 Information Systems
coordinator: Mr C S Johnson
Formal and practical exposure to, and understanding of, a variety of specific applications of information technology, such as management information systems, database, decision support systems, process control, graphics etc. Subject material will complement that of 31789 Applications of Information Technology 2 to ensure a common level of experience for all students. This is an industry subject for BInfTech.

31780
INDUSTRY STUDIES
6cp; 6hpw
prerequisite: 31770 Industry Project 1
coordinator: Mr B Wong
Students undertake surveys of industry sponsors of the BInfTech program investigating contemporary topics in the field of information systems. Students may also be required to undertake other formal activities to complement the industry objectives of the BInfTech program.
31781
BUSINESS SYSTEMS DESIGN
5cp; 3hpw
prerequisites: 31641 Systems Design; 31771 Business Requirements Analysis
coordinator: Mr J Underwood
Understanding systems design in a business setting; performance and quality criteria; alternative implementation strategies; approaches to systems construction and estimation (including package evaluation and prototyping); implementation issues; productivity issues; methods engineering; information technology in business; industry and product differences. Case studies. This is an industry subject for Blutech.

31788
ORGANISATION THEORY FOR IT PROFESSIONALS
4cp; 3hpw
prerequisite: 51370 Human Communication or equivalent
coordinator: Mr J Underwood
This subject examines the structural and sociological aspects of organisations. Topics include: the nature of organisation theory; organisation effectiveness; structure and technology; structure and environment; typical organisation structures; organisations as social systems; work groups and job design; organisational learning; cultures and organisations; information technology in organisations.

31789
APPLICATIONS OF INFORMATION TECHNOLOGY 2
5cp; 3hpw
prerequisite: 31779 Applications of Information Technology 1
coordinator: Mr C S Johnson
Formal and practical exposure to and understanding of a variety of specific applications of information technology, such as management information systems, database, decision support systems, process control graphics etc. Subject material will complement that of 31779 Applications of Information Technology 1 to ensure a common level of experience for all students.

31790
INDUSTRY PROJECT 2
5cp; 14hpw
prerequisite: 31770 Industry Project 1
coordinator: Mr B Wong
Students gain practical 'hands on' experience of the role of members of an information systems development team in relation to business organisational goals and objectives; students are incorporated as members of a project team in a sponsoring company. Training will also be provided in a variety of development tools in order to build up a defined skills profile in conjunction with the subject 31770 Industry Project 1.

31853
OFFICE AUTOMATION
4cp; 3hpw
prerequisite: 31621 Systems Analysis
coordinator: Mr C S Johnson
Covers the advanced concepts of office automation and the impact on the organisational structure. Analysis of the social issues of the implementation of office automation systems into the corporate structure and the current information systems. The management of office automation systems is discussed. Current research issues in office automation are presented by the researchers. Practical exposure is given in the requirements stage of office automation.

31854
DISTRIBUTED DATABASES
4cp; 3hpw
prerequisites: 31631 Database; 31632 Communications and Networks
coordinator: Dr G Feuerlicht
Addresses both the theoretical and practical issues associated with design and implementation of distributed
database and client/server systems. Relational database concepts will form the basis for the theoretical material presented in this course. The object-oriented approach to distributed computing is also briefly covered. The material presented in lectures will be supported by practical assignment work using a commercially available distributed database management system.

31855
SOFTWARE QUALITY ASSURANCE PRINCIPLES

4cp; 3hpw
prerequisite: nil
coordinator: Mr D Wilson

Provides students with the practical knowledge and skills in the definition of quality for software products, quality characteristics and their relationships, setting measurable and testable quality attributes, the importance of being able to measure quality, different approaches to quality metrics, methods of defining suitable metrics, examples of typical metrics and the relationship between the QA Function, Software Developers and Management. The major topics are: Total Quality Management, principles of software quality, software metrics and estimation. This is one of three subjects that comprise a full-fee-paying course which is designed for professional upgrade leading to the award of a Graduate Certificate.

31857
SOFTWARE QUALITY TECHNIQUES

4cp; 3hpw
prerequisite: 31855 Software Quality Assurance Principles
coordinator: Mr D Wilson

Provides students with the practical knowledge and skills in Verification, Validation and Test (VV&T) methods and techniques, VV&T tools, relation of VV&T to all phases of the software development life cycle, the processes of VV&T appropriate to each of the life-cycle phases, characteristics and documentation of SQA plans, quality standards, configuration management, quality audit and the effectiveness and cost of SQA. The major topics are: verification, validation and test, configuration management, software quality plans and standards, implementing SQA. This is one of three subjects that comprise a full-fee-paying course which is designed for professional upgrade leading to the award of a Graduate Certificate.

31858
QUALITY AND SOFTWARE ENGINEERING

4cp; 3hpw
prerequisite: 31855 Software Quality Assurance Principles
coordinator: Mr B Wong

The subject looks at the role of engineering methods and tools in the software development process, advantages and disadvantages of different approaches, contribution of engineering disciplines to the achievement of quality. This is one of three subjects that comprise a full-fee-paying course which is designed for professional upgrade leading to the award of a Graduate Certificate.
differences between the two approaches and advantages and disadvantages of each of them are discussed. The use of domain-specific libraries of reusable objects is also covered. Different object-oriented modelling techniques including abstract data types are compared and their applicability in different problem domains is assessed. The transition from the implementation-independent results of the OOA to the object-oriented design for different implementation platforms is also covered.

31860
OBJECT-ORIENTED PROGRAMMING AND C++

4cp; 3hpw
prerequisite: 31904 Systems Programming
coordinator: Dr K Suffern

Introduces C++ as a language to implement object-oriented programming. The subject covers objects, classes, inheritance, polymorphism and memory management in C++. Students will build upon their object-oriented experience in Eiffel, and their syntax knowledge of C.

31862
FUNDAMENTALS OF HUMAN-COMPUTER INTERACTION

6cp; 3hpw
prerequisite: nil
coordinator: Mrs J Hammond

Introduces students to the fundamental knowledge required to understand the nature and scope of HCI, the contribution to HCI of discipline areas involving human factors, language and communication, and ergonomics, and the role of HCI in the software and systems design and development process. Approaches to incorporate HCI into the software and systems development process will be examined with an emphasis on how HCI can ensure more usable software and systems for mainframes, personal computers and networks.

31863
HUMAN-COMPUTER INTERACTION TOOLS AND TECHNIQUES

6cp; 3hpw
prerequisite: 31862 Fundamentals of Human-Computer Interaction
coordinator: Mrs J Hammond

Introduces students to the knowledge and skills required to use a variety of HCI tools and techniques in all phases of the software and systems development process using mainframes, personal computers and/or networks, and to use methods and metrics for evaluating the usability of software and systems. The role of usability guidelines and standards in the systems design process is examined.

31864
IMPLEMENTATION OF HUMAN-COMPUTER INTERACTION

6cp; 3hpw
prerequisite: 31862 Fundamentals of Human-Computer Interaction
corequisite: 31863 Human-Computer Interaction Tools and Techniques
coordinator: Mrs J Hammond

Provides students with the knowledge and practical skills to implement HCI approaches in the software and systems design and development process and integrating them into organisational and business contexts. Students undertake a substantial project to gain practical experience of how HCI can be implemented, and how usability can be measured through testing and evaluation. The implementation of usability guidelines and standards in conjunction with industry-wide quality assurance standards and future trends in HCI is examined.
31875
PARALLEL PROGRAMMING
4cp; 3hpw
prerequisites: 31624 Data Structures and Algorithms; 31633 Operating Systems
coordinator: Dr B Howarth
An introduction to parallel programming covering the following topics: a parallel programming language and program development system; modularising a problem into a set of cooperating sequential processes running in parallel; the prevention of deadlock; orderly termination of a set of parallel processes; use of multiple intercommunication processors; comparison of performance under different physical configurations.

31876
OPERATING SYSTEMS FACILITIES
4cp; 3hpw
prerequisites: 31624 Data Structures and Algorithms; 31633 Operating Systems
coordinator: Dr B Howarth
The development of applications to make use of the facilities offered by an operating system offering support for a graphical user interface, such as Microsoft Windows or Macintosh will be covered. Included is the methodology involved in building applications that are driven by user actions such as the mouse as well as input from a keyboard. Issues related to inter-application communication will also be explored.

31892
LOGIC PROGRAMMING
4cp; 3hpw
prerequisites: 31624 Data Structures and Algorithms; 31625 Software Engineering
coordinator: Dr S Prabhakar
Intended to give the student an understanding of the principles and techniques underlying logic programming. A student should become proficient in PROLOG and its applications to AI problems.

31894
PROJECT
4cp; 3hpw
prerequisite: 31641 Systems Design
coordinator: Mr CW Johnson
A project is intended to give a student experience in working independently and responsibility for scientific research or the development of a small system from initial analysis to user documentation. Projects may be drawn from any area of computer science or information systems. Each project is supervised by a member of academic staff.

31896
LISP PROGRAMMING
4cp; 3hpw
prerequisites: 31624 Data Structures and Algorithms; 31625 Software Engineering
coordinator: Dr R Rist
This subject introduces the student to various aspects of common LISP, their application to AI problems and methodologies, and important programming concepts in LISP. Different aspects of LISP include various data types of LISP, recursion, iteration, functions and macros. AI applications include expert systems, model-based reasoning and diagnosis. Programming concepts include variable binding, lexical and dynamic scoping, data and procedure abstractions, and building large programs.

31897
COMPUTER SYSTEMS ARCHITECTURE 3
4cp; 3hpw
prerequisite: 31633 Operating Systems
coordinator: Associate Professor T Hintz
A systematic treatment of more advanced topics in machine organisation and systems architecture. Particular emphasis is placed on parallelism in general and its exploitation in a number of special purpose machines. Some practical work with a distributed parallel system will be included.
31901
ARTIFICIAL INTELLIGENCE THEORY
4cp; 3hpw
prerequisites: 31624 Data Structures and Algorithms; 31625 Software Engineering
coordinator: Dr R Rist
This subject covers Artificial Intelligence to give a professional basis in the basic methods and algorithms of the subject. It includes knowledge representation, machine reasoning, planning, problem solving and research, constraint-based systems, learning, and computer vision.

31902
AUDITING THE COMPUTER
4cp; 3hpw
prerequisite: 31617 Accounting Fundamentals
coordinator: Mr J Clark
Audit concepts and techniques in the EDP audit field. Control measures that must be embedded in computer accounting and information systems. Different systems of control, administrative, operational and security. Audit techniques and the DP audit function. Risk analysis, quality assurance.
The emphasis is oriented to control measures possible and desirable in various computer systems e.g. billing, creditors, payroll etc. and non-monetary information systems.

31904
SYSTEMS PROGRAMMING
4cp; 3hpw
prerequisite: 31633 Operating Systems
coordinator: Mr U Szewcow
The role of the systems programmer. Comparison of programming languages for systems programming. UNIX operating system. C programming language. Comparison of using tools vs writing a new program.

31916
COGNITIVE MODELLING
4cp; 2.5hpw
prerequisite: nil
coordinator: Dr T Osborn
Designed to proved an overview of recent developments in the exciting field of cognitive science. Bringing together work from several disciplines including psychology, neurophysiology, philosophy and AI, this subject will investigate the biological mechanisms underlying human intelligence in order to provide a theoretical model for emulating such behaviour artificially. Topics include philosophy of mind, memory systems, selective attention, learning, and emerging AI technologies such as neural networks.

31917
COMMERCIAL PROGRAMMING
4cp; 4hpw
prerequisite: 31429 Procedural Programming
coordinator: Ms J Robb
Top-down structured program design techniques, and their application to the development of commercial programming applications. Emphasis will be on quality and usability of the resultant systems. Debugging and testing skills will be developed. The language used will be COBOL.

31918
DEVELOPMENT METHODOLOGIES
4cp; 4hpw
prerequisite: 31424 Systems Modelling
coordinator: Mr J El-Den
This subject deals with the ways system development becomes part of the operation of the modern day enterprise. It outlines how system development processes fall into and support everyday operations in an enterprise and how they are managed within the enterprise. There is particular emphasis on re-engineering existing systems into client needs using existing systems whenever possible, and minimising development
costs through reuse of existing modules and the use of productivity tools that minimise development time while improving system quality.

31919
DISTRIBUTED SOFTWARE PROGRAMMING
4cp; 4hpw
prerequisite: 31436 Systems Software and Networks; 31920 Network Management
coordinator: Mr U Szewcow
This subject builds on material learned in Systems Software and Networks and the Network Management elective to provide an understanding of the distributed systems and public domain software that enable students to design and develop distributed applications.

31920
NETWORK MANAGEMENT
4cp; 4hpw
prerequisite: 31436 Systems Software and Networks
coordinator: Mr J Colville
Instruction in network concepts, and the concepts and practical issues of network management. Students will have access to a laboratory where some aspects of network management can be tried out in a practical way.

31921
OBJECTBASES
4cp; 3hpw
prerequisite: 31434 Database Design
coordinator: Dr G Feuerlicht
This subject introduces the students to OODB concepts. We review the basic OO principles and discuss their application to database. The theoretical discussion of the topic will be supported with practical exercise using a commercially available OODBMS.

31922
OBJECT-ORIENTED METHODOLOGIES
4cp; 3hpw
prerequisite: 31424 Systems Modelling
coordinator: Professor B Henderson-Sellers
Two selected methodologies are presented in detail. Lifecycle issues, process support and deliverables are all described. Each methodology is explored in the framework of concepts; representation; process; pragmatic; application domains.

31923
OFFICE AND GROUP SUPPORT
4cp; 3hpw
prerequisite: 31424 Systems Modelling
coordinator: Professor I Hawryszkiewycz
The subject describes evolution of systems towards distributed environments with more emphasis on remote and mobile workers. It describes how people work together and the changes to work practices resulting from distribution of such work. The subject covers the collaboration technology needed to support distributed work and the design processes followed to construct computer-based group support systems.

31924
PERFORMANCE MODELLING
4cp; 4hpw
prerequisite: 31432 Systems Software and Networks
coordinator: Dr B Howarth
This subject teaches concepts and practice of mathematical modelling for discrete-event systems. Students will gain experience in applying queuing theory models and discrete-event simulations to computer systems, and analysing the results. An important application of modelling is capacity planning, and students will be introduced to this topic.
31925
SMALLTALK
4cp; 3hpw
prerequisites: 31415 Principles of Software Development A; 31421 Systems Modelling
coordinator: Professor B Henderson-Sellers
Topics include Smalltalk 80 - class, metaclass, message, inheritance, polymorphism; Input and output; Dynamic typing; Debugging; Testing; Collections; Streams; Booleans; Graphics classes; Smalltalk/Visual Works environment; Smalltalk image; triad.

31931
SOFTWARE QUALITY ASSURANCE
4cp; 3hpw
prerequisite: 31621 Systems Analysis
coordinator: Mr C S Johnson
Aims to provide students with the practical knowledge and skills that are necessary to effectively measure and control the quality of software products. Major topics are quality assurance principles, quality metrics, verification, validation and test, implementing quality assurance, software engineering methods and tools.

31934
INTRODUCTION TO DATABASE DESIGN
4cp; 4hpw
prerequisite: nil
coordinator: Dr G Feuerlicht
This subject introduces the students to basic database design and implementation concepts. Database design techniques including relational design and E-R analysis are presented. Relational databases and object-oriented databases are described and the applicability of each approach to various problem domains discussed.

31940
INTRODUCTION TO SYSTEMS MODELLING
4cp; 4hpw
prerequisite: nil
coordinator: Professor I Hawryszkiewycz
Introduces information system concepts including their static and dynamic components. It describes how these concepts can be used to model systems to correctly capture its structure and needs. It outlines how the ability to capture information about the system in ways understood by its eventual users will improve the final quality of the system.
Introduce analysis using various approaches found in contemporary system development including object-oriented methods, data flow diagrams and Entity-Relationship modelling and describe the relationships between these techniques and their application.

31941
INTRODUCTION TO PROCEDURAL PROGRAMMING
4cp; 3hpw
prerequisite: nil
coordinator: Mr U Szewcow
Top-down structured program design techniques, and their application to the development of commercial programming applications. Emphasis will be on quality and usability of the resultant systems. Debugging and testing skills will be developed. The language used will be C.

31942
INTRODUCTION TO COMPUTER SYSTEMS ARCHITECTURE
4cp; 3hpw
prerequisite: nil
coordinator: Mr C W Johnson
To provide students with a model of computer hardware and data communications. This will help students understand the execution environment required by the software they will study and develop in the remainder of the course.
31943
INTRODUCTION TO
INFORMATION SYSTEMS
4cp; 4hpw
prerequisite: nil
coordinator: Mr J Underwood
This subject deals with information systems in their organisational context.
The effects of information systems on society, organisations and individuals are discussed. Examples from typical organisations are used to illustrate information systems concepts. Techniques for analysing and describing user requirements are introduced.
Throughout the subject there is an emphasis on human activities, the importance of the user in the analysis phase and the usability of systems. Another theme is communication skills, i.e. the ability of the analyst and designer of an information system to interview, to write reports and manuals, to design efficient and effective interfaces and to give presentations on the system.

32106
OBJECT-ORIENTED SOFTWARE DEVELOPMENT
6cp; 3hpw
prerequisite: nil
coordinator: to be advised
Basic principles of object-oriented (OO) software development. Classes as modules and classes as types. OO analysis and design. Software design as object modelling through abstract data type definition. Design by contract and subcontracting. The different forms of inheritance. OO programming. Static vs dynamic typing; static vs dynamic binding. Comparison of OO programming languages. Software development environments. Support for OO methods and techniques. OO models of the software development process. Project management for OO. Designing for reusability. Abstraction and generalisation. Models of application domains as the basis for OO frameworks for fast application development.

32107
FORMAL REASONING FOR SOFTWARE DEVELOPMENT
6cp; 3hpw
prerequisite: nil
coordinator: Dr B Jay
Promote a methodology where correctness is established before efficiency is considered. Specification languages allow the precise description of systems, while abstracting away from implementation concerns. Formal refinement allows programs to be developed from specifications, while preserving correctness. Semantics of languages provide a basis for reasoning about their correct implementation. Reasoning about concurrency is difficult; formal models of concurrency will be introduced.

32108
SPECIALIST TOPICS IN ARTIFICIAL INTELLIGENCE
6cp; 3hpw
prerequisite: nil
coordinator: Dr S Prabhakar
This subject covers some important areas of Artificial Intelligence (AI) and their applications. These areas include, broadly, Knowledge Representation, Problem Solving, Planning, Knowledge-based Systems, Dealing with Uncertainty, Explanation Facilities, Machine Learning, and Applications of AI. The subject quickly introduces to students the basic AI techniques and then deals with individual topics in depth. The subject may specialise in one or more sub-areas of AI.

32204
ADVANCED DATA MANAGEMENT
6cp; 3hpw
prerequisite: nil
coordinator: Dr G Feuerlicht
The subjects covers a range of advanced topics in database including relational and object-oriented database systems and distributed databases. The subject area is treated mainly from a technology view-point, but also includes discussions of management issues.
32205
COMPUTER COMMUNICATION SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Ms D Jinks


32206
ADVANCED INFORMATION SYSTEMS MODELLING
6cp; 3hpw
coordinator: Mr R Raban

Information systems requirements can be modelled in many different ways. The modelling method used should be suitable to the class of the system. The modelling methods differ in terms of their expressive power and ability to describe requirements in specific application domains. This subject presents and compares the information systems modelling methods used in structured and object-oriented methodologies. Formal and de facto industry standards for modelling information systems are also covered.

32207
INFORMATION MANAGEMENT
6cp; 4hpw
prerequisite: nil
coordinator: Mr P Bebbington

This subject covers three broad topics: management of the information resources of an organisation, management of the development and maintenance of systems using those resources, and management of IT personnel and users of the information resources. Management of information resources requires the calculation of the costs, and benefits of such resources both in accounting, and qualitative terms, and the controlling and recovering of costs so that services can be used in an efficient and effective manner. It also includes the security, privacy, and legal matters which are part of data management. Management of system development and maintenance includes project management and control, systems development methodologies and tools, and IT organisation structures. The emphasis in IT personnel and client relationship management is on the effective use of IT staff in an increasingly user-oriented world.

32208
INFORMATION PROCESSING STRATEGY
6cp; 3hpw
prerequisite: 32207 Information Management
coordinator: Mr D Wilson

This subject is designed to provide students with an awareness of the problems in developing corporate strategies for information processing and to develop skills in the selection and use of appropriate techniques. Topics include: tools for strategic planning, a review of strategic planning tools such as Business Systems Planning, Economic Analysis and Critical Success Factors; corporate needs for information technology covering the potential role of information technology in organisations of the 1990s such as competitive strategies, client-server systems, multimedia, outsourcing; and strategic planning, a review of state-of-the-art methodologies and frameworks for developing information processing strategies.

32306
CAPACITY MANAGEMENT
6cp; 3hpw
prerequisite: nil
coordinator: Dr B Howarth

Introduces students to the concepts of capacity management, and relates this management tool to the broader management areas of corporate planning and systems development.
32307
OPERATING SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Dr B Howarth

32308
COMPUTER ARCHITECTURE
6cp; 3hpw
prerequisite: nil
coordinator: Associate Professor T Hintz
Current directions in machine architectures, and the relationship between machine architecture, task structure and system performance.

32402
INFORMATION TECHNOLOGY ENVIRONMENT
6cp; 3hpw
prerequisite: nil
coordinator: Mr J Underwood
(not offered in 1995)
This subject deals with trends and issues in the management of IT. Typical issues are: IT within the company – user and expert cultures; competition vs collaboration in the IT industry; relations between suppliers and customers; hardware manufacturers and software houses; downsizing and outsourcing; encouraging innovation; IT as a global industry; social impacts of IT; employment effects; IT as a leading part of the economy.

32501
COMPUTER GRAPHICS
6cp; 3hpw
prerequisite: nil
coordinator: Dr K Suffern
Demonstrates why computer graphics is important, and, through the lectures and practical work, gives students a working knowledge of elementary two-dimensional and three-dimensional graphics programming algorithms.

32502
ADVANCED COMPUTER GRAPHICS TECHNIQUES
6cp; 3hpw
prerequisite: 32501 Computer Graphics
coordinator: Dr K Suffern
Gives students a working knowledge of ray tracing, which is one of the two major image synthesis techniques. It also gives students practical experience with a commercial rendering and animation package.

32503
DISTRIBUTED DATABASES AND CLIENT/SERVER COMPUTING
6cp; 3hpw
prerequisite: nil
coordinator: Dr G Feuerlicht
The subject covers a range of topics in distributed database and client/server computing. The main topics include discussion of distributed database design, distributed transactions and queries, and data replication strategies. The subject area is treated mainly from a technical viewpoint, but also includes discussions of management issues relevant to distributed database and client server computing and commercially available technology.

32504
TOOL-BASED SYSTEMS DEVELOPMENT
6cp; 3hpw
prerequisite: nil
coordinator: Dr G Feuerlicht
The current industry trend is away from the traditional programming-oriented approach towards a tool-based approach to system analysis and development. Central to this approach is the use of repositories to define and maintain information about application systems.
and the use of tools to develop applications. This elective subject focuses on system development methodologies and techniques and the use of commercially available tools for systems development.

32505
ADVANCED OBJECT-ORIENTED ANALYSIS AND DESIGN
6cp; 3hpw
prerequisite: nil
coordinator: Mr R Raban

This subject introduces object-oriented methods to analyse the problem domain and to create an implementation independent formal representation of the system requirements. The object-oriented analysis (OOA) utilises the concept of 'an object' to represent the problem and to identify meaningful abstractions within the problem domain. As elements of the OOA process, OOA representation and OOA complexity management are introduced and compared with related concepts of structured analysis methodologies and differences discussed between the two approaches. Advantages and disadvantages of each of them are discussed. The use of domain specific libraries of reusable objects is also covered. Different object-oriented modelling techniques including abstract data types are compared and their applicability in different problem domains is assessed. The transition from the implementation independent results of the OOA to the object-oriented design for different implementation platforms is also covered.

32506
KNOWLEDGE SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Dr S Prabhakar


32507
PERFORMANCE EVALUATION
6cp; 3hpw
prerequisite: nil
coordinator: Dr B Howarth

Introduces students to performance modelling techniques for computers and networks. It is intended for students who have not covered similar material in their undergraduate studies.

32508
SOFTWARE QUALITY MANAGEMENT SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Mr D Wilson

Provides students with the practical knowledge and skills necessary to manage the quality of software products. It will provide an essential understanding of software quality management, which is a key strategy in enabling the Australian IT industry to compete both nationally and internationally.

32509
HUMAN-COMPUTER INTERACTION IN INFORMATION SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Mrs J Hammond

Provides students with an understanding of the principles, concepts, tools and techniques needed to manage the development of information systems from a human–computer interaction perspective. Usability is considered throughout information systems development from initial systems concept to implementation.
32601
ADVANCED PROJECT MANAGEMENT
6cp; 3hpw
prerequisite: nil
coordinator: Mr D Wilson
Provides an essential understanding of advanced project management issues and identifies the knowledge required of a project manager in the information technology industry.

32602
IMPACT OF INFORMATION TECHNOLOGY
6cp; 3hpw
prerequisite: nil
coordinator: to be advised
Reviews the effect of the introduction of computer technology into work places, improved efficiency of work organisations, increased occupational health hazards for computer terminal operators, and increased potential for computer crimes. Physical, psychological and environmental factors that contribute significantly to the conditions such as RSI are explained in depth. The effects of information technology on employment patterns are examined. We define and categorise computer crime and discuss difficulties associated with its prevention, detection, and with subsequent legal actions. Measures to ensure the protection of privacy are explained in this unit.

32603
SOFTWARE QUALITY MANAGEMENT
6cp; 3hpw
prerequisite: nil
coordinator: to be advised
Provides the students with the practical knowledge and skills necessary to manage the quality of software products.

32604
SYSTEMS INTEGRATION
6cp; 3hpw
prerequisite: 32601 Advanced Project Management
coordinator: to be advised
System Integration can be defined as the business of adding value to a specific project, by assuming responsibility for combining information products and services into a specified business solution. The System Integrator takes the responsibility and risk for the project. From the set of user requirements right through to the final output solution, delivered on time, within budget and achieving the expected performance criteria.

32701
ADVANCES IN INFORMATION TECHNOLOGY
6cp; 3hpw
prerequisite: nil
coordinator: to be advised
Looks at the technology trends affecting information processing and delivery, to provide the student with the vision to ensure that not only is their company well served in the present by its technology environment, but that it is also able to take up the opportunities of the future.

32702
CONTEMPORARY TELECOMMUNICATIONS
6cp; 3hpw
prerequisite: nil
coordinator: to be advised
32703
INFORMATION TECHNOLOGY STRATEGY
6cp; 3hpw
prerequisite: nil
coordinator: to be advised
Designed to provide students with an awareness of the problems in developing corporate strategies for information processing and to develop skills in the selection and use of appropriate techniques.

32818
PROJECT
18cp; 3hpw to be advised
prerequisite: Graduate Diploma in Information Technology Management
corequisite: 21751 Management Research Methods
coordinator: to be advised
All students in the MBus in IT Management are required to enrol in and pass the project subject. The project is normally undertaken in the final year of study. The project entails a substantial investigation, under the supervision of a member of the academic staff, and is examined on the quality of both a written report and an oral presentation of the project work. The oral presentation must be made in the final year of enrolment in the Master's course and must be presented at a satisfactory standard. Expert speakers may be available to present Master's seminars as required throughout the final year of the course. Students are required to attend the Master's seminars.

32901
RECENT ADVANCES IN COMPUTER SCIENCE
6cp; 3hpw
prerequisite: nil
coordinator: Dr S Prabhakar
Review of key developments in computer science. Selection of topics from: software engineering, artificial intelligence, knowledge processing, computer graphics, theory of computer science, decision support systems, capacity planning, communications, distributed systems, computer architecture.

32902
RECENT ADVANCES IN INFORMATION SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Mr J Underwood
Reviews some key developments in the information systems discipline. Some likely topics are: new techniques in database design; automated development methodologies; alternative system modelling techniques; system usability; quality in information systems; organisation-wide network design; participative system design; managing the IT function in the next decade; security in information systems; evaluating the economics of information systems; career paths in IT.

32912
PROJECT
12cp
prerequisite: nil
coordinator: Professor J Debenham
(Please see 32924 Project below)

32924
PROJECT
24cp
prerequisite: nil
coordinator: Professor J Debenham
Subjects offered by other faculties

Students should consult the relevant Faculty and its handbook for any late changes to subject information.

21708

STRATEGIC BUSINESS MANAGEMENT

6cp; 3hpw
prerequisites: Graduate Certificate in Information Technology Management; 21806 Managing Organisational Change

coordinator: Professor S Mukhi

The nature of strategic issues; arenas of strategy; the information technology industry: context and issues; concepts of strategy; environmental analysis; capability analysis; development of strategic alternatives; evaluation and choice of strategic alternatives; stability, change and transformation; the process of strategy implementation; strategic control and monitoring.

21751

MANAGEMENT RESEARCH METHODS

6cp; 3hpw
prerequisite: Graduate Certificate in Information Technology Management

coordinator: Associate Professor G Ticehurst

Will familiarise IT managers with a range of approaches used in management research, with an emphasis on approaches commonly used in practical settings. Advantages and limitations of different research approaches will be examined, as well as their applicability in different IT contexts. Experience will be provided in the design of research studies and in the analysis and interpretation of data and report presentation. Participants will acquire skills which will be useful in the conduct of research agendas in their own IT organisations, and in the critical evaluation of other’s research work.

21788

EFFECTIVE PEOPLE MANAGEMENT

6cp; 3hpw
prerequisite: nil

coordinator: Mr R Connor

Deals with a range of critical interpersonal management skills, competencies and understandings necessary for effective people management. It seeks to develop enhanced competence in managing others and recognising the importance of continuing personal learning and development in management, and seeks to develop an increased sensitivity and understanding of self and others in organisational contexts.

21789

CONTEMPORARY MANAGEMENT PRACTICES

6cp; 3hpw
prerequisite: nil

coordinator: Associate Professor G Ticehurst

Addresses a range of management practices appropriate to contemporary organisations. The unit provides students with an understanding of key aspects of current management practices including managerial relationships; intercultural management; leadership, status and power; negotiation; interviewing; team building; managerial audits; and managerial ethics.

Students explore a range of strategies for handling management issues, e.g. competencies relevant to people, organisational structures and issues and working in international environments.

21806

MANAGING ORGANISATIONAL CHANGE

6cp; 3hpw
prerequisite: nil

coordinator: Ms A Ross-Smith

Provides participants with a knowledge of the principles of organisational design and an appreciation of the dynamics underlying organisational
change. The role of IT managers in creating adaptive, flexible structures and in maintaining the momentum of the change process will be discussed. Students will be introduced to a variety of techniques for diagnosing the strengths and weaknesses of organisations, and to a range of organisational development interventions suitable for their industry. They will develop useful change agent skills by participating in a group action learning project.

21807
TOTAL QUALITY AND PRODUCTIVITY MANAGEMENT
6cp; 3hpw
prerequisite: Graduate Certificate in Information Technology Management
coordinator: Dr T Fisher
Productivity and quality are both key factors in successful performance in the IT industry. This subject aims to develop a clear understanding of the practical and managerial aspects of quality management and productivity management, including the fundamentals of TQM and its relationship to productivity. Students completing this subject will have a sound philosophical and practical basis for evaluating productivity and quality improvement programs and Total Quality implementation programs.

21809
MANAGERIAL ANALYSIS AND EVALUATION OF INFORMATION SYSTEMS
6cp; 3hpw
prerequisite: nil
coordinator: Dr F Soliman
Presents a range of fundamental accounting, risk analysis and performance criteria for information systems. This subject is intended to provide basic skills in evaluating computer-based information systems. For students who are involved in management, it is important that they are aware of what information systems can provide and how to rate them and how to specify their requirements for their organisation's advantage.

24105
PRINCIPLES OF MARKETING
5cp; 3hpw
prerequisite: nil
coordinator: Ms R McGuiggan
To develop an awareness and understanding of marketing concepts and how these concepts apply to profit and not for profit organisations. To provide the foundations from which a more advanced study of marketing may be pursued. To show the relevance of the need for a marketing orientation in a dynamic and changing business environment. To allow students to test and apply marketing concepts in a dynamic simulated business environment. To develop the skills necessary to formulate a basic marketing plan. The projects also highlight the need for group decision making for effective management.

24704
MANAGING CLIENT RELATIONS
6cp; 3hpw
prerequisite: nil
coordinator: to be advised
Reviews the nature of the business development process through focussing upon the specific needs of clients. It explores the complex issues of determining and focussing on client needs as a key activity for IT managers who wish to maximise their impact. Specific IT-based case material will be used throughout the course to ensure that participants recognise the essential relationship between product and client satisfaction.
25106
ECONOMICS
Scp; 3hpw
prerequisite: nil
coordinator: Mr E Kasamanie
Provides a short, intensive introduction to the two major components of economic theory—microeconomics (which deals with the behaviour of individuals, firms and industries) and macroeconomics (which deals with the behaviour of the national and international economies). Through this introduction, students will begin to acquire a foundation of economic understanding useful in management decision-making. Microeconomics is a major source of techniques used by managerial economists; and both micro and macroeconomics provide insights into the external environment within which firms operate and managers must function.

25301
FINANCIAL MANAGEMENT
Scp; 3hpw
prerequisite: 23106 Economics
coordinator: Mr K Chan
Financial Management is a specialised field of study which provides the analytical framework for corporate financial decisions. Its objective is to introduce students to finance theory and to the tools of financial decision making in the context of the Australian institutional environment. Financial Management is concerned primarily with investment project evaluation and risk analysis of securities.

FACULTY BOARD IN MATHEMATICAL AND COMPUTING SCIENCES

The composition of Faculty Board is currently under review. The following list is subject to change.

Ex officio members
Dean of Faculty
Associate Professor J M Hughes (Chair)
Alternate Dean
Professor A G Shannon (Deputy Chair)
Head, School of Mathematical Sciences
Associate Professor L C Botten
Head, School of Computing Sciences
Associate Professor J J Edwards
The Professoriate
Professor J K Debenham, School of Computing Sciences
Professor I T Hawryszkiewycz, School of Computing Sciences
Professor B Henderson-Sellers, School of Computing Sciences
Professor B S Thornton, School of Mathematical Sciences

Nominated members
Ms S Alexander, Centre for Learning and Teaching
Professor C R Drane, Faculty of Engineering
Associate Professor J Kirk, Faculty of Humanities and Social Sciences
Mr R Munro, Faculty of Education
Associate Professor G P Norton, Faculty of Science
Ms E Sietsma, University Library
Dr M Stevenson, Faculty of Business

Elected staff members
School of Mathematical Sciences
Academic staff
Associate Professor G L Cohen
Mr T M Langtry
Dr G J McLelland
Mr T M Park
Dr G H Smith
Ms L N Wood
Support staff
Mrs J C Smith
School of Computing Sciences

Academic staff
Mr P Bebbington
Associate Professor T Hintz
Dr B Howarth
Ms J Y Robb
Dr K G Suffem
Mr J Underwood

Support staff
Mrs S L Jenner

Elected student members
School of Mathematical Sciences
Mr Q Nguyen
Mr C-K Wong

School of Computing Sciences
Mr A Blair
Mr G J E Moes

SCHOOL ADVISORY COMMITTEES

The following information is correct as at 4 November 1994.

SCHOOL OF MATHEMATICAL SCIENCES

Ex officio members
Dean of Faculty
Associate Professor J M Hughes
Head, School of Mathematical Sciences
Associate Professor L C Botten

Academic staff members
Professor A G Shannon
Dr G J McLelland

External members
Dr N Barton, Manager, Applied and Industrial Mathematics Program, Division of Mathematics and Statistics, CSIRO
Dr J Green (Chair), Executive Director, Quantitative Applications Division, Macquarie Bank
Dr G Lack, Director, Management Consultancy Division, Coopers & Lybrand Consultants
Dr R McPhedran, University of Sydney
Mr R Morath, Chief Executive, MLC Investments

Mr P Newnam, Computer Systems Specialist, Surveillance Division, Australian Stock Exchange

Recent graduates
Mrs D Nash, Commonwealth Bank of Australia
Mr L Rask, CS First Boston Australia
Mr N Rugg, Australian Stock Exchange

SCHOOL OF COMPUTING SCIENCES

Ex officio members
Dean of Faculty
Associate Professor J M Hughes
Head, School of Computing Sciences
Associate Professor J J Edwards

Academic staff members
Professor J K Debenham
Dr B Howarth

External members
Ms M Alexander (Chair), Expertise Australia Pty Ltd
Mr P Andrew, General Manager, Information Systems, Commonwealth Bank of Australia
Mr C Connaughton, Chief Technical Officer, Computer Sciences Corporation Australia Pty Ltd
Mr J Goddard, Honorary Associate, School of Computing Sciences
Ms H Meredith, The Financial Review, John Fairfax & Sons Ltd
Mr R Schmid, Hon Secretary (NSW Branch), Australian Computer Society
Mr P Steele, Senior Consultant, Totalizer Agency Board of NSW

Recent graduates
Ms L Francis, Maxim Technology Ltd
Mr A Klammer, OTC Limited
COURSE ADVISORY COMMITTEES

BACHELOR OF MATHEMATICS AND FINANCE – COURSE ADVISORY COMMITTEE

Ex officio members

Head, School of Finance and Economics
Professor C Chiarella (Chair)

Head, School of Mathematical Sciences
Associate Professor L C Botten

Academic staff members

Dr G McLelland, Deputy Head, School Mathematical Sciences
Dr M Stevenson, Senior Lecturer, School of Finance and Economics

External members

Dr L Balzer, Lend Lease Corp Services
Dr J Gray, AMP Investments
Dr J Green, Executive Director, Quantitative Applications Division, Macquarie Bank
Mr K Trevor, Australian Graduate School, University of New South Wales
Dr P Vann, Partner, Condell, Vann and Co

BACHELOR OF INFORMATION TECHNOLOGY – COURSE STEERING COMMITTEE

Ex officio members

Dean of Faculty
Associate Professor J M Hughes (Chair)

Head, School of Computing Sciences
Associate Professor J J Edwards

Director, Undergraduate Studies
Dr B Howarth

BInfTech Coordinator
Mr D N Wilson

Director, Industry Liaison
Mr P Bowyer

External members

Mr G Andean, Senior Applications Project Manager, Nestlé Australia Ltd
Ms J Bell, Director, Human Resources – Pacific Basin, Amdahl Pacific Services Pty Ltd

Mr G Berté, Manager, Application Systems, NZI Insurance Australia Ltd
Mr J Brown, Director of Information Technology Directorate, NSW Department of School Education
Mr C Buckland, Development Manager, Application Development & Maintenance Services, IBM Australia Ltd
Ms G Burke, Head of Information Services, Macquarie Bank Ltd
Ms J Busby, Controller IT Systems Development, Information Technology, Australian Broadcasting Corporation
Mr J Carlson, Training Administrator, AGL Information Systems Pty Ltd
Mr V Connolly, Senior Manager Projects, Systems & Technology Department, Reserve Bank of Australia
Mr L Coyne, General Manager (Information Services), Legal & General Life of Australia Ltd
Mr K Crowe, Systems Development Manager, Westpac Banking Corporation
Ms R Davies, Manager, Corporate Services, QANTEK Ltd
Mr G Dixon, Manager, Products Industry, Andersen Consulting
Mr C Fagan, Associate Director, Price Waterhouse Urwick
Mr C Firbank, Senior Manager, Systems, Advance Bank Australia Ltd
Ms A Hutchings, Recruitment and Training Officer, Macquarie Bank Ltd
Mr G Jones, Senior Analyst Programmer, American Express International Inc
Mr K Loughland, Senior Manager – Resources Planning and Administration, Commonwealth Banking Corporation
Mr T MacGregor, Manager – Corporate Information Services, Johnson & Johnson Pacific Pty Ltd
Mr B McClean, Group Management Accountant, NRMA Ltd
Ms B Monk, Manager, Resources Planning, Technology Department, Westpac Banking Corporation
Mr G Murray, General Manager, Financial Services, IBM Australia Ltd
Mr G Paiva, MIS Manager, Otis Elevator Company Pty Ltd
Ms H Richardson, Project Manager, IBM Australia Ltd
Mr R Tuxford, Manager, Information Systems, AGL Information Systems Pty Ltd
Mr M Webb, Assistant General Manager, Business Services, NZI Insurance Australia Ltd
Ms B Webb, Senior Manager, Life & Superannuation Services, Continuum Australia Ltd
Mr G Wilson, Head of Systems & Technology Department, Reserve Bank of Australia

Student representatives
Ms S Mostacci
Mr R Streeter

UTS mentors
This group consists of a number of academic staff from the School of Computing Sciences. Their principal role is to ensure that students will benefit from the industry placement. The mentors act as the primary point of contact between the student and the University, and between the sponsor and the University during the industry placement.

STAFF LIST

Associate Professor and Dean of Mathematical and Computing Sciences
J M Hughes, BSc (Syd), MIEEE, FACS, MBCS

Faculty Administrator
F Ma, BA (Hons), DipEd (HKU)

Secretary to the Dean
I Ee

Graduate Assistant
B M Irvine, BA (Hons) (Macq)

Administrative Assistant
G C Goodwin-Moore, BSc (Hons) (Lond)

School of Mathematical Sciences

Associate Professor and Head of School
L C Botten, BSc (Hons), PhD (Tas), FAIP, MACS, MOSA

Deputy Head of School
G J McLelland, BSc, PhD (Syd)

Associate Professor and Director, Postgraduate Studies
G L Cohen, MSc (Syd), PhD (UNSW), CMath, FIMA, FAustMS

Director, Undergraduate Studies
G H Smith, MSc (Rand), PhD (UNSW), DipGeoscience (Macq)

Adjunct Professor
R C McPhedran, BSc (Hons), PhD (Tas), FAIP, FOSA

Computational Mathematics Unit

Senior Lecturer and Head of Unit
T M Park, BSc (Mane), MSc (UNSW), FACS, MIEEE, MBCS

Professor
B S Thornton, PhD (UNSW), DSc (Syd), CPhys, CEng, FInstP, FBCS, FACS, FRAeS, FIEAust

Associate Professor
L C Botten, BSc (Hons), PhD (Tas), FAIP, MACS, MOSA
Senior Lecturers
T N Langtry, BA (Hons) (UNSW), MA (NSWIT), MACS
K W Özanne, BA (Hons) (Melb), MSc (Lond)

Lecturers
B R E Lederer, BSc (Hons), MEngSc (UNSW), PhD (Syd), MACS
D R Porteus, BSc, DipEd (Tas), MACE
R M Sorli, BSc (Hons) (Syd), MA (NSWIT), MACS

Mathematics Unit
Associate Professor and Head of Unit
G L Cohen, MSc (Syd), PhD (UNSW), CMath, FIMA, FAustMS

Professor of Applied Mathematics
A G Shannon, AM, BSc, DipEd (Syd), MA, PhD, MLitt (NE), CMath, FCP, FIMA, FACE

Senior Lecturers
G J McLelland, BSc, PhD (Syd)
B J Moore, MSc (Syd), PhD (Cantab)
J G Sekhon, BSc (Hons) (WAust), MSc (Lough), DipEd, PhD (NE)
G H Smith, MSc (Rand), PhD (UNSW), DipGeoscience (Macq)
L N Wood, BSc (Hons) (UNSW), DipEd (Tech) (SCAE), MA (Macq)

Lecturers
M Coupland, BSc, DipEd, MEd (Syd)
B W Stephenson, BAppSc (NSWIT), DipTeach (Syd Teach Coll), MA (UNSW)

Statistics and Operations Research Unit
Head of Unit
Vacant

Senior Lecturer
P Petocz, BA (Hons), PhD (UNSW), DipEd (Tech) (SCAE)

Lecturers
L Groen, BSc, DipEd (Syd), GradDipOR (NSWIT), MA (UTS), MCom (Hons) (UNSW), MASOR
J M Hogg, BSc (Syd), MSc (OR) (UNSW), MASOR
E Lidums, BSc (Hons), MSc (Syd)
R I Rozsasi, BSc (Syd), AFIMA

P A Wright, BA (Macq), MStats, MEngSc (UNSW)
Y Zinder, MSc (Gorky), PhD (AcadSc, USSR), MASOR

Associate Lecturer
N F Smith, BSc (Hons) (Syd)

Administrative and Technical Staff

Administrative Officer
J C Smith

School Clerk
Vacant

Word Processor Operator
Vacant

Senior Systems Programmer
M J Caden, BAppSc (UTS)

Computer Systems Support Officer
E B Lindsay

School of Computing Sciences

Associate Professor and Head of School
J J Edwards, BSc (Hons), MSc, PhD (Syd), MACS, MASOR

Associate Professor and Deputy Head of School
T Hintz, BSc (EE) (UTexas), MSc (EE), DSc (EE) (NewMexSU), MACS, MACM, MIEEE

Professor of Computing Science, Director, Key Centre for Advanced Computing Sciences and Director, Postgraduate Studies
J K Debenham, MA, MSc (Dub), PhD (Syd)

Professor of Computing Science
I T Hawryszkiewycz, BE (Hons), ME (Adel), PhD (MIT), MACS

Professor of Information Systems
B Henderson-Sellers, BSc (Hons) (Lond), MSc (Reading), PhD (Leic), ARCS, FIMA, FIEAust, MACS, CPEng

Associate Professor, and Director, External Development
M Fry, MA (Cantab), MSc (Lond), PhD (Syd), DIC
Director, Undergraduate Studies
B Howarth, BSc (UNSW), MEng (N’cle), PhD (Calif), SMIEEE, MACS

Director, Graduate Education
J Robb, BSc (UNSW), MSc (Lond), MBCS, MACS

Visiting Professor
L Constantine, MBA (Sloan), MACM, MIEEE

Honorary Associates
J Goddard, DipTech (Public Admin) (NSWIT), MScS, FACs
W Holmes, BEE (Melb)
D Herbison-Evans, BA (Hons) (Oxon), MA, DPhil (Oxon), Dip (Dance Ed) (Sydney Dance Development Centre)

Computing Methods Unit
Senior Lecturer and Head of Unit
K Suffern, BSc (Hons), MSc (Monash), MSc (Corn), PhD (Syd), MACS

Senior Lecturers
C B Jay, BSc (Hons) (Syd), PhD (McGill)
T Osborn, BMath (Hons), MMath, PhD (N’cle), INNS, ACM
R Rist, BSc (Psych) (Hons), BSc (ComSc) (UNSW), GradDip (CCAE), MSc, MPhil, PhD (Yale), MACS

Lecturer
S Prabhakar, BE, PhD (IISc)

Associate Lecturer
D Mahler BSc (Hons) (La Trobe)

Computer Systems Unit
Senior Lecturer and Head of Unit
B Howarth, BSc (UNSW), MEng (N’cle), PhD (Calif), SMIEEE, MACS

Lecturers
J Colville, MSc (Melb), MBCS, MACS, CEng
C W Johnson, MAppSc (NSWIT), MComp (Macq), MRACI, CChem, MACS
U Szewcow, BSc, DipNAAC (Syd), MEngSc (UNSW), MIEEE, MACS
V Tu, BSc, BE (UMontreal), ME (Hons) (W’gong), MCSEE, MACS

Information Systems Management Unit
Lecturer and Head of Unit
J Underwood, BSc (UNSW), GradDipRecPlan, GradDipAdmin (CCAE)

Senior Lecturers
J Hammond, BA, DipTchg (NZ), MScSoc (UNSW), FACS, MBCS, MACE
D Wilson, BSc (Hons), MSc (UTS), CEng, MBCS, MACS, MACM, MQSA

Lecturers
P Bebbington, BSc (Tech), MEngSc, MCom (UNSW), MACS
J Clark, BEcon (JCU), MEcon (New Mex), IASTED, ACM, BIM
C S Johnson, BAppSc (Hons) (CompSc) (NSWIT), MPhil (Brun)
L Smith, BA (Syd), MA (Macq), MACS
B Wong, BSc (Syd), MCom (UNSW), MACS, AIMM, JP

Information Systems Technology Unit
Senior Lecturer and Head of Unit
J Feuerlicht, BSc (Lond), DIC, PhD (Lond), MACS

Senior Lecturer
J Robb, BSc (UNSW), MSc (Lond), MBCS, MACS

Lecturers
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D Jinks, BSc (ANU), MACS
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I Chu

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L Chamas

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G Redwood, BE (Hons) (NSWIT)

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