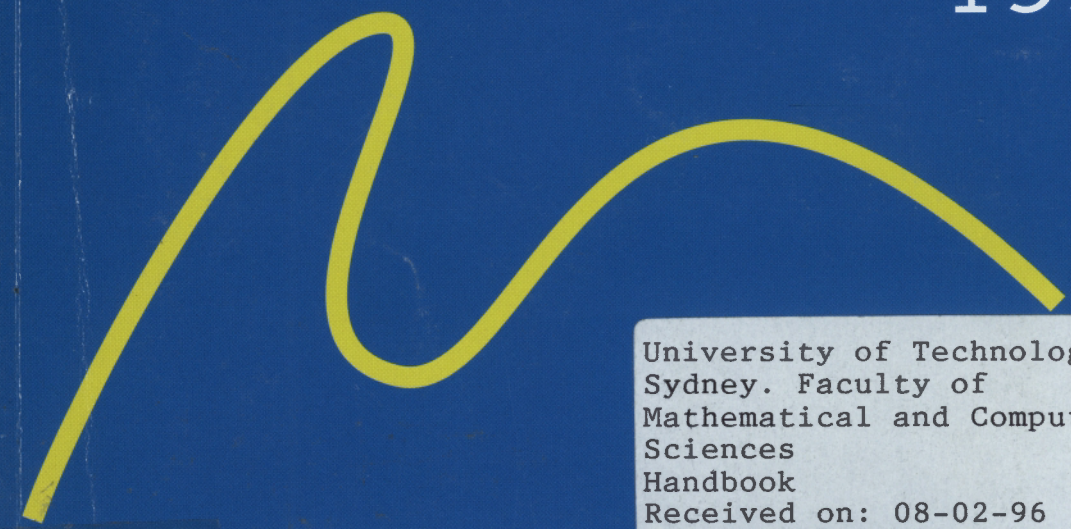
Faculty of Mathematical and Computing Sciences Handbook 1996



UTS

Faculty of Mathematical and Computing Sciences Handbook **1996**

The University attempts to ensure that the information contained in the handbook is correct as at 6 November 1995. The University reserves the right to vary any matter described in the handbook at any time without notice.

UTS

Equal opportunity

It is the policy of the University of Technology, Sydney to provide equal opportunity for all persons regardless of sex, race, marital status, family responsibilities, disability, sexual preference, age, political conviction or religious belief.

Free speech

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.

Editorial and production:

Corporate Responsibilities Unit
University Secretary's Division

Design:

UTS News and Design Services

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ADDRESSES AND TELEPHONE NUMBERS

POSTAL ADDRESS

PO Box 123
Broadway
New South Wales 2007 Australia

TELEPHONE

(02) 330 1990
International: +61 2 330 1990
Fax: (02) 330 1551

From July 1996
(02) 9514 2000
International: +61 2 9514 2000
Fax: (02) 9514 1551

All other numbers listed in this publication with a prefix of 330 will have a new prefix of 9514 e.g. 330 5555 will become 9514 5555.

STREET ADDRESSES

City campus

- Broadway
  No. 1 Broadway, Ultimo
- Harris Street, Ultimo

  Building 6
  702–730 Harris Street

  Bon Marche Building
  755 Harris Street

  645 Harris Street
- Haymarket
  Corner Quay Street and Ultimo Road
  Haymarket, Sydney
- Blackfriars
  Blackfriars Street, Chippendale
- Smail Street
  3 Smail Street, Ultimo
- Wembley House
  839–847 George Street, Sydney
- Bulga Ngurra
  23–27 Mountain Street, Ultimo
- 82–84 Ivy Street, Chippendale

Kuring-gai campus

Eton Road
Lindfield
(PO Box 222, Lindfield NSW 2070)

St Leonards campus

- 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

Yarrawood conference and research centre

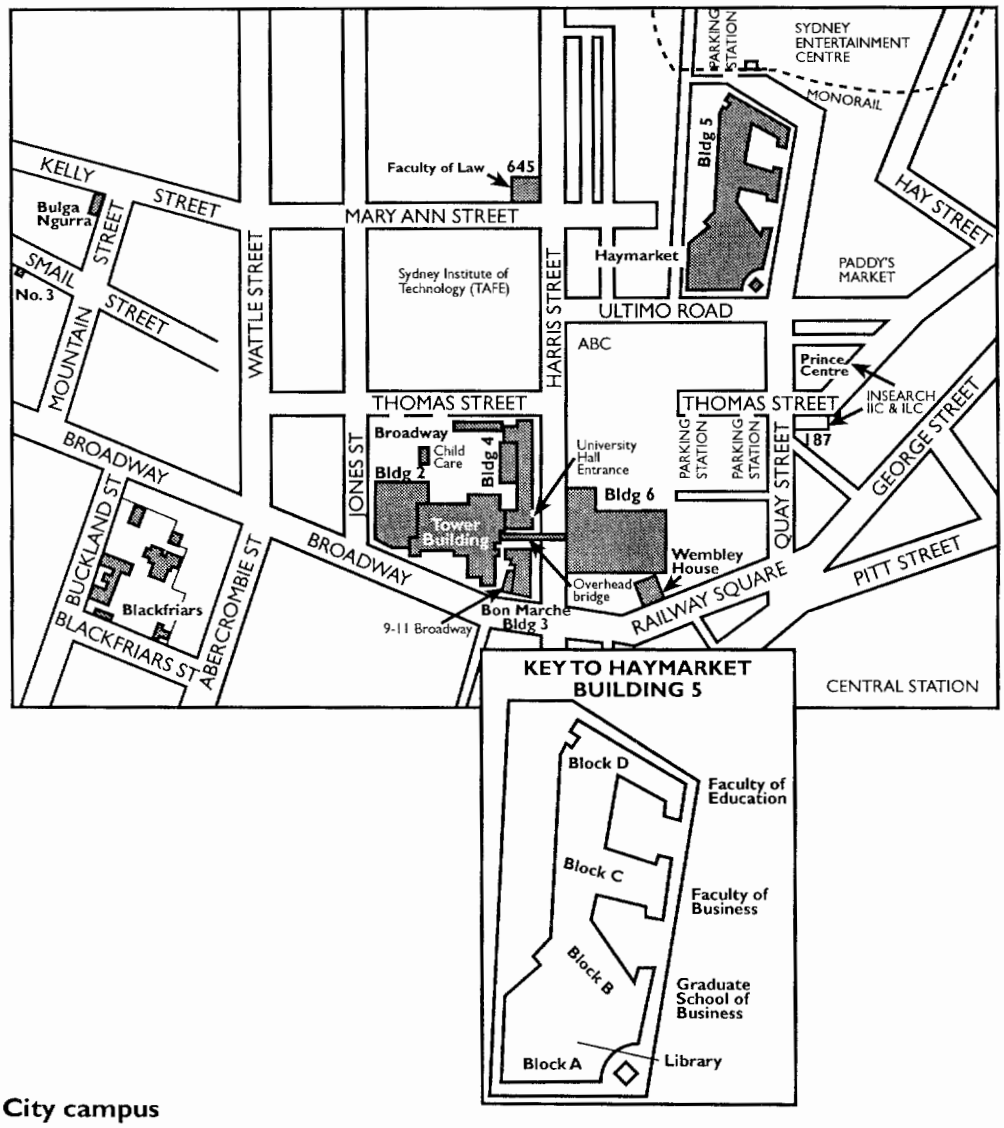
Hawkesbury Road
Yarramundi 2753

Stroud

Lot AFP 161894
The Bucketts Way
Booral 2425

CAMPUS MAPS

CITY CAMPUS



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  Blackfriars Street, Chippendale
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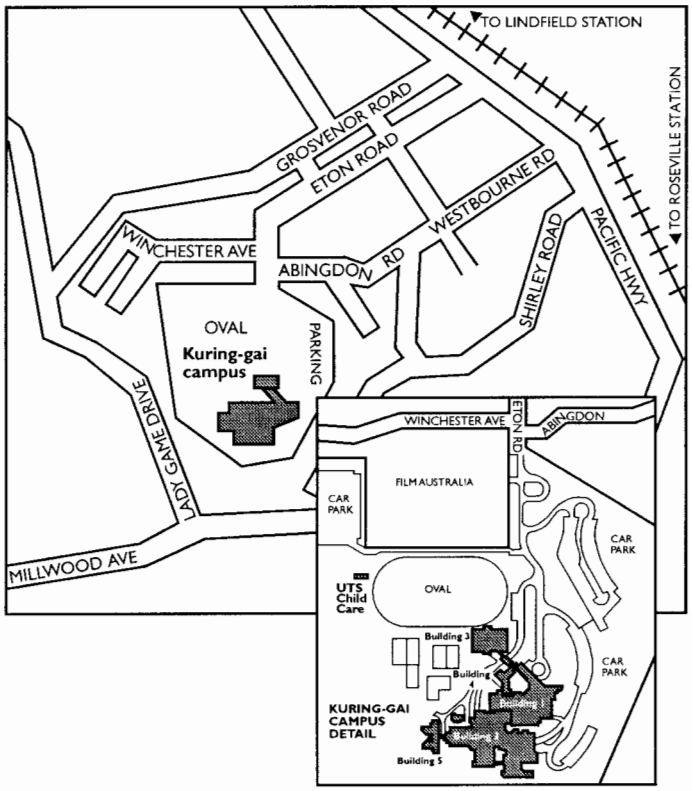
  3 Smail Street, Ultimo
- Wembley House
  839–847 George Street, Sydney
- Bulga Ngurra
  23–27 Mountain Street, Ultimo
- 82–84 Ivy Street, Chippendale

Kuring-gai campus

Eton Road
Lindfield
(PO Box 222, Lindfield
NSW 2070)

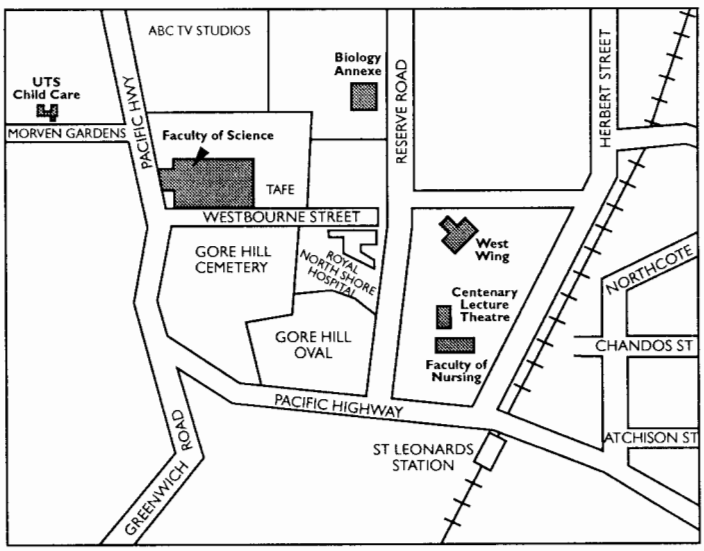
KURING-GAI CAMPUS



St Leonards campus

- 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

ST LEONARDS CAMPUS



PRINCIPAL DATES FOR 1996[1]

AUTUMN SEMESTER

January

9 Release of HSC results
12 Formal supplementary examinations for 1995 Spring semester students
12 Closing date for changes of preference to the Universities Admissions Centre (UAC) from 1995 NSW HSC applicants (by 6.00 p.m.)
15–30 Enrolment of students at City campus
26 Australia Day – public holiday
26 Public school holidays end
31 Enrolment of new undergraduate students at City campus including UAC and direct applicants (and 1–5 February)

February

1–5 Enrolment of new undergraduate students at City campus including UAC and direct applicants (and 31 January)
6-23 Enrolment of students at City campus

March

4 Classes begin
15 Last day to enrol in a course or add subjects
29 Last day to change to 'pay now/up-front' HECS payment
29 Last day to apply for leave of absence without incurring student fees/charges[2]
29 Last day to withdraw from a subject without financial penalty[2]
31 HECS census date

April

1 Public school holidays begin
5 Good Friday – public holiday
8 Easter Monday – public holiday
9 Graduation period begins
12 Last day to withdraw from a course or subject without academic penalty[2]
8–12 Vice-Chancellors' Week (non-teaching)
12 Public school holidays end
25 Anzac Day – public holiday
26 Provisional examination timetable available
30 Last day to apply to graduate in Spring semester 1996

May

1 Applications available for selected undergraduate courses for Spring semester
7 Graduation period ends
13 Applications available for postgraduate courses
17 Examination Masters due
31 Final examination timetable available
31 Closing date for selected undergraduate applications for Spring semester

June

10 Queen's Birthday – public holiday
14 Last teaching day of Autumn semester
14 Closing date for postgraduate applications for Spring semester
15–28 Formal examination period (and 1–5 July)

July

1 Public school holidays begin
1–5 Formal examination period (and 15–28 June)
5 Autumn semester ends
8–12 Vice-Chancellors' Week (non-teaching)
12 Public school holidays end
15–19 Formal alternative examination period for Autumn semester students
19 Release of Autumn semester examination results
22 Formal supplementary examinations for Autumn semester students
22–26 Confirmation of Spring semester programs
25–26 Enrolment of new and readmitted students and students returning from leave/concurrent study

SPRING SEMESTER

July

29 Classes begin

August

1 Applications available for undergraduate courses
2 Last day to withdraw from full-year subjects without academic penalty[2]
5 Applications available for postgraduate courses
9 Last day to enrol in a course or add subjects
23 Last day to apply for leave of absence without incurring student fees/charges[2] (Spring enrolments only)
30 Last day to change to 'pay now/up-front' HECS payment
30 Last day to withdraw from a subject without financial penalty[2]
30 Last day to apply to graduate in Autumn semester 1997
31 HECS census date

September

6 Last day to withdraw from a course or subject without academic penalty[2]
20 Provisional examination timetable available
27 Closing date for undergraduate applications via UAC (without late fee)
27 Closing date for inpUTS Special Admission Scheme applications
30 Public school holidays begin
30 Graduation period begins
30 Vice-Chancellors' Week (non-teaching) begins
30 Closing date for postgraduate applications (in some faculties)

October

4 Vice-Chancellors' Week (non-teaching) ends
4 Graduation period ends
7 Labour Day – public holiday
11 Public school holidays end
11 Examination Masters due
25 Final examination timetable available
31 Closing date for postgraduate research and course award applications
31 Closing date for undergraduate applications via UAC (with late fee)
31 Closing date for undergraduate applications direct to UTS (without late fee)

November

8 Last teaching day of Spring semester
9–29 Formal examination period
29 Spring semester ends

December

9–13 Formal alternative examination period for Spring semester students
20 Release of Spring semester examination results
23 Public school holidays begin

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[1] Information is correct as at 15 November 1995. The University reserves the right to vary any information described in Principal Dates for 1996 without notice.

[2] HECS/Postgraduate course fees will apply after the HECS census date.

PREFACE

This handbook is one of 10 faculty/institute handbooks: Business; Design, Architecture and Building; Education; Engineering; Humanities and Social Sciences; International Studies; Law; Mathematical and Computing Sciences; Nursing; and Science. Each handbook provides general information about the faculty/institute as well as detailed information on the courses and subjects offered.

The handbooks are part of a suite of 13 publications which also comprise the University *Calendar* and the undergraduate and postgraduate student handbooks.

The *Calendar* contains the University By-law, which all students should read. It also includes 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 faculty offices, and may be purchased at the Co-op Bookshop.

The student handbooks provide information on the rights and responsibilities of students and on the services and facilities available to them. They 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. You should make sure that you read the student rules published in these handbooks. Copies of the student handbooks are provided free to students at enrolment.

Other publications providing information of a general nature are the UAC *Guide* and the UTS *Undergraduate Studies Guide* which are available from the UTS Information Service.

For 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 Faculty has a commitment to creating a quality learning environment, and to providing an education with an emphasis on professional relevance. To this end, the Faculty values the considerable expertise of its advisory committees, drawn from industry, government and the professions. Senior practitioners with considerable expertise in industry give their time in assisting in the design and presentation of courses. Together with the Faculty's commitment to cooperative education, this ensures that the reputation of producing high-quality graduates, capable of immediately contributing to industry, will be maintained.

The last two years were ones of change, with major revisions to the undergraduate courses, improvements in accommodation and the introduction of new programs such as the Management Development Program. The year 1996 promises to be one of consolidation, but nonetheless an interesting one. Improvements to laboratory and lecture accommodation will be made, and the use of the computer algebra system, *Mathematica*, will become more widespread in mathematics teaching and learning.

The enhancement of research profile will continue, with more research staff reflecting the success during 1995 in obtaining research grants. The Faculty sees the existence of a strong corps of postgraduate research students as vital, and 1996 will see better accommodation for these students. Much of this research work will be focused around the centres in the Faculty (the Centre for Object Technology Applications and Research and the Australian Transputer Centre), the research laboratories and the cooperative research centres in which the Faculty is involved.

This Faculty has an international outlook and has attracted students from many countries and cultures, making learning here a rich and interesting experience. Many graduates work overseas in the period following completion. I commend to you the many activities and opportunities available within UTS. 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 at UTS 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 and learning, 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 and learning

- maintain a comprehensive range of educational programs to satisfy the spectrum of needs in the community
- excel in both the quality of the learning environment and the professional relevance of its educational 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, interfaculty, 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

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. Although student administration functions are centralised at faculty level, all the courses 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 Leigh Wood. The services of the Centre are available at the City and Kuring-gai campuses. 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 **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 through AARNet, the Centre is also the focus for work in parallel processing in the School of Computing Sciences. The Director of the Centre is 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 offers a selection of **Continuing Professional Education (CPE)** courses each semester. These include programming courses such as Object-oriented Programming with C++, COBOL and UNIX/C, and, from time to time, professional courses in database design, expert systems design, distributed databases and capacity planning. Information on CPE courses is available from the Faculty Information Offices on 330 1803 or 330 2246.

LIST OF COURSES AND CODES

The Faculty offers the following courses:

School of Mathematical Sciences

Bachelor of Mathematics and Finance	MM03
Bachelor of Mathematics and Finance (Honours)	MM04
Bachelor of Science in Mathematics	MM01
Bachelor of Science (Honours) in Mathematics	MM02
Graduate Certificate in Mathematical Sciences	MM56
Graduate Diploma in Applicable Mathematics	MM67
Graduate Diploma in Mathematics and Finance	MM66
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 Information Technology	MC03
Bachelor of Science in Computing Science	MC02
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 inquiries regarding courses should be directed to the Faculty Information Offices on 330 1803 or 330 2246.

FACULTY OFFICE CONTACTS

Faculty Office staff are located on either the third floor of Building 4 or on Level 15 of Building 1, as indicated below. There is an Information Office at each location to assist students and the general public on course-related matters, although, generally, inquiries relating to computing science courses should be directed to the Information Office in Building 4, and those relating to mathematical science courses should be directed to the Information Office in Building 1.

	Bldg/Rm	Ext	Student administration responsibility
Dean			
Associate Professor J M Hughes	4/343	1801	—
Faculty Administrator			
Miss F C Ma	4/341	1880	—
Executive Assistant to the Dean			
Vacant	4/342	1800	—
Executive Officer			
Mr G C Goodwin-Moore	4/335	1308	—
Student administration			
Student Administration Manager			
Ms L G McCoy	4/373	1867	*All courses*
Industry Liaison Officer			
Mr D A Saunders	4/374	1804	*BInfTech and Industrial Training*
Graduate Studies Officer			
Mr B M Irvine	4/335	1806	*All postgraduate programs*
Student Liaison Officers			
Ms I Chu	4/337	1802	*All BSc (Comp Sc)*
Ms J C Smith	1/1520	2250	*All BSc (Maths), BMathFin, and related Honours programs*
Information Assistants			
Ms R Bow	4/335	1803	*General inquiries*
Mr D Sunton	1/1520	2246	*General inquiries*

INSEARCH INSTITUTE OF COMMERCE

Insearch Institute of Commerce, which is wholly owned by the University of Technology, Sydney, offers a Diploma program in Information Technology. This program was designed by staff of the Faculty of Mathematical and Computing Sciences. While the University cannot guarantee admission to its degree programs, students who have completed this Diploma may apply for admission to the Bachelor of Science in Computing Science. If admitted, students may be granted up to one year's advanced standing. For further information contact the Admissions Manager, Insearch Institute of Commerce, Level 3, 187 Thomas Street, Haymarket or by telephone 281 8188, or by fax 281 9875.

INTERNATIONAL STUDIES ELECTIVES

The Institute for International Studies in UTS offers electives in language studies, and in the study of contemporary societies in parts of the non-English speaking world. All subjects last one semester and have a value of eight credit points.

Language studies

All students wishing to engage in language studies as a credited part of their degree are required to enrol through the Institute for International Studies, whether the language studies are undertaken in UTS or elsewhere. The Institute teaches some language programs at UTS, has made arrangements with other universities for some languages to be taught to UTS students, and can make special arrangements for individual students to attend specific language programs where academic needs demand. The individual student's level of language proficiency before entry to the UTS program determines his or her level of language study. There is a range of entry levels to the various programs available. Most are available at beginner's and post-HSC levels, and some at more advanced levels.

In 1996 the following programs will be available at UTS as part of the International Studies Program, and are open to students in all faculties: Cantonese, Chinese, Indonesian, Japanese, Modern Standard Chinese and Spanish. In addition, arrangements are in place for the delivery of French, German, Hindi, Italian, Korean and Thai. (Modern Standard Chinese is a program for students who are either complete beginners or who started to learn Chinese at school in Australia.) There are no prerequisites for entry to any language program.

Contemporary society

The Institute also offers a series of subjects that provide an introduction to the contemporary societies, politics, economics and culture of the countries of East and South-East Asia, Latin America and Western Europe that are the areas of specialisation of the Institute.

In 1996 introductory subjects on the contemporary societies of China, Japan, South-East Asia, Hong Kong and Taiwan, Latin America and Western Europe, will be available. There are no prerequisites for any of the Contemporary Society subjects. All subjects are taught in English and are available, with the permission of their faculty, to all UTS students.

Students should consult the Academic Administrator at the Institute for International Studies, UTS, 9 Broadway (telephone: 330 1574, fax: 330 1578), or the Institute for International Studies Handbook, for subject details.

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.

ELIGIBILITY FOR AUSTUDY

Austudy provides financial help to full-time students who meet its income and assets requirements. Application forms and information about Austudy eligibility are available from offices of the Student Services Unit at the City and Kuring-gai campuses. **Students who receive Austudy and decide to drop subjects during the semester need to be aware that to remain eligible for Austudy they must be enrolled in a minimum of 18 credit points or have a HECS liability for the semester of .375.** The only exceptions made are for students with disabilities which interfere with their studies, students who are single supporting parents or those who have been directed by the University to reduce their study load. Student Welfare Officers in the Student Services Unit can assist students who wish to apply for exceptions on these grounds.

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.

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 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 Bachelor of Science in Mathematics, which is a three-year Pass degree with a fourth year Honours degree;
- the Graduate Certificate in Mathematical Sciences;
- the Graduate Diploma in Applicable Mathematics;
- the Graduate Diploma in Mathematics and Finance;
- 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.

Name	Ext	Room
Associate Professor Lindsay Botten *Head of School*	2247	1520
Mr Martin Caden *Senior Systems Programmer*	2253	1618
Associate Professor Graeme Cohen *Director, Postgraduate Studies, and Head, Mathematics Unit*	2262	1528
Ms Mary Coupland *inpUTS Coordinator for students with special needs and Academic Liaison Officer*	2241	1535
Ms Layna Groen *Electives Coordinator*	2266	1533
Dr Ian Hoffman	2244	1545
Mr Jeff Hogg *Graduate Certificate Coordinator*	2238	1524
Dr Tim Langtry	2261	1537
Dr Brian Lederer	2263	1558
Mr Ed Lidums	2235	1530
Mr Eric Lindsay *Computer Systems Support Officer*	2254	1618
Dr Beverley Moore	2258	1550
Dr Gordon McLelland *Deputy Head of School*	2259	1520
Mr Ken Ozanne	2256	1538
Mr Larry Park *Head, Computational Mathematics Unit*	2278	1560
Dr Peter Petocz *Honours Coordinator*	2264	1531

Mr Denis Porteus	2265	1559
Mr Bob Rozsasi	2245	1561
Dr Peter Sekhon *Exemptions Coordinator*	2257	1549
Professor Tony Shannon	1334	1511
Dr Geoff Smith *Director, Undergraduate Studies*	2236	1532
Ms Narelle Smith	2239	1539
Associate Professor Deborah Street *Head, Statistics and Operations Research Unit*	2251	1527
Mr Ron Sorli	2281	1548
Mr Brian Stephenson	2267	1547
Professor Barry Thornton	2252	1541
Ms Leigh Wood *Director, Mathematics Study Centre*	2268	1536
Ms Nadene Wright *Executive Assistant*	2249	1520
Mr Peter Wright	2243	1546
Dr Yakov Zinder	2279	1523

PRIZES

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 nonprofit organisation whose nominated beneficiary is the Faculty of Mathematical and Computing Sciences. The Foundation has made available three prizes to students enrolled in courses run by the School of Mathematical Sciences. One prize, valued at $250, is for the best graduating student from the Bachelor of Science (Honours) in Mathematics degree. The other two, valued at $100 each, are awarded to the outstanding first year full-time student enrolled in either the Bachelor of Science in Mathematics or the Bachelor of Mathematics and Finance program, and to the outstanding part-time student enrolled in Stage 1 of either of these programs.

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 through 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.

MATHEMATICA

The University has recently acquired a site licence for the computer algebra system *Mathematica*. This software permits the integration of symbolic, graphical and numerical computation with a modern programming environment. It is ideally suited to teaching and research in any mathematically based area of interest.

The system is being introduced into many of the subjects offered by the School. Students' exposure to *Mathematica* begins in the first semester of the BSc and BMathFin degree programs and knowledge of the system expands as the course develops. By the time of graduation, all students will have acquired considerable expertise in the use of this software.

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 does not grade students eligible to receive the Bachelor of Science in Mathematics degree.

COURSE PROGRAM

Full-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)
35170 Introduction to Computing (6cp)
Electives (approx 6cp)

Spring semester

35102 Mathematics 2 (6cp)
35151 Statistics 1 (6cp)
Electives (approx 12cp)

Year 2

Autumn semester

35212 Linear Algebra (6cp)
35232 Advanced Calculus (6cp)
35252 Statistics 2 (6cp)
Electives (approx 6cp)

Spring semester

35231 Differential Equations (6cp)
35241 Mathematical Programming 1 (6cp)
35281 Numerical Analysis 1 (6cp)
Electives (approx 6cp)

Year 3

Autumn semester

35321 Analysis 1 (6cp)
Major 1 (6cp)
Major 2 (6cp)
Electives (approx 6cp)

Spring semester

Major 3 (6cp)
Major 4 (6cp)
Electives (approx 12cp)

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

35170 Introduction to Computing (6cp)
Electives (approx 6cp)

Year 2

Autumn semester

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

Spring semester

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

Year 3

Autumn semester

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

Spring semester

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

Year 4

Autumn semester

35231 Differential Equations (6cp)
35241 Mathematical Programming 1 (6cp)

Spring semester

35321 Analysis 1 (6cp)
Electives (approx 6cp)

Year 5

Autumn semester

35281 Numerical Analysis 1 (6cp)
Major 1 (6cp)

Spring semester

Major 2 (6cp)
Electives (approx 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

35313 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

In some circumstances, these modules may be taken as individual subjects worth three credit points. For this purpose, following consultation with their academic adviser, students must enrol in one of the subjects 35274 Computing Seminar A, 35275 Computing Seminar B, 35378 Computing Seminar C, 35379 Computing Seminar D.

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.

Year 1

Autumn semester

No Computing major subjects

Spring semester

31424 Systems Modelling (6cp)

Year 2

Autumn semester

35171 Computing 1 (6cp)

Spring semester

31414 Information Systems (6cp)

Year 3

Autumn semester

31434 Database Design (6cp)

Spring semester

No Computing major subjects

Year 4

Autumn semester

No Computing major subjects

Spring semester

35272 Computing 2 (6cp)

Year 5

Autumn semester

35373 Computing 3 (6cp)

Spring semester

No Computing major subjects

Year 6

Autumn semester

35376 Advanced Topics in Computing A (6cp)

Spring semester

35377 Advanced Topics in Computing B (6cp)

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:
either
31414 Information Systems (6cp)
or
31424 Systems Modelling (6cp)
35373 Computing 3 (6cp)
35376 Advanced Topics in Computing A (6cp)
35377 Advanced Topics in Computing B (6cp)

Physics sub-majors

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.

Communication 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 two-thirds of the program) and a thesis. This thesis 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, although some strands may not be offered in a given year. The program will consist of eight coursework subjects each of four credit points and a thesis of 16 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.

The Honours degree consists of:

- 24 credit points of Honours-level mathematics subjects (numbered as 354**). These consist of six 4cp subjects, at least five of which must be taken in the major area of study.
- A thesis consisting of a research project of 16 credit points, assessed by a written report and a seminar. A supervisor will be appointed to monitor the progress with the thesis and to advise on its preparation.
- Eight credit points consisting of the subjects 35496 Thesis Seminar A and 35497 Thesis Seminar B. These are reading courses designed to complement the research project or to provide additional foundation for graduate study in the area of the project. The thesis supervisor will be responsible for designing and administering these subjects. In certain circumstances, these subjects may be replaced by Honours Seminar subjects.

Subjects offered in the various strands are as follows.

Mathematics strand

Credit point values are shown in parentheses.

35418 Analytic Number Theory (4cp)
35419 Advanced Algebra (4cp)
35427 Functional Analysis (4cp)
35428 Convexity and Optimisation (4cp)
35436 Advanced Mathematical Methods (4cp)

35437 Partial Differential Equations (4cp)
35438 Nonlinear Dynamical Systems (4cp)
35466 Advanced Stochastic Processes (4cp)

Operations Research strand

Credit point values are shown in parentheses.

35443 Mathematical Programming 3 (4cp)
35446 Scheduling Theory (4cp)
35447 Discrete Optimisation (4cp)
35448 Dynamic Optimisation (4cp)
35466 Advanced Stochastic Processes (4cp)
35485 Advanced Financial Modelling (4cp)
35486 Optimal Control 1 (4cp)
35487 Optimal Control 2 (4cp)

Statistics strand

Credit point values are shown in parentheses.

35456 Nonlinear Statistical Models (4cp)
35457 Multivariate Statistics (4cp)
35458 Loglinear Modelling (4cp)
35459 Linear Models and Experimental Design (4cp)
35466 Advanced Stochastic Processes (4cp)
35467 Time Series Analysis (4cp)
35469 Statistical Consulting (4cp)

Each strand is augmented by two seminar subjects, 35491 Honours Seminar A and 35492 Honours Seminar B. 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 time.

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 coursework subjects, the thesis and the associated seminar. 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), Second Class (Division 2) or Third Class.

The grade of Honours will be determined from the average mark of all subjects, weighted by their credit point values. The grade of First Class, Second Class (Division 1), Second Class (Division 2) or Third Class Honours will be awarded for an average mark in the range 80–100, 70–79, 60–69 or 50–59, respectively. An average mark of less than 50 will be regarded as a failure for the course. A thesis 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 does not grade students eligible to receive the Bachelor of Mathematics and Finance degree.

COURSE PROGRAM

Full-time program

Credit point values are shown in parentheses.

Year 1

Autumn semester

22105 Accounting A (4cp)
25110 Microeconomics (4cp)
25308 Financial Markets (4cp)
35101 Mathematics 1 (6cp)
35170 Introduction to Computing (6cp)

Spring semester

25209 Macroeconomics (4cp)
25314 Business Finance (4cp)
35100 Mathematical Practice (3cp)
35102 Mathematics 2 (6cp)
35151 Statistics 1 (6cp)

Year 2

Autumn semester

35111 Discrete Mathematics (3cp)
35212 Linear Algebra (6cp)
35232 Advanced Calculus (6cp)
35252 Statistics 2 (6cp)
79101 Business Law (4cp)

Spring semester

25905 Capital Budgeting and Valuation (Honours) (6cp)
25906 Investment Analysis (Honours) (6cp)
35231 Differential Equations (6cp)
35281 Numerical Analysis 1 (6cp)

Year 3

Autumn semester

25621 Financing Decisions and Capital Market Theory (6cp)
25620 Derivative Securities (6cp)

or

25210 Microeconomic Theory and Policy (6cp)
35321 Analysis 1 (6cp)

35353 Regression Analysis and Experimental Design (6cp)

Spring semester

25421 International Financial Management (6cp)
25606 Financial Time Series Analysis (6cp)
35241 Mathematical Programming 1 (6cp)

or

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

Students not intending to proceed to Honours must take the subjects 25620 Derivative Securities and 35241 Mathematical Programming 1 in their Year 3 program. Students intending to undertake the Honours degree must include 25210 Microeconomic Theory and Policy and 35322 Analysis 2 in their Year 3 program.

Part-time program

Credit point values are shown in parentheses.

Year 1

Autumn semester

25110 Microeconomics (4cp)
35101 Mathematics 1 (6cp)

Spring semester

22105 Accounting A (4cp)
35100 Mathematical Practice (3cp)
35170 Introduction to Computing (6cp)

Year 2

Autumn semester

25209 Macroeconomics (4cp)
35102 Mathematics 2 (6cp)
35111 Discrete Mathematics (3cp)

Spring semester

25308 Financial Markets (4cp)
25314 Business Finance (4cp)
35212 Linear Algebra (6cp)

Year 3

Autumn semester

35151 Statistics 1 (6cp)
79101 Business Law (4cp)

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

25905 Capital Budgeting and Valuation (Honours) (6cp)
25906 Investment Analysis (Honours) (6cp)

Year 5

Autumn semester

25621 Financing Decisions and Capital Market Theory (6cp)
35353 Regression Analysis and Experimental Design (6cp)

Spring semester

25606 Financial Time Series Analysis (6cp)
35321 Analysis 1 (6cp)

Year 6

Autumn semester

25620 Derivative Securities (6cp)

or

25210 Microeconomic Theory and Policy (6cp)
35361 Probability and Stochastic Processes (6cp)

Spring semester

25421 International Financial Management (6cp)
35241 Mathematical Programming 1 (6cp)

or

35322 Analysis 2 (6cp)

Students not intending to proceed to Honours must take the subjects 25620 Derivative Securities and 35241 Mathematical Programming 1 in their Year 6 program. Students intending to undertake the Honours degree must include 25210 Microeconomic Theory and Policy and 35322 Analysis 2 in their Year 6 program.

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

25907 Theory of Financial Decision Making (4cp)
25910 Thesis (12cp)
35438 Nonlinear Dynamical Systems (4cp)
35466 Advanced Stochastic Processes (4cp)
35467 Time Series Analysis (4cp)
35486 Optimal Control 1 (4cp)

Spring semester

25908 Derivative Security Pricing (4cp)
25909 Advanced Corporate Finance (4cp)
25910 Thesis (subject continues)
35456 Nonlinear Statistical Models (4cp)
35487 Optimal Control 2 (4cp)

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 interfaculty 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 Faculty of Science, the Faculty of Nursing, the School of Electrical Engineering, the School of Mechanical Engineering and the School of Computing Sciences.

FEES

Fees will be levied in accordance with University policies and DEET guidelines. Details will be available in early 1996.

RECENT THESES

PhD theses

Ollerton, R L, Adaptive Control and the Insulin Dependent Diabetic, 1990.

Dobson, R J, Modelling Host Regulation of Trichostrongylus Colubriformis, a Nematode Parasite of Sheep, 1992.

Melham, R S, Some Aspects of Homogeneous Linear Recursive Sequences of Order Mainly Two, 1995.

MSc theses

Reuben, A J, Mathematical Models of Erythrocyte Sedimentation, 1990.

Haggar, F, An Account of the Behaviour of Some Pairs of e(1) Variables, 1991.

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 a supervisor. 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 (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 (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 1996, the tuition fees have been set at $2,100 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.

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 attendance 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, they 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 mathematics which are presumed in the core subjects of the degree.

Applicants not satisfying these prerequisites are advised to consider enrolling in the Graduate Diploma in Operations Research or the Graduate Certificate programs offered by the School. Applicants 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 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 research, statistics or possibly subjects from some area of business or management. 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).

COURSE PROGRAM

Part-time program

Credit point values are shown in parentheses.

Semester 1

35447 Discrete Optimisation (4cp)
35448 Dynamic Optimisation (4cp)
Electives (approx 4cp)

Semester 2

35443 Mathematical Programming 3 (4cp)
35446 Scheduling Theory (4cp)
Electives (approx 4cp)

Semester 3

35449 Operations Research Models and Methodology (4cp)
35489 Optimal Control 1 (4cp)
35599 Report (Part 1) (6cp)

Semester 4

35599 Report (Part 2) (6cp)
Electives (approx 4cp)

It should be noted that 35599 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 Applicable Mathematics (GradDipApplicMath)

Course code MM67

The Graduate Diploma in Applicable Mathematics is designed to offer suitably qualified graduates the background in mathematics required to pursue further studies in an area of mathematics, and particularly in the area of mathematical finance. Students will be expected to have a sound background in mathematics and statistics to approximately second-year level.

The subjects in the Graduate Diploma include the necessary background material at undergraduate level that will enable its graduates to proceed into the Bachelor of Mathematics and Finance (Honours) degree, provided an acceptable standard is reached. Exemption from some subjects, due to prior study, will be available where warranted.

The length of the course is 48 credit points, comprising coursework in eight subjects. One of these subjects is an elective that would generally be chosen from one of the major areas (Mathematics, Statistics or Operations Research) in the Bachelor of Science in Mathematics degree. The expected pattern of attendance is part-time, over two years.

The course has been designed preferably for commencement in the Spring semester each year. Students commencing the course at the beginning of the year may not be able to complete it in minimum time, due to timetable difficulties, and may be required to attend some classes during the day.

Applicants for the Graduate Diploma should discuss their eligibility with the Director, Postgraduate Studies. Those who have not completed the necessary prerequisites will be required to enrol in appropriate subjects, either as miscellaneous students or in a Graduate Certificate program.

Students will have their registration discontinued for 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 for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80).

FEES

At present there are no government-funded student places for this course, and it is necessary to charge full fees. The cost of the course has been set at $2,880 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.

COURSE PROGRAM

Part-time program

Credit point values are shown in parentheses.

Semester 1

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

Semester 2

35231 Differential Equations (6cp)
35353 Regression Analysis and Experimental Design (6cp)

Semester 3

35321 Analysis 1 (6cp)
35361 Probability and Stochastic Processes (6cp)

Semester 4

35322 Analysis 2 (6cp)
Elective (6cp)

Graduate Diploma in Mathematics and Finance (GradDipMathFin)

Course code MM66

The Graduate Diploma in Mathematics and Finance is designed to allow suitable graduates in one area of mathematics, say statistics or pure mathematics, to be retrained so that they will have sufficient knowledge of relevant aspects of financial modelling to enable them to participate authoritatively in the area of finance. Students will be expected to have a sound background in mathematics and statistics to second-year level.

The subjects in the Graduate Diploma range from necessary background material at undergraduate level through to Honours level subjects in time-series analysis and financial modelling. Exemption from subjects, due to prior study, will be available where warranted.

The length of the course is 48 credit points, comprising 36 credit points of coursework in seven subjects and a project worth 12 credit points. The expected pattern of attendance is part-time, over two years. Applicants should be aware that attendance at daytime classes may be unavoidable for some subjects.

Applicants for the Graduate Diploma should discuss their eligibility with the Director, Postgraduate Studies. Those who have not completed the necessary prerequisites will be required to enrol in appropriate subjects, either as miscellaneous students or in a Graduate Certificate program.

Students will have their registration discontinued for 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 for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80).

FEES

At present there are no government-funded student places for this course, and it is necessary to charge full fees. The cost of the course has been set at $2,880 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.

COURSE PROGRAM

Part-time program

Credit point values are shown in parentheses.

Semester 1

33401 Mathematics (Computing Science) (6cp)
35252 Statistics 2 (6cp)

Semester 2

35241 Mathematical Programming 1 (6cp)
35361 Probability and Stochastic Processes (6cp)

Semester 3

35384 Financial Modelling (4cp)
35467 Time Series Analysis (4cp)
35596 Project (Part 1) (6cp)

Semester 4

35485 Advanced Financial Modelling (4cp)
35596 Project (Part 2) (6cp)

Graduate Diploma in Operations Research (GradDipOR)

Course code MM52

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 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 for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80).

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 1995, 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 (Part 1) (6cp)

Semester 4

35340 Operations Research Practice (6cp)
35596 Project (Part 2) (6cp)

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 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 for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80).

FEES

The Graduate Diploma in Statistics is offered with a fixed quota of student places and the course fees have been set in accordance with University policy. In 1995, 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.

COURSE PROGRAM

Part-time program

Credit point values are shown in parentheses.

Semester 1

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

Semester 2

35354 Statistical Inference (6cp)
35361 Probability and Stochastic Processes (6cp)

Semester 3

35363 Stochastic Methods in Operations Research (6cp)
35467 Time Series Analysis (4cp)

Semester 4

35355 Quality Control (6cp)
35594 Project (8cp)

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.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration in the case of a part-time student, or two semesters from that time in the case of a full-time student, not inclusive of periods of leave of absence.

FEES

Full tuition fees will be charged for this course. In 1995, a fee of $900 per subject was payable. This fee is subject to annual review.

COURSE PROGRAM

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.

Subject Number	Subject Name	Semester Offered	Credit Points	Contact Hours	Prerequisites
22105	Accounting A	A,S	4	3	Nil
25110	Microeconomics	A,S	4	3	Nil
25209	Macroeconomics	A,S	4	3	25110
25210	Microeconomic Theory and Policy	A,S	6	4	25110
25308	Financial Markets	A,S	4	3	25209
25314	Business Finance	A,S	4	3	22105, 35151, 25308 *c*
25421	International Financial Management	S	6	4	25308, 25314
25606	Financial Time Series Analysis	S	6	4	35232, 35353
25620	Derivative Securities	A	6	4	25906
25621	Financing Decisions and Capital Market Theory	A	6	4	25905
25905	Capital Budgeting and Valuation (Honours)	S	6	4	25308, 25314
25906	Investment Analysis (Honours)	S	6	4	25308, 25314
25907	Theory of Financial Decision Making	A	4	3	By consent
25908	Derivative Security Pricing	S	4	3	By consent
25909	Advanced Corporate Finance	S	4	3	By consent
25910	Thesis	Y	12		By consent
31414	Information Systems	A	6	3	Nil
31424	Systems Modelling	S	6	3	Nil
31434	Database Design	A	6	3	31424
33401	Mathematics (Computing Science)	A	6	3	Nil
35100	Mathematical Practice	A,S	3	3	Nil
35101	Mathematics 1	A,S	6	6	Nil
35102	Mathematics 2	A,S	6	6	35101
35111	Discrete Mathematics	A,S	3	3	Nil
35151	Statistics 1	A,S	6	6	Nil

Subject Number	Subject Name	Semester Offered	Credit Points	Contact Hours	Prerequisites
35170	Introduction to Computing	A,S	6	7	Nil
35171	Computing 1	S	6	7	35170, 35111 *c*
35205	History of Mathematics	S	6	4	Nil
35212	Linear Algebra	A,S	6	4	35101
35231	Differential Equations	A,S	6	4	35102, 35212
35232	Advanced Calculus	A,S	6	4	35102
35241	Mathematical Programming 1	A,S	6	4	35212, 35232
35252	Statistics 2	A,S	6	4	35151
35272	Computing 2	S	6	6	35111, 35171
35274	Computing Seminar A	A or S	3	2	See subject description
35275	Computing Seminar B	A or S	3	2	See subject description
35281	Numerical Analysis 1	A,S	6	4	35170, 35231 *c*
35292–6	Project	A,S	2–6	1–4	By arrangement
35313	Pure Mathematics 3A	A	6	4	35231, 35232
35314	Pure Mathematics 3B	S	6	4	35111
35321	Analysis 1	A,S	6	4	35102, 35212
35322	Analysis 2	S	6	4	35321
35333	Applied Mathematics 3A	A	6	4	35232, 35335 *c*
35334	Applied Mathematics 3B	S	6	4	35333, 35335
35335	Mathematical Methods	A	6	4	35231
35340	Operations Research Practice	S	6	4	35241, 35252
35342	Mathematical Programming 2	A	6	4	35241
35344	Network Optimisation	S	6	4	35241
35353	Regression Analysis and Experimental Design	A	6	4	35252
35354	Statistical Inference	A,S	6	4	35252
35355	Quality Control	S	6	4	35361
35361	Probability and Stochastic Processes	A,S	6	4	35252
35363	Stochastic Methods in Operations Research	A,S	6	4	35170, 35361 *c*
35373	Computing 3	A	6	4	35272
35376	Advanced Topics in Computing A	A	6	4	See subject description
35377	Advanced Topics in Computing B	S	6	4	See subject description

Subject Number	Subject Name	Semester Offered	Credit Points	Contact Hours	Prerequisites
35378	Computing Seminar C	A or S	3	2	See subject description
35379	Computing Seminar D	A or S	3	2	See subject description
35382	Numerical Analysis 2	S	6	4	35281
35384	Financial Modelling	A	4	3	35102, 35151
35391	Seminar (Mathematics)	A or S	6	4	By arrangement
35392	Seminar (Operations Research)	A or S	6	4	By arrangement
35393	Seminar (Statistics)	A or S	6	4	By arrangement
35394	Seminar (Computing)	A or S	6	4	By arrangement
35418	Analytic Number Theory	A	4	3	35314, 35232
35419	Advanced Algebra	A	4	3	35314
35427	Functional Analysis	S	4	3	35322
35428	Convexity and Optimisation	A	4	3	35322
35436	Advanced Mathematical Methods	S	4	3	35334
35437	Partial Differential Equations	A	4	3	35335
35438	Nonlinear Dynamical Systems	A	4	3	35231, 35321
35443	Mathematical Programming 3	S	4	3	35342
35446	Scheduling Theory	S	4	3	35342, 35447
35447	Discrete Optimisation	A	4	3	35111, 35342
35448	Dynamic Optimisation	A	4	3	35241, 35361, 35447 *c*
35449	Operations Research Models and Methodology	S	4	3	35363, 35443, 35448, 35446 *c*
35456	Nonlinear Statistical Models	S	4	3	35353, 35467
35457	Multivariate Statistics	A	4	3	35353, 35354
35458	Loglinear Modelling	S	4	3	35353
35459	Linear Models and Experimental Design	S	4	3	35353, 35457
35466	Advanced Stochastic Processes	A	4	3	35322, 35361
35467	Time Series Analysis	A	4	3	35361
35469	Statistical Consulting	S	4	3	See subject description

Subject Number	Subject Name	Semester Offered	Credit Points	Contact Hours	Prerequisites
35485	Advanced Financial Modelling	A	4	3	35340
35486	Optimal Control 1	A	4	3	35231, 35232
35487	Optimal Control 2	S	4	3	35466, 35486
35491	Honours Seminar A	A or S	4	3	By consent
35492	Honours Seminar B	A or S	4	3	By consent
35496	Thesis Seminar A	A	4	3	By consent
35497	Thesis Seminar B	S	4	3	By consent
35498	Thesis (Honours)	Y	16		By consent
35594	Project	S	8		By arrangement
35596	Project	Y	12		By arrangement
35599	Report	Y	12		By consent
79101	Business Law	A,S	4	3	Nil

ALPHABETICAL LISTING OF SUBJECTS

Accounting A	22105
Advanced Algebra	35419
Advanced Calculus	35232
Advanced Corporate Finance	25909
Advanced Financial Modelling	35485
Advanced Mathematical Methods	35436
Advanced Stochastic Processes	35466
Advanced Topics in Computing A	35376
Advanced Topics in Computing B	35377
Analysis 1	35321
Analysis 2	35322
Analytic Number Theory	35418
Applied Mathematics 3A	35333
Applied Mathematics 3B	35334
Business Finance	25314
Business Law	79101
Capital Budgeting and Valuation (Honours)	25905
Computing 1	35171
Computing 2	35272
Computing 3	35373
Computing Seminar A	35274
Computing Seminar B	35275
Computing Seminar C	35378
Computing Seminar D	35379
Convexity and Optimisation	35428
Database Design	31434
Differential Equations	35231
Derivative Securities	25620
Derivative Security Pricing	25908
Discrete Mathematics	35111
Discrete Optimisation	35447
Dynamic Optimisation	35448
Financial Markets	25308
Financial Modelling	35384
Financial Time Series Analysis	25606
Financing Decisions and Capital Market Theory	25621
Functional Analysis	35427
History of Mathematics	35205
Honours Seminar A	35491
Honours Seminar B	35492
Information Systems	31414
International Financial Management	25421
Introduction to Computing	35170
Investment Analysis (Honours)	25906
Linear Algebra	35212
Linear Models and Experimental Design	35459
Loglinear Modelling	35458
Macroeconomics	25209
Mathematical Methods	35335
Mathematical Practice	35100
Mathematical Programming 1	35241
Mathematical Programming 2	35342
Mathematical Programming 3	35443
Mathematics for Computing	33401
Mathematics 1	35101
Mathematics 2	35102
Microeconomic Theory and Policy	25210
Microeconomics	25110
Multivariate Statistics	35457
Network Optimisation	35344
Nonlinear Dynamical Systems	35438
Nonlinear Statistical Models	35456
Numerical Analysis 1	35281
Numerical Analysis 2	35382
Operations Research Models and Methodology	35449
Operations Research Practice	35340
Optimal Control 1	35486
Optimal Control 2	35487
Partial Differential Equations	35437
Probability and Stochastic Processes	35361
Project	35292–6
Project	35594
Project	35596

Pure Mathematics 3A	35313
Pure Mathematics 3B	35314
Quality Control	35355
Regression Analysis and Experimental Design	35353
Report	35599
Scheduling Theory	35446
Seminar (Computing)	35394
Seminar (Mathematics)	35391
Seminar (Operations Research)	35392
Seminar (Statistics)	35393
Statistical Consulting	35469
Statistical Inference	35354
Statistics 1	35151
Statistics 2	35252
Stochastic Methods in Operations Research	35363
Systems Modelling	31424
Theory of Financial Decision Making	25907
Thesis	25910
Thesis (Honours)	35498
Thesis Seminar A	35496
Thesis Seminar B	35497
Time Series Analysis	35467

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.

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.

33401

MATHEMATICS FOR COMPUTING

6cp; 3hpw

Matrices and determinants. Gaussian reduction. Solution of linear equations. Eigenvalues and eigenvectors. Vectors. Products of vectors. Equations of lines and planes. Complex numbers. Polar form and de Moivre's theorem. Linear independence of vectors. Rank of a matrix. Symmetric matrices. Quadratic forms. Geometric transformations in two and three dimensions.

35100

MATHEMATICAL PRACTICE

3cp; 3hpw

Introduction to the art and practice of mathematics. Perspectives on communication and mathematical communication. History of mathematical communication. Reading, writing and speaking mathematics. Mathematics in context. Inductive and deductive reasoning and scientific method. Mathematical practice case studies: proof techniques, problem solving and modelling.

35101

MATHEMATICS 1

6cp; 6hpw

Matrices and determinants; solution of linear equations; Gaussian reduction. Eigenvalues and eigenvectors. Vectors: products of vectors, equations of lines and planes. Complex numbers: polar form, de Moivre's theorem. Limits, continuity and differentiation. Mean value theorem. Curve sketching. Related rates. Maxima and minima. Integration. Riemann sums, fundamental theorem of calculus; application to areas and volumes and to lengths of curves. Logarithm and exponential functions. Trigonometric and hyperbolic functions; inverse trigonometric and hyperbolic functions. L'Hôpital's rule.

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

Graphs, paths, trees. Set operations. Indexing and recurrence relations. Propositional and predicate calculus. Groups and monoids. Automata. Permutations, combinations, partitions, counting and allocation problems.

35151

STATISTICS 1

6cp; 6hpw

Describing and exploring data. Producing data. Probability. Random variables. Introduction to inference. Inference for distributions. Inference for categorical data. Regression. Analysis of variance. Distribution-free inference.

35170

INTRODUCTION TO COMPUTING

6cp; 7hpw

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

Further investigation of functional and imperative programming techniques. Functional programming: polymorphism, higher-order functions, finite and infinite lists, proofs of relations. Imperative programming: pointers, linked lists, arrays, static and dynamic variables, file handling. Searching and sorting algorithms. Lists, stacks, queues and trees. Design techniques: modularisation, abstraction, generalisation, structural induction, testing, information hiding. Comparison of functional and imperative programming paradigms with respect to iteration and recursion, eager and lazy evaluation and the use of prototypes.

35205

HISTORY OF MATHEMATICS

6cp; 4hpw

Overview of general history. Overview of the history of mathematics. Mathematics before the Greeks. Greek mathematics and the development of logical argument and rigour. The decline of Greek mathematics. Indian and Arabic contributions to notation and calculation, and the preservation of Greek knowledge. Scholastic and Renaissance mathematics: the rediscovery of classical knowledge in western Europe. The scientific revolution and the discovery of the calculus. Development of the calculus and its applications in continental Europe. The search for a rigorous foundation for the calculus and the rise of analysis. The resurgence of geometry and algebra in the 19th century.

35212

LINEAR ALGEBRA

6cp; 4hpw
prerequisite: 35101 Mathematics 1

Systems of linear equations, decompositions. Vector spaces. Inner product spaces, Gram-Schmidt orthogonalisation. The eigenvalue problem. Symmetric matrices, diagonalisation, quadratic forms. Jordan form. Matrix exponentials.

35231

DIFFERENTIAL EQUATIONS

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

Existence and uniqueness of solutions. Variation of parameters. Qualitative theory of linear and nonlinear systems. Limit cycles. Poincaré-Bendixson theorem. Applications. Boundary value problems, separation of variables. Fourier series. Heat and wave equations. Laplace's equation. Transform methods.

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

Subject and methodology of operations research. Examples of linear, nonlinear and dynamic programming. Simplex method. Unconstrained nonlinear programming problems, first-order and second-order conditions. Convex and concave functions. Newton's method. Method of steepest descent. Basic concepts of sequential decision processes. Principle of optimality and functional equations.

35252

STATISTICS 2

6cp; 4hpw
prerequisite: 35151 Statistics 1

Probability. Random variables and their probability distributions. Multivariable probability distributions. Functions of random variables. Sampling distributions and the Central Limit Theorem. Applications to estimation. Multivariate normal distribution.

35272

COMPUTING 2

6cp; 6hpw
prerequisites: 35111 Discrete Mathematics; 35171 Computing 1

Object-oriented design and programming. User-defined recursive data-structures with implementation in an object-oriented imperative language and a functional programming language. Standard problem solving strategies. Analysis of data types and algorithms. Introduction to formal techniques for program specification and design.

35274

COMPUTING SEMINAR A

3cp; 2hpw
prerequisites: see 35376 Advanced Topics in Computing A

This subject provides coverage of an advanced topic of contemporary interest in mathematically-based computing. It is drawn from the suite of modules which comprise the Advanced Topics in Computing subjects. The modules to be offered will vary from semester to semester, depending on demand and staff availability. Students cannot choose a module already taken within an Advanced Topics in Computing subject.

35275

COMPUTING SEMINAR B

3cp; 2hpw
prerequisites: see 35376 Advanced Topics in Computing A

As for 35274.

35281

NUMERICAL ANALYSIS 1

6cp; 4hpw
prerequisite: 35170 Introduction to Computing
corequisite: 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' and Desargues' 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

Number theory: the division algorithm and unique factorisation in **Z**; number-theoretic functions; congruences, Fermat's theorem, Euler's theorem, linear diophantine equations; continued fractions. Groups: basic definitions, symmetry groups, cyclic groups; generators, relations and presentations of a group; subgroups and cosets, conjugacy and normal subgroups, quotient groups, solvable groups; prime power groups, Sylow theorems. Group homomorphisms and isomorphism theorems. Introduction to rings: homomorphisms, subrings, ideals, quotient rings.

35321

ANALYSIS 1

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

Review of sets and functions. Algebraic and order properties of **R**. Countability. Point sets. Application to sequences. Limit of a function: limit theorems, continuity and uniform continuity. Properties of a continuous function on a closed interval. Differentiation. Taylor's theorem with remainder. Review of series, Taylor's series. The Riemann integral. Sequences and series of functions: uniform convergence, Weierstrass M-test. Metric spaces: Cauchy sequences and completeness, the fixed point theorem and applications. Sequentially compact sets in metric space, application to approximation theory. Normed vector spaces: Banach space, finite-dimensional normed spaces, equivalent norms. The Weierstrass approximation theorem.

35322

ANALYSIS 2

6cp; 4hpw
prerequisite: 35321 Analysis 1

Further point set theory: compact subsets of **R**, the Heine-Borel theorem. Topological spaces: Hausdorff spaces, homeomorphisms, connectedness. Operators and functionals on normed spaces, the dual space. Inner product spaces. Hilbert space: adjoint operators, separability, generalised Fourier series, Hilbert space isomorphism, s-algebras, measures and outer measures. Lebesgue and Lebesgue-Stieltjes measure, functions of bounded variation. Borel sets. The Cantor set. Measurable functions, step functions. The Lebesgue integral. L^p spaces: Hölder and Minkowski inequalities, completeness. Product measures. Probability spaces: random variables, distribution functions, independence, expectation and variance. Modes of convergence: Borel-Cantelli lemmas, laws of large numbers. The Radon-Nikodym theorem. Conditional expectation and conditional probability.

35333

APPLIED MATHEMATICS 3A

6cp; 4hpw
prerequisite: 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, Ampere's circuital law, Faraday's law, Maxwell's equations.

35334

APPLIED MATHEMATICS 3B

6cp; 4hpw
prerequisites: 35333 Applied Mathematics 3A; 35335 Mathematical Methods

Acoustic waves in fluids. Waves on a liquid surface. Elastic waves in solids. Electromagnetic waves.

35335

MATHEMATICAL METHODS

6cp; 4hpw
prerequisite: 35231 Differential Equations

Vector integral theorems. Bessel and Legendre equations. Applications to boundary value problems. Integral transform methods for solving boundary value problems.

35340

OPERATIONS RESEARCH PRACTICE

6cp; 4hpw
prerequisites: 35241 Mathematical Programming 1; 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 1

The revised simplex method, the product form of the inverse. Dual linear programs. Duality theorem of linear programming. Sensitivity. Complementary slackness theorem. The dual simplex method. The primal-dual algorithm. Constrained nonlinear optimisation: equality constraints and inequality constraints, first-order and second-order conditions, sensitivity theorems. Feasible direction method. The gradient projection method. Reduced gradient method.

35344

NETWORK OPTIMISATION

6cp; 4hpw
prerequisite: 35241 Mathematical Programming 1

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

Simple linear regression. Multiple regression. Single factor analysis of variance. Further analysis of variance. Other experimental designs. Interpretation of results in regression. Regression diagnostics. Regression model building.

35354

STATISTICAL INFERENCE

6cp; 4hpw
prerequisite: 35252 Statistics 2

Point estimation. Sufficiency. Rao-Blackwell theorem. Hypothesis testing. Neyman-Pearson lemma. UMP tests. Likelihood ratio tests. Decision theoretical approaches. Randomisation tests. Sequential probability ratio test.

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 of control charts. Process capability analysis. Taguchi methods. Acceptance sampling.

35361

PROBABILITY AND STOCHASTIC PROCESSES

6cp; 4hpw
prerequisite: 35252 Statistics 2

Probability. Random variables and expectations. Limit theorems. Markov chains. The Poisson process. Birth and death processes.

35363

STOCHASTIC METHODS IN OPERATIONS RESEARCH

6cp; 4hpw
prerequisite: 35170 Introduction to Computing
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

Overview of graphics hardware and standard graphics software libraries. Mathematical foundation of transformations used in two- and three-dimensional visualisation. Key algorithms for line drawing, clipping and filling. Image creation: hidden line removal, ray tracing. Curve and surface generation: splines. Implementation of key algorithms and use of a graphics software library.

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

Categorisation and specification of grammars. Lexical, syntactic and semantic analysis. Recursive descent and table-driven parsing. Practical compiler-compiler technology. Code generation. Optimisation. Implementation of a compiler for a simple, block-structured imperative language.

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

Feedforward networks: McCulloch-Pitts neuron, simple perceptron, classification problem, linear separability, convergence theorem, multi-layered perceptrons and hard learning, backpropagation training algorithm, convergence, overfitting. Feedback networks: dynamic systems, attractors, memories, Hebbian learning, spurious memories, optimisation problems.

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.

35378

COMPUTING SEMINAR C

3cp; 2hpw
prerequisites: see 35376 Advanced Topics in Computing A

As for 35274.

35379

COMPUTING SEMINAR D

3cp; 2hpw
prerequisites: see 35376 Advanced Topics in Computing A

As for 35274.

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.

35384

FINANCIAL MODELLING

4cp; 3hpw
prerequisites: 35102 Mathematics 2; 35151 Statistics 1

Introduction to models of the standard problems of financial management and the mathematical techniques for their solution; asset and liability management, planning day-to-day operations and the firm's financing and investment decisions. Net-present value. Capital budgeting problem; investment under certainty, investment decisions under uncertainty. The debt-capacity decision; debt maturity and timing decisions, dividend policy, internal financing and growth.

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.

35418

ANALYTIC NUMBER THEORY

4cp; 3hpw
prerequisites: 35314 Pure Mathematics 3B; 35232 Advanced Calculus

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.

35419

ADVANCED ALGEBRA

4cp; 3hpw
prerequisite: 35314 Pure Mathematics 3B

Ring theory: commutative rings, integral domains, field of fractions of an integral domain; polynomial rings; principal ideal domains and unique factorisation. Module theory: left and right modules, submodules, free modules; direct sums of modules; structure of finitely generated modules over a principal ideal domain; application to abelian groups and linear transformations of a vector space. Galois theory: classical problems of constructibility and solution of algebraic equations by radicals; extension fields and splitting fields of a polynomial; Galois groups, fundamental theorem of Galois theory and applications.

35427

FUNCTIONAL ANALYSIS

4cp; 3hpw
prerequisite: 35322 Analysis 2

Banach spaces. Bounded linear transformations. Spectrum. Dual space. Adjoint operator. Hahn-Banach theorem. Compact operators. Riesz theory. Fredholm integral

equations. Fredholm alternative. Application to potential theory. Hilbert spaces. Operators and adjoints. Riesz representation theorem. Orthogonality. Orthonormal bases. Abstract Fourier theory. Self-adjoint operators. Projections. Compact operators. Spectral theory for compact operators. Application to Sturm-Liouville theory. Fourier series.

35428

CONVEXITY AND OPTIMISATION

4cp; 3hpw
prerequisite: 35322 Analysis 2

Convex sets in a linear space. Affine sets and hyperplanes. Algebraic interior and closure. Separation theorems. Geometric Hahn-Banach theorem. Convex functions. Epigraphs. Subdifferentiability and differentiability. Duality. Polars. Support functions. Linear and convex programming. Kuhn-Tucker conditions. General constrained optimisation theory, application to calculus of variations, introduction to applications in optimal control theory.

35436

ADVANCED MATHEMATICAL METHODS

4cp; 3hpw
prerequisite: 35334 Applied Mathematics 3B

Generalised functions, Green's functions; applications in electrostatics and electromagnetism. Tensor analysis: tensors from a geometrical viewpoint, metric and curvature tensors, differential forms, Stokes' theorem, applications in special relativity and Maxwell's equations. Use of the symbolic package MathTensor.

35437

PARTIAL DIFFERENTIAL EQUATIONS

4cp; 3hpw
prerequisite: 35335 Mathematical Methods

First-order equations. Classification of second-order linear equations. Wave equation. D'Alembert's formula. Poisson's formula. Huygen's principle. Heat equation. Maximum principles. Regularity of solutions. Nonlinear problems. Laplace's equation. Properties of harmonic functions. Green's functions. Method of images. Integral equations. Fredholm theory. Application to Dirichlet and Neumann problems. Introduction to scattering theory. Scattering of plane waves by cylinders.

35438

NONLINEAR DYNAMICAL SYSTEMS

4cp; 3hpw
prerequisites: 35231 Differential Equations; 35321 Analysis 1

Review of linear systems. Nonlinear systems. Phase plane analysis. Linearisation. Local stability and instability. Global asymptotic stability. Stable and unstable manifolds. Limit cycles and strange attractors. Introduction to chaos theory. Asymptotic methods. The methods of Poincaré and Lindstedt. The method of averaging. Applications to the theory of finance.

35443

MATHEMATICAL PROGRAMMING 3

4cp; 3hpw
prerequisite: 35342 Mathematical Programming 2

Decomposition methods for large-scale mathematical programming problems. Ellipsoid methods. Karmarkar's projective algorithm. Stochastic programming, two-stage stochastic programming problems.

35446

SCHEDULING THEORY

4cp; 3hpw
prerequisites: 35342 Mathematical Programming 2; 35447 Discrete Optimisation

Examples of scheduling problems in manufacturing and service. Deterministic and stochastic mathematical models for scheduling, resources, task systems, sequencing constraints, performance measure. Polynomial-time scheduling algorithms. Computational complexity of scheduling problems. Enumerative methods, branch-and-bound algorithms, dynamic programming. Approximation algorithms. Scheduling and controlling manufacturing.

35447

DISCRETE OPTIMISATION

4cp; 3hpw
prerequisites: 35111 Discrete Mathematics; 35342 Mathematical Programming 2

Example of discrete optimisation problems. Computational complexity, deterministic and nondeterministic Turing machines,

NP-completeness and Cook's theorem. Examples of the proofs of NP-completeness. Cutting plane algorithms. Enumerative methods. Partitioning algorithms. Modern heuristic techniques. Performance guarantees for approximation algorithms.

35448

DYNAMIC OPTIMISATION

4cp; 3hpw
prerequisites: 35241 Mathematical Programming; 35361 Probability and Stochastic Processes I
corequisite: 35447 Discrete Optimisation

Sequential decision processes. Deterministic dynamic programming, principle of optimality and recursive relations. Relation to other fields of mathematical programming. Computational efficiency. Stochastic dynamic programming. Applications of dynamic programming: equipment replacement, resource allocation, inventory control, (s, S)-policies, dynamic portfolio analysis. Markovian decision processes, policy iteration and linear programming, successive approximation. Applications of the Markov decision model.

35449

OPERATIONS RESEARCH MODELS AND METHODOLOGY

4cp; 3hpw
prerequisites: 35363 Stochastic Methods in Operations Research; 35443 Mathematical Programming 3; 35448 Dynamic Optimisation
corequisite: 35446 Scheduling Theory

Comprehensive study of operations research methodology through case studies requiring methods of linear programming, nonlinear programming, dynamic programming, integer and combinatorial optimisation, simulation, and queueing theory. Further development of skills in the presentation of the results of operations research studies in the form of a technical report and oral presentation. Further practice in working with scientific journals in the field of operations research.

35456

NONLINEAR STATISTICAL MODELS

4cp; 3hpw
prerequisites: 35353 Regression Analysis and Experimental Design; 35467 Time Series Analysis

Nonlinear regression; least squares estimation; hypothesis testing. Use of SAS. Multivariate nonlinear regression. Nonlinear simultaneous equation models; method of moment estimators.

35457

MULTIVARIATE STATISTICS

4cp; 3hpw
prerequisites: 35353 Regression Analysis and Experimental Design; 35354 Statistical Inference

Multivariate normal distribution: definition; moments; characteristic function; estimation of mean and covariance matrices; Wishart distribution; Hotelling's $T2$. Multivariate linear regression; principal components. Factor analysis. Cluster analysis.

35458

LOGLINEAR MODELLING

4cp; 3hpw
prerequisite: 35353 Regressional Analysis and Experimental Design

Revision of linear models and exponential families. Generalised linear models. Applications including logistic regression and contingency tables. Modelling using statistical distributions; continuous distribution models; discrete distribution models.

35459

LINEAR MODELS AND EXPERIMENTAL DESIGN

4cp; 3hpw
prerequisites: 35353 Regressional Analysis and Experimental Design; 35457 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.

35466

ADVANCED STOCHASTIC PROCESSES

4cp; 3hpw
prerequisites: 35322 Analysis 2; 35361 Probability and Stochastic Processes

Formal definitions of probability space and stochastic processes. Martingales. Riemann-Stieltjes integration. Brownian motion and related processes. Stochastic calculus and stochastic differential equations. Financial applications.

35467

TIME SERIES ANALYSIS

4cp; 3hpw
prerequisite: 35361 Probability and Stochastic Processes

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.

35469

STATISTICAL CONSULTING

4cp; 3hpw
prerequisites: 35353 Regression Analysis and Experimental Design; 35355 Quality Control; 35361 Probability and Stochastic Processes
corequisite: enrolment in any 12cp of core statistics subjects in the Honours program

Introduction to the general framework of statistical consulting including a large practical component. Job estimation and business aspects of consulting. Recognition of and searching for appropriate techniques to solve particular problems. Constraints imposed by the analysis time frame. Communication of results in written, graphical and oral forms to lay and technical audiences. Ethical issues.

35485

ADVANCED FINANCIAL MODELLING

4cp; 3hpw
prerequisite: 35340 Operations Research Practice

Options and futures: concepts and valuation models; current issues and developments. Capital structure and theory of the firm: the effects of corporate and personal taxation on the capital structure of a firm; dividend policy; current issues.

35486

OPTIMAL CONTROL 1

4cp; 3hpw
prerequisites: 35231 Differential Equations; 35232 Advanced Calculus

Problems of the calculus of variations and optimal control. Terminology and notation, historical development, formulation, necessary and sufficient conditions for optimality, the maximum principle, various endpoint conditions, inclusion of constraints of various types, bang-bang and singular controls, infinite horizon problems, dynamic programming, applications in continuous and discrete time.

35487

OPTIMAL CONTROL 2

4cp; 3hpw
prerequisites: 35466 Advanced Stochastic Processes; 35486 Optimal Control 1

Formulation of stochastic control problems. Examples of controls. The Hamilton-Jacobi-Bellman equation. Necessary and sufficient conditions. Reduction to Markov controls. Dynamic portfolio strategies. The optimal portfolio selection problem. Discussion of solutions in various particular cases.

35491

HONOURS SEMINAR A

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.

35492

HONOURS SEMINAR B

4cp; 3hpw
prerequisite: by consent

As for 35491.

35496

THESIS SEMINAR A

4cp; 3hpw
prerequisite: by consent

This subject is intended to provide essential background to the Thesis (Honours) or opportunities for study in areas related to the thesis, complementing the project or providing further research in the area. The subject is operated as a reading course with the studies being coordinated by the thesis supervisor.

35497

THESIS SEMINAR B

4cp; 3hpw
prerequisite: by consent

As for 35496.

35498

THESIS (HONOURS)

16cp
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.

35592–6

PROJECT

4,6,8,10,12cp
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.

35599

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.

SUBJECTS OFFERED BY OTHER FACULTIES

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

22105

ACCOUNTING A

4cp; 3hpw

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

4cp; 3hpw

Basic market theory. Demand theory. Elasticity of demand. Short-run cost theory. Short-run supply theory, long-run cost theory. Resource market theory. Perfect and monopolistic competition. Oligopoly and monopoly. Firm behaviour, theory of competition policy. Theory of trade. Market failure theory. Income redistribution. Industry policy, regulation.

25209

MACROECONOMICS

4cp; 3hpw
prerequisite: 25110 Microeconomics

Inflation and unemployment. Aggregate supply and demand. National accounts. Elementary income determination theory. Interest rates and expenditure. The monetary sector. Combining money and expenditure sectors. The balance of payments. Prices, wages and the Phillip's curve. Stagflation.

25210

MICROECONOMIC THEORY AND POLICY

6cp; 4hpw
prerequisite: 25110 Microeconomics

The need for public regulation and/or control of business activity. Microeconomic policy formulation; theory of firms and markets, restrictive trade practices, consumer protection; small business. Industry policy, tariffs and structural change. Foreign investment. Resources policy.

25308

FINANCIAL MARKETS

4cp; 3hpw
prerequisite: 25209 Macroeconomics

Financial intermediation. Interest rate determination. Financial market theory, bond pricing, foreign exchange market futures, options and swaps. The financial system and the Reserve Bank. Introduction to banking. Equity market.

25314

BUSINESS FINANCE

4cp; 3hpw
prerequisites: 22105 Accounting A; 35151 Statistics 1
corequisite: 25308 Financial 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

6cp; 4hpw
prerequisites: 25308 Financial Markets; 25314 Business Finance

International financial management; mechanics and functions of foreign exchange markets, exchange rate determination and parity relationships, forecasting, measurement of foreign exchange risk, multinational working capital management, trade finance, financing foreign operations, long-term asset and liability, international taxation management.

25606

FINANCIAL TIME SERIES ANALYSIS

6cp; 4hpw
prerequisites: 35232 Advanced Calculus; 35353 Regression Analysis and Experimental Design

Financial returns, their definitions and behaviour. Models of price volatility. Forecasting standard deviations. Testing the random walk hypothesis. Testing the market efficiency hypothesis. Forecasting trends in prices. Valuing options.

25620

DERIVATIVE SECURITIES

6cp; 4hpw
prerequisite: 25906 Investment Analysis (Honours)

Introduction to derivative securities, basic arbitrage arguments, the pricing of futures, properties of options, pricing of differing instruments and hedging strategies using derivatives.

25621

FINANCING DECISIONS AND CAPITAL MARKET THEORY

6cp; 4hpw
prerequisite: 25905 Capital Budgeting and Valuation (Honours)

Provides an understanding of the theory, empirical evidence and practice of corporate financing decisions. Critical evaluation of a company's existing capital structure and proposed methods of raising new finance. Review of theoretical and empirical research relating to the efficient market hypothesis.

25905

CAPITAL BUDGETING AND VALUATION (HONOURS)

6cp; 4hpw
prerequisites: 25308 Financial Markets; 25314 Business Finance

The contribution of Markowitz and others to modern portfolio theory and the Capital Asset Pricing Model, including market equilibrium and efficient market assumptions; empirical tests. Relating to the Capital Asset Pricing Model and its

derivatives. Arbitrage Pricing Theory. Pricing models for contingent claims, options and futures. Efficient capital markets, theory and evidence.

25906

INVESTMENT ANALYSIS (HONOURS)

6cp; 4hpw
prerequisites: 25308 Financial Markets; 25314 Business Finance

Equilibrium models. Performance measures. Pricing instruments. Options. Return profiles. Option valuation models. Market efficiency. Share market analysis. Fixed income securities. International diversification.

25907

THEORY OF FINANCIAL DECISION MAKING

4cp; 3hpw
prerequisite: by consent

The theory of choice. State preference theory. The mean–variance criteria. Capital market equilibrium, Capital Asset Pricing Model and Arbitrage Pricing Theory. Efficient capital markets, theory and evidence.

25908

DERIVATIVE SECURITY PRICING

4cp; 3hpw
prerequisite: by consent

Introduction to derivative securities. Basic arbitrage arguments. Geometric Brownian motion model of asset pricing movements. Ito's lemma. Risk-neutral valuation and the Black-Schole's model. Currency and futures options. Hedging techniques. Interest-rate-derivative securities. Alternatives to Black-Schole's option pricing.

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 or her supervisor.

79101

BUSINESS LAW

4cp; 3hpw

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

Bachelor of Business/Bachelor of Science in Computing Science

POSTGRADUATE COURSES

Research degrees

Master of Science (by thesis)

Doctor of Philosophy

Coursework degree

Master of Science in Computing

Management Development Program

Graduate Certificate in Information Technology Management

Graduate Diploma in Information Technology Management

Master of Business in Information Technology Management

Graduate Diploma

Graduate Diploma in Information Technology

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 Programming Practice

Graduate Certificate in Software Quality Assurance

ACADEMIC ADVISERS FOR 1996

Academic advisers in the School of Computing Sciences are located in Building 4, City campus, (Broadway).

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

	Room	Ext
Undergraduate courses		
Bachelor of Science in Computing Science		
Mr John Colville	524	1854
Mr Chris S Johnson	360	1834
Mr Cedric Richardson	368	1866
Projects Coordinator		
Mr Jason Pouflis	358	1657
Bachelor of Information Technology		
Mr Jim Underwood	356	1831
Academic Liaison Officer (Special conditions, disability)		
Dr Bruce Howarth	530	1859
Electives Coordinator		
Mr Jason Pouflis	358	1657
Postgraduate courses		
All Graduate Certificates		
Miss Jean Robb	364	1836
Graduate Diploma in Information Technology		
Miss Jean Robb	364	1836
Master of Business in Information Technology Management and articulated courses		
Miss 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 interconnects the computing facilities available on each campus.

School computing facilities

All laboratory computing equipment within the School of Computing Sciences is interconnected through 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:

linus	Sun 4/670MP	Login, X-Window, print (Staff)
schroeder	Sun 4/4300	PC-NFS-server
sally	Sun SparcStation 10	CPU server, X-Windows, unikix
lucy	Sun SparcServer 20	file server, mail, WWW, ftp
lrhg	Sun SparcStation 10	Research, Transputer
charlie	Sun SparcStation 10	CPU server, X-Windows, unikix
woodstock	Sun SparcStation 4	NEWS server

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

- UNIX workstations—Sun Microsystems and Silicon Graphics
- PC compatible microcomputers
- Transputer systems
- Unikix OLTP
- Access to supercomputers
- Remote access

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 inquiries. 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

Restricted access

To ensure maximum utilisation of the School's computing laboratories and to provide students extended hours of access, most 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 restricted computing laboratories. These can be

obtained at the commencement of each semester from the Interface Room.

Students should note that there are rules of conduct governing the use of School computing laboratories. Disciplinary action may be initiated by the School for failure to abide by these rules.

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. 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.**

Remote access

The school provides modem access to students and staff of the School.

'General access' computing laboratories

'General access' computing laboratories are available for general use by all students registered in the School of Computing Sciences. However, these laboratories may be booked by teaching staff for specific classes and are unavailable for general student use during these periods.

Level	Room	Laboratory name
4	442	Sun Classic Laboratory
4	443	Sun Laboratory—X-Terminals, ELC workstations
2	233	PC Laboratory 386 PC-NFS
2	230	PC Laboratory NEC 386 PC-NFS
2	229	PC-Laboratory 486 PC-NFS

As equipment is upgraded the functions of these laboratories may change.

'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.

Level	Room	Laboratory name
2	235	Parallel Processing Laboratory
2	237	Cooperative Systems Research Laboratory
2	239	Computer Graphics Laboratory

ITD computing laboratories

The ITD maintains two laboratories within the School of Computing Sciences. Equipment maintenance and support services are provided by the ITD.

Level	Room	Laboratory name
4	440	Sun Workstation Laboratory
4	444	Computer Centre PC Laboratory

STAFF CONTACT LIST

All staff in the School of Computing Sciences are located in Building 4, City campus (Broadway).

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

All e-mail addresses should be suffixed with '@socs.uts.edu.au'.

Name	Ext	Room	E-mail
Mr Peter Bebbington	1828	353	peterb
Ms Lyn Chamas *(Secretary/WPO)*	2154	335	lynette
Mr Jeff Clark	1827	355	clark
Mr John Colville	1854	524	colville
Professor Larry Constantine	1840	370	larry
Professor John Debenham *(Director, Postgraduate Studies)*	1837	437	debenham
Assoc Prof Jenny Edwards *(Head of School)*	1844	340	jenny
Mr Jamal El-Den	1830	366	jamal
Dr George Feuerlicht	1835	363	jiri
Assoc Prof Michael Fry *(Director, External Development)*	1821	G32	mike
Mr Peter Gale *(Senior Systems Programmer)*	1868	447	gale
Mr Nigel Hamilton	1833	362	nige
Mrs Judy Hammond	1822	359	judy
Professor Igor Hawryszkiewycz	1809	372	igorh
Professor Brian Henderson-Sellers *(Director, COTAR)*	1189	338	brian
Assoc Prof Tom Hintz *(Deputy Head of School)*	1865	548	hintz
Dr Bruce Howarth *(Director, Undergraduate Studies)*	1859	530	bruce
Dr Barry Jay	1814	514	cbj
Mr Sanjay Jha	1858	520	sanjay
Mr Chris S Johnson	1834	360	chrisj
Mr Chris W Johnson	1855	522	chris
Mrs Elaine Lawrence	1861	533	elaine
Dr Tom Osborn	1852	519	osborn
Mr Jason Pouflis	1657	358	pouflis
Dr Sattiraju Prabhakar	1851	515	prabhakar
Mr Richard Raban	1829	365	richard
Mr Cedric Richardson	1866	368	cedric
Dr Robert Rist	1849	516	rist
Miss Jean Robb *(Director, Graduate Education)*	1836	364	jvrobb
Mr Lin Smith	1864	536	lsmith
Dr Kevin Suffern	1845	512	kevin
Mr Ury Szewcow *(Director, Australian Transputer Centre)*	1862	534	ury
Mr John Tu	1856	523	vohao
Mr Jim Underwood	1831	356	jim
Dr Ron van der Meyden	1850	514	ron
Mr David Wilson	1832	354	davidw
Mr Bernard Wong	1825	357	bernard
Ms Marie Woessner *(Executive Assistant)*	1808	339	marie
Interface Room	1869	447	

PRIZES AND SCHOLARSHIPS

The School of Computing Sciences awards the following prizes and scholarship on a yearly basis. It should be noted that the conditions of award and names of these prizes and scholarship are under review, and will be amended pending Faculty Board approval.

Asia Pacific Computer Consultants Tuition Scholarship

This tuition scholarship, established in 1995 by Asia Pacific Computer Consultants, is awarded annually to an able, needy, first-year, full-time student who is currently enrolled in the Bachelor of Science in Computing Science degree, and for whom this is the first year of tertiary study. The total value of the scholarship is $10,000.

CABS Information Systems Case Study Prize

Established in 1985 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 Sciences 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 in Computing Science student who achieves the highest aggregate mark in the subjects 'Distributed Databases' and 'Database'. The prize has a cash value of $1,000.

Symantec Prize for Excellence in C++ Programming

Established in 1994, by Symantec Australia Pty Ltd, this prize is awarded to the Bachelor of Science in Computing Science student who achieves the highest combined mark in the subject 'Object-oriented Programming and C++' and 'Programming Principles' (or its replacement subject 'Principles of Software Development A'), in any one year. The prize is a cash award of $1,000.

Westpac IT Strategic Plan Award

This prize was established in 1987 by the Westpac Banking Corporation. It is awarded annually to the full-time Bachelor of Science in Computing Science student who develops the best IT strategic plan based on his or her Industrial Training experience. The successful student must be an Australian resident. The prize has a cash value of $500.

UNDERGRADUATE PROGRAMS

Bachelor of Science in Computing Science (BSc)

Course code MC02

This course aims 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 provides an in-depth study of computing science and its applications, and, in addition, support subjects are included to enable graduates to fulfil 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

Students are graded 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 1994 and 1995 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. The prerequisites for Industrial Training 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 Industry Liaison 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 Industry Liaison 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.

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.

Students are expected to apply for exemptions, for which they believe they are eligible, at the commencement of their first year of study. Exemptions are usually processed by the School immediately following enrolment.

Exemptions for holders of TAFE Associate Diplomas and Diplomas

Holders of TAFE Associate Diplomas and Diplomas who are admitted to the course will be eligible for the following exemptions, provided the qualifications were gained within five years of date of entry to UTS. These exemptions are currently under review.

Associate Diploma of Business (Commercial Data Processing)

31414 Information Systems (6cp)
2402C Systems Analysis and Design 1
2402D Computing 1

31417 Computing Practice (6cp)
2402D Computing 1
2402A Programming Concepts
2402Y Computers in Business and Society
8559C Business Communication

31429 Procedural Programming (6cp)
2402A Programming Concepts
2402J Programming Workshop
2402P Programming Option—C

31447 Accounting Information Systems (4cp)
2402C Systems Analysis and Design 1

To obtain the exemption in 31417 Computing Practice, students must demonstrate knowledge of UNIX commands and utilities.

Unspecified CS/IS electives: 20cp

TOTAL: 42cp

Associate Diploma of Business (Microcomputer Systems)

31414 Information Systems (6cp)
8519K Business Systems
2403AG Data Fundamentals

31417 Computing Practice (6cp)
2403A Microcomputer System Usage
2403AC Single-User Operating Systems
2403AD Electronic Spreadsheets
8559H Business Communications Writing

To obtain the exemption in 31417 Computing Practice, students must demonstrate knowledge of UNIX commands and utilities.

Unspecified electives: 16cp

TOTAL: 28cp

Associate Diploma of Engineering (Electronic Engineering)

31416 Computer Systems Architecture (6cp)
2840BC Computer Principles
2840CN Digital Computers 1
2840CP Digital Computers 2
2840AL Electronic Communications Systems
2840BB Computer Data Communications 1

Unspecified electives: 24cp

TOTAL: 30cp

Elective exemptions

Exemption from electives may only be granted on the basis of recent academic study towards a degree, or TAFE award. 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 Director, Undergraduate Studies, 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. A strand taken predominantly from a single area is preferred over a collection of unrelated subjects;

  and

- 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 show 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. (Special arrangements may be made for the study of a foreign language at another university.);

  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 the second part of the elective requirement.

For the purposes of determining completion of elective requirements, the School will award four credit points for every three hours of electives completed up until the end of 1992.

Electives from other universities

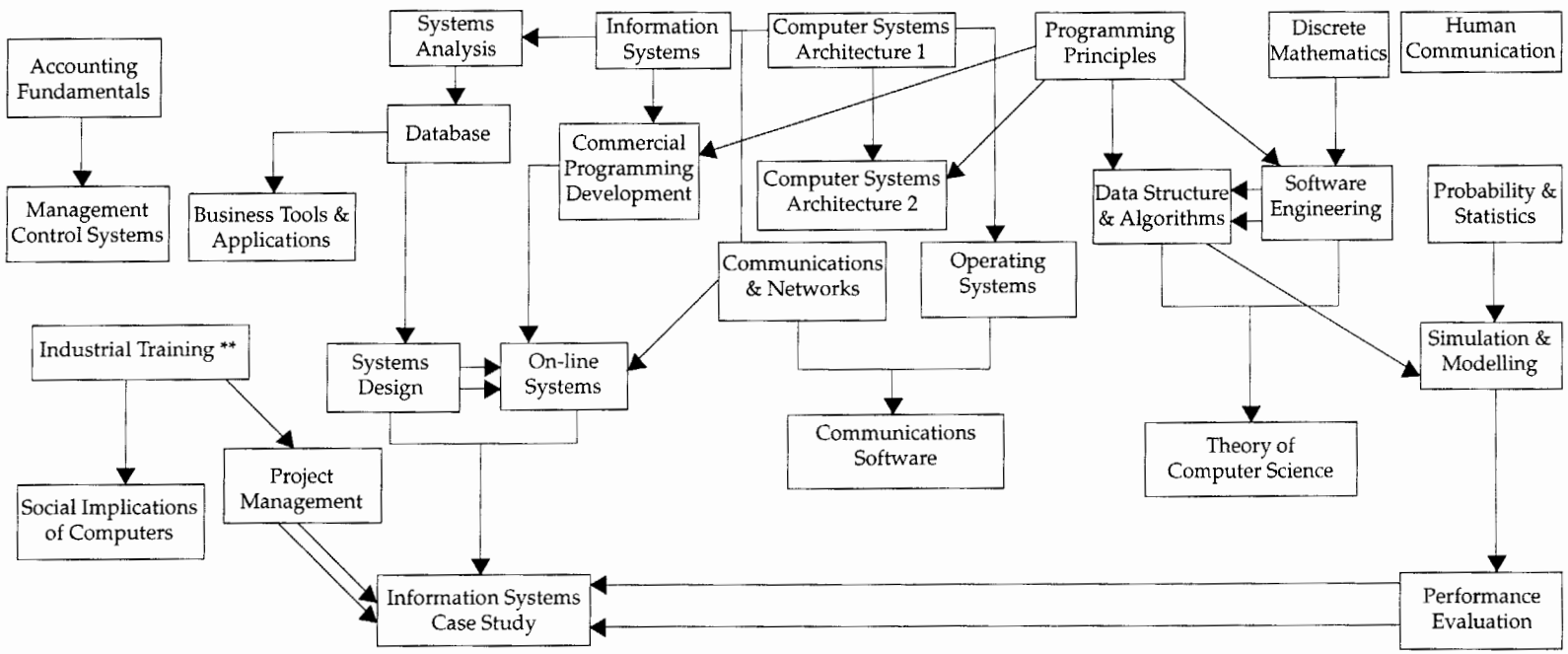
Students wishing to do electives outside the University **must** see the Electives Coordinator to discuss the proposal. Special approval must be sought well before the intended semester of study. Students may undertake subjects outside the University as electives **only** if no comparable subject is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

PROJECTS

In lieu of elective(s) students may take one 4cp project, two 4cp projects, or one 8cp 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 complete a Project Registration form, available from the Projects Coordinator, who will answer any inquiries. 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 allowed without an approved Project Registration form.

BSc (Computing Science) Prerequisite Chart
(For Students Who Commenced Prior to 1995)



A horizontal arrow 

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.

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 4cp 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 on page 74.

TRANSFERRING TO THE NEW COURSE

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

Full-time

Commenced ↓	1995	1996	1997	1998
1992	old 4F			
1993	IT	new 4F		
1994	old 2F	IT	new 4F	
1995	new 1F	new 2F	IT	new 4F

Part-time

Commenced ↓	1995	1996	1997	1998	1999	2000
1990	old 6P					
1991	old 5P	old 6P				
1992	old 4P	new 5P	new 6P			
1993	old 3P	new 4P[1]	new 5P	new 6P		
1994	new 2P[2]	new 3P	new 4P[1]	new 5P	new 6P	
1995	new 1P	new 2P	new 3P	new4P	new 5P	new 6P

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 POST-1995 BSc SUBJECTS

From 1995	Pre-1995
31414 Information Systems	31611 Information Systems 31621 Systems Analysis
31415 Principles of Software Development A	31614 Programming Principles
31416 Computer Systems Architecture	31613 Computer Systems Architecture 1 31623 Computer Systems Architecture 2
31417 Computing Practice	No Equivalent
31424 Systems Modelling	31621 Systems Analysis 31641 Systems Design 31858 Object-oriented Analysis and Design

From 1995	Pre-1995
31425 Principles of Software Development B	31615 Discrete Mathematics 31625 Software Engineering
31428 Quantitative Modelling	31626 Probability and Statistics 31636 Simulation and Modelling
31429 Procedural Programming	31622 Commercial Programming Development 31904 Systems Programming
31434 Database Design	31631 Database
31436 Systems Software and Networks	31632 Communications and Networks 31633 Operating Systems
31444 Systems Design and Development	31641 Systems Design 31642 On-line Systems
31447 Accounting Information Systems	31617 Accounting Fundamentals
31454 Project Management and the Professional	31658 Project Management 31669 Social Implications of Computers
31455 Software Development Case Study	31655 Theory of Computer Science 31625 Software Engineering
31464 IT Planning and Design	31662 Information Systems Case Study

PROGRAM FOR STUDENTS WHO COMMENCE FROM 1995 ONWARDS

Recommended full-time program

Credit point values are shown in parentheses.

Year 1

Autumn semester

31414 Information Systems (6cp)
31415 Principles of Software Development A (6cp)
31416 Computer Systems Architecture (6cp)
31417 Computing Practice (6cp)

Spring semester

31424 Systems Modelling (6cp)
31425 Principles of Software Development B (6cp)
31428 Quantitative Modelling (6cp)
31429 Procedural Programming (6cp)

Year 2

Autumn semester

31434 Database Design (6cp)
31436 Systems Software and Networks (8cp)
31447 Accounting Information Systems (4cp)
Electives (8cp)

Spring semester

31444 Systems Design and Development (10cp)
Electives (12cp)

Year 3

Autumn semester

31696 Industrial Training (0cp)

Spring semester

31697 Industrial Training (0cp)

Year 4

Autumn semester

31454 Project Management and the Professional (8cp)
31455 Software Development Case Study (5cp)
Electives (12cp)

Spring semester

31455 Software Development Case Study (5cp) (subject continues)
31464 Information Technology Planning and Design (6cp)
Electives (12cp)

Recommended part-time program

Credit point values are shown in parentheses.

Year 1

Autumn semester

31415 Principles of Software Development A (6cp)
31417 Computing Practice (6cp)

Spring semester

31416 Computer Systems Architecture (6cp)
31425 Principles of Software Development B (6cp)

Year 2

Autumn semester

31414 Information Systems (6cp)
31428 Quantitative Modelling (6cp)

Spring semester

31424 Systems Modelling (6cp)
31429 Procedural Programming (6cp)

Year 3

Autumn semester

31434 Database Design (6cp)
Elective (4cp)

Spring semester

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

Year 4

Autumn semester

31444 Systems Design and Development (10cp)
Elective (4cp)

Spring semester

31447 Accounting Information Systems (4cp)
Electives (8cp)

Year 5

Autumn semester

31455 Software Development Case Study (5cp)
Electives (8cp)
31698 Industrial Training (0cp)

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

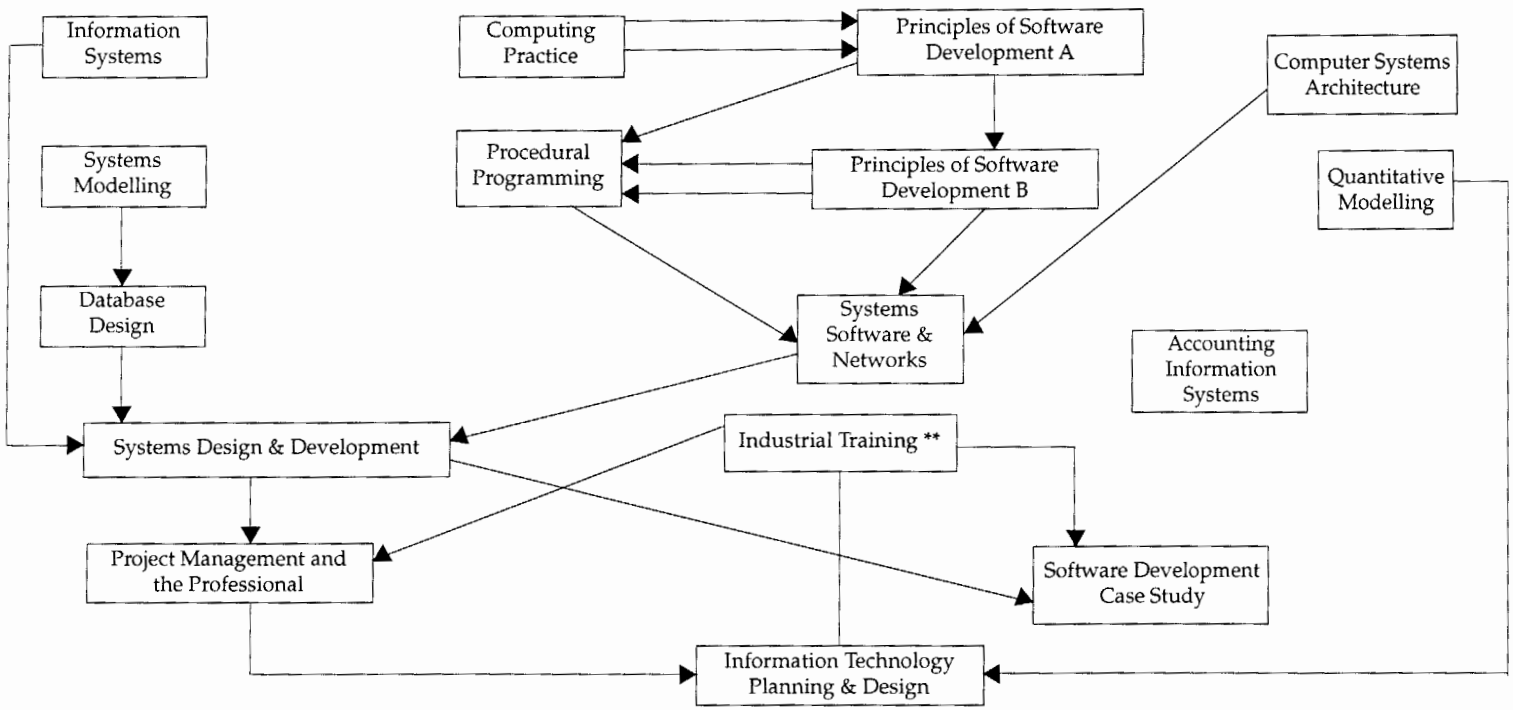
Students must do a minimum of 44 credit points of electives, of which 16 credit points must be taken from the School of Computing Sciences. The remaining elective credit points (minimum 28) may also be taken from the School of Computing Sciences. Alternatively, a student may opt to take a coherent staged group of subjects, normally a formally approved sub-major from another school or faculty. Typically, these are from the Faculties of Business, Engineering, Humanities and Social Sciences and Science, and the School of Mathematical 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 total elective credit points may exceed 44.)

Students should refer to the Post-1995 Bachelor of Science prerequisite chart on page 78.

PROJECTS

Refer to Pre-1995 project information on pages 71 and 73.

BSc (Computing Science) Prerequisite Chart
(For Students Who Commence from 1995 Onwards)



** Prerequisites for Industrial Training are: Information Systems, Systems Modelling, Database Design and Systems Software and Networks and its prerequisites.

SUB–MAJORS

Mathematics

Credit points: 24

Contact person: J Hogg

Telephone: 330 2238; Room: 1522, Building 1

Operations Research

Subject number	Subject name	CP	HPW
Compulsory subjects			
33401	Mathematics for Computing	6	4
35241	Mathematical Programming 1	6	4
35340	Operations Research Practice	6	4
35344	Network Optimisation	6	4

Statistics

Subject number	Subject name	CP	HPW
Compulsory subjects			
33401	Mathematics for Computing	6	4
35252	Statistics 2	6	4
35353	Regression Analysis and Experimental Design	6	4
35361	Probability and Stochastic Processes	6	4

With the exception of the subject pair 33401 Mathematics (for Computing) 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 and Social Sciences

The Faculty of Humanities and Social Sciences offers the following sub-majors to students of the School of Computing Sciences. Students should be aware that subjects whose numbers are in the sequence 54xxx are **not** graded. Students may prefer to undertake the equivalent subjects numbered in the sequence 52xxx which **are** graded. For further information, students are advised to consult the Faculty of Humanities and Social Sciences Student Centre.

Communication, History, Politics and Society (24cp)

Subject number	Subject name	CP	HPW
200 Level			
54201	Communication, Culture and the Law	8	3
54210	International Politics	8	3
54211	Australian Politics	8	3
54212	Power and Social Regulation	8	3
54213	Australian History	8	3
54230	Aboriginal Social and Political History	8	3
53212	Australian History	8	3
51369	Technical and Professional Communications	6	3
	or		
50712	Communication Skills in English	6	3
	or		
59326	Professional Communication	4	3
59325	Science, Technology and Human Values	8	3
	or		
59324	Issues in Science Technology and Human Values	8	3
	or		
52231	Industrial Relations	8	3
	or		
59324	Issues in Industrial Relations	4	3
300 Level			
54300	Communication History	8	3
54301	International Communication	8	3
54302	Media, Culture and Identity	8	3
54310	Issues in Australian Politics	8	3
54311	Asian and Pacific Politics	8	3
54312	The Making of the Third World	8	3
54313	Gender, Culture and Power	8	3
54314	Australia in the World Economy	8	3

54315	Comparative Religions	8	3
54316	Power, Race and Ethnicity	8	3
54318	Urban Culture	8	3
54319	Public and Social Policy	8	3
54320	Social Movements	8	3
54330	The Politics of Aboriginal History	8	3
52339	Organising EEO	8	3
	or		
59335	Issues in Organising EEO	4	3

Public Relations (24cp)

Subject number	Subject name	CP	HPW
56013	Public Relations Process and Practice	6	4
56011	Public Relations Strategies and Management	6	4
56012	Public Relations Contexts and Applications	6	4
56014	Public Relations Professional Practice	6	4

Business

The following sub-majors are offered to Computing Science students by the Faculty of Business. It should be noted that Computing Science students are **not** permitted to take the Business Information Systems sub-major. Students may undertake other sub-majors if they have the necessary prerequisites. Further information on these sub-majors may be obtained from the Student Liaison Unit, Faculty of Business.

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

School of Accounting

Financial Reporting

Subject number	Subject name	CP	HPW
22205	Accounting B	4	3
22320	Accounting for Business Combinations	6	4
22420	Accounting Standards and Regulation	6	4
	plus two of the following:		
22319	Issues in Financial Statement Analysis	6	4
22240	International Accounting	6	4
22206	Government Accounting	6	4
22610	Accounting for Insolvency	6	4

This combination has a value of 22 credit points. A sub-major must consist of a minimum of 24 credit points. It is suggested that students take the subject 31902 Auditing the Computer (4cp) or a further accounting subject from the list above to complete the sub-major.

Management Reporting

Subject number	Subject name	CP	HPW
22205	Accounting B	4	3
22321	Cost Management Systems	6	4
22421	Managerial Decisions and Control	6	4
22318	Contemporary Issues in Management Accounting	6	4

This combination has a value of 22 credit points. A sub-major must consist of a minimum of 24 credit points. It is suggested that students take the subject 31902 Auditing the Computer (4cp) or a further accounting subject from the list above to complete the sub-major.

Small Business Accounting

Subject number	Subject name	CP	HPW
22205	Accounting B	4	3
22566	Accounting for Small Business 1	6	4
22567	Accounting for Small Business 2	6	4
22318	Accounting for Overseas Transactions	6	4

This combination has a value of 22 credit points. A sub-major must consist of a

minimum of 24 credit points. It is suggested that students take the subject 31902 Auditing the Computer (4cp) or a further accounting subject from the list above to complete the sub-major.

School of Finance and Economics

Economics

Subject number	Subject name	CP	HPW
25110	Microeconomics	4	3
25209	Macroeconomics	4	3
25210	Microeconomic Theory and Policy	6	4
25475	Macroeconomic Theory and Policy	6	4
25478	Industry Economics	6	4

School of Management

Employment Relations

Subject number	Subject name	CP	HPW
21130	Management and Organisations	4	3
21125	International Business Environment	4	3
21306	International Employment Relations	6	4
21407	Strategic Human Resource Management	6	4
31734	Information Systems and Organisations	4	3

International Management

Subject number	Subject name	CP	HPW
21130	Management and Organisations	4	3
21125	International Business Environment	4	3
21519	International Management	6	4
21531	Managing International Organisations	6	4
31734	Information Systems and Organisations	4	3

Introductory Advertising

Subject number	Subject name	CP	HPW
24105	Marketing Principles	4	3
24202	Consumer Behaviour	6	4
24309	Introductory Marketing Research	6	4
24210	Advertising and Promotions Management	6	4
59330	Advertising Practice	6	4
	or		
59333	Advertising Strategies	6	4

Introductory Marketing

Subject number	Subject name	CP	HPW
24105	Marketing Principles	4	3
24202	Consumer Behaviour	6	4
24205	Business Marketing	6	4
24220	International Marketing	6	4
24309	Introductory Marketing Research	6	4

School of Leisure and Tourism Studies

Leisure Management (at Kuring-gai campus)

Subject number	Subject name	CP	HPW
27***	The Leisure Industry	6	4
27***	Leisure Services Management	6	4
27523	Leisure Tourism Planning	6	4
	plus one of the following:		
27628	Law for Leisure, Sport and Tourism	6	4
27306	Marketing Leisure Services	6	4
*****	Festivals and Special Events	6	4
27316	Leisure and Fitness Centre Operations	6	4

Sports Management (at Kuring-gai campus)

Subject number	Subject name	CP	HPW
27307	Administration of Australian Sports	6	4
27716	Sports Marketing	6	4
27***	Events and Facilities Management	6	4
	plus one of the following:		
27628	Law for Leisure, Sport and Tourism	6	4
27103	The Olympic Games	6	4
27316	Leisure and Fitness Centre Operations	6	4
27***	Applied Sports Psychology	6	4

Tourism Management

Subject number	Subject name	CP	HPW
27128	Tourism Systems	6	4
27648	The Tourism Industry	6	4
27631	Tourism Management	6	4
	plus one of the following:		
27628	Law for Leisure, Sports and Tourism	6	4
27632	Tourist Behaviour	6	4
27642	Tourism Services Marketing	6	4
27523	Leisure and Tourism Planning	6	4

Science

Physics (General)

This sub-major provides a grounding in general physics for 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 the programming of scientific and engineering problems.

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

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
	Compulsory subjects				
68711	Physics 1 S	A,S	8	6	
68721	Physics 2 S	A,S	8	6	Physics 1 S or permission
	plus at least eight credit points from the following:				
68731	Physics 3 S	A	4	3	Physics 2 S or Engineering Physics (Civil) S
68732	Applied Optics S	A	4	3	Physics 2 S or Engineering Physics (Civil) S
68743	Thermodynamics and Energy S	S	4	3	Physics 2 S or Engineering Physics (Civil) S
68741	Quantum Physics 1 S	S	4	3	Physics 2 S
68751	Nuclear Physics S	A	4	3	Quantum Physics 1 S

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:

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
Compulsory subjects					
68713	Physics for Electronics S	A	8	6	
68734	Electronics 1 S	A	8	6	Physics 2 S or Engineering Physics (Civil) S
	plus at least eight credit points to be chosen from the following:				
68744	Electronics 2 S	S	4	3	Electronics 1S
	or				
68754	Microprocessors in Instrumentation S	A	4	3	Electronics 2 S ***or*** Electronics 1 S ***and*** Logic Design 1
68764	Principles of Instrumentation S	S	4	3	

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.

Engineering

Electrical Computer Systems

Credit points: 19

Contact person/s: Ms E With/Mr J Leaney

Telephone: 330 2432; Room: 2423, Building 1/330 2389; 2221A, Building 1

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

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
Compulsory subjects					
33401	Mathematics for Computing	A	4	3	31415, 31428
45163	Real Time Software and Interfacing	A,S	3	3	45143
45364	Digital Systems	A,S	3	3	45143
45372	Computer Systems Analysis	S	3	3	45143, 33401
45382	Computer Systems Design	A	6	6	45372

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

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.

Year	Semester 1	Semester 2
1	UTS	Industry
2	UTS	UTS
3	Industry	UTS

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 those 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 assigned to them.

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.

The Bachelor of Information Technology satisfies all of the requirements for full membership of the Australian Computer Society, the industry's professional body.

GRADING OF AWARDS

Students will be graded 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

Students 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 BInfTech 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 progressively being replaced by new BInfTech subjects.

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

25410 Corporate Financial Analysis (6cp)
31464 Information Technology Planning and Design (6cp)
31669 Social Implications of Computers (3cp)
31764 Information Technology Strategy (4cp)
31766 Performance Modelling and Management (4cp)
31902 Auditing the Computer (4cp)

PROGRAM FOR STUDENTS WHO COMMENCE FROM 1995 ONWARDS

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)
31718 Contemporary Information Technology 1 (6cp)

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

Summer

31729 Information Systems Practice (2cp)

Autumn semester–UTS

31434 Database Design (6cp)

31436 Systems Software and Networks (8cp)
31734 Information Systems and Organisations (4cp)
31447 Accounting Information Systems (4cp)
Elective (4cp)

Spring semester–UTS

25410 Corporate Financial Analysis (6cp)
31424 Systems Modelling (6cp)
31444 Systems Design and Development (10cp)
31443 Distributed Databases and Client–Server Computing (4cp)
31737 Business Process Transformation (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 Marketing Principles (4cp)
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 Law, Faculty of Business or the School of Computing Sciences, subject to the approval of the BInfTech 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.

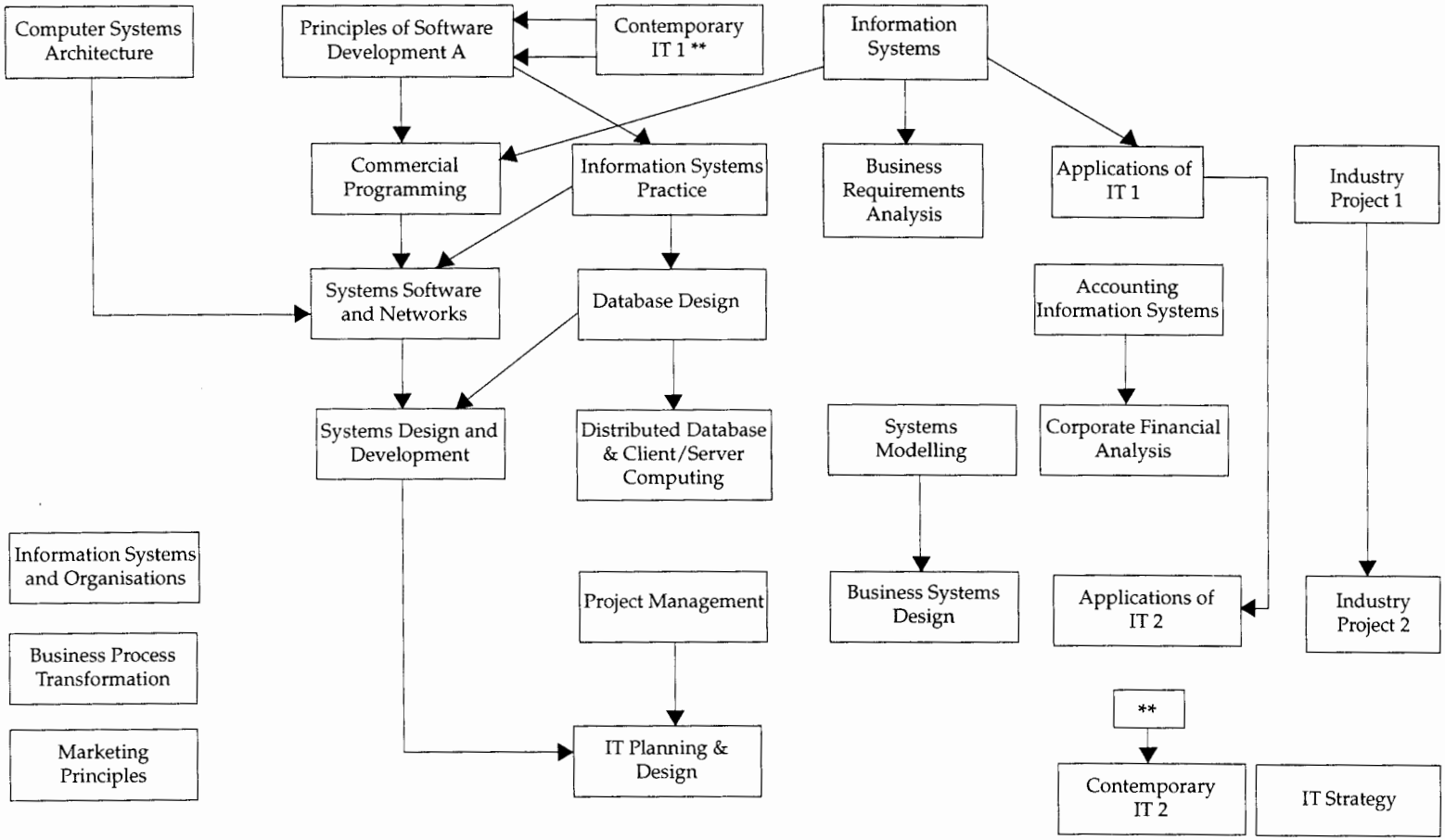
Variations to the approved program of study for the Bachelor of Information Technology are restricted. No industry-based subject may be deleted from the program, except under extraordinary circumstances and at the discretion of the Course Steering Committee and the School of Computing Sciences. No industry-based subject may 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 who, 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.

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.

Bachelor of Information Technology Prerequisite Chart



INDUSTRY SEMESTERS

The dates of the industry-based semesters for 1996 are as follows:

Autumn semester (third-year students) Monday 15 January 1996–Friday 28 June 1996

Spring semester (first-year students) Monday 1 July 1996–Friday 13 December 1996

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. BInfTech students **must** also inform Des Saunders, Industry Liaision 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 2852.

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 BInfTech students with satisfactory progress will move from their current level to the next level.

The levels for 1996 are as follows:

Level 1	$10,000 per annum
Level 2	$10,500 per annum
Level 3	$11,000 per annum

The scholarship paid to BInfTech 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. The course is of five years' duration and is offered only on a full-time basis (although students will be expected to attend some evening lectures). 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. This provision is under review.

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

Students enrol with the Faculty of Law, and are 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 **two** degrees and therefore receive **two** testamurs on graduation (subject to university approval). 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.

The Faculty of Law administers the course. Full details of the course, and the standard program, are contained in the *Faculty of Law Handbook*. Inquiries should be directed to the Faculty of Law on 281 2699.

Double degree in Business and Computing Science

Students initially enrol in the Bachelor of Business degree and take the Computing Science 'Programming and Design' sub-major. On satisfactory completion of the Business degree and the Computing Science 'Programming and Design' sub-major, students may then apply for admission to the Bachelor of Science in Computing Science degree. If admitted, the sub-major, and part of the business component are used in lieu of the requirement for external electives in the Bachelor of Science in Computing Science.

Full details of the Bachelor of Business degree are contained in the *Faculty of Business Handbook*.

POSTGRADUATE PROGRAMS

General inquiries should be directed to either the University Graduate School, telephone 330 1523, or the Faculty's Graduate Studies Officer, telephone 330 1806. All prospective applicants should contact the Faculty's Graduate Studies Officer **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, image processing
- computer performance evaluation
- computer-supported cooperative work
- distributed and object databases
- distributed multimedia
- distributed systems
- human–computer interaction
- information processing strategy, systems management
- local networks and network interface technology
- microprocessors and their applications
- neural networks
- object-oriented metrics
- object-oriented systems development methodologies
- parallel processing and transputers
- quality of systems and software
- semantics and design of programming languages
- usability of systems and software

Computing Sciences research laboratories

Within the School, a wide range of computing and information technology research is supported by a variety of research laboratories. Graduate research students, academics, visiting researchers and research assistants undertake collaborative research within these laboratories. The quality and relevance of research in the laboratories is enhanced by well-established links, both with industry and with overseas research 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: Ury Szewcow)

Computer Graphics Laboratory—using seven Silicon Graphics workstations, this laboratory is concerned with the development of realistic images and computer animation. Other areas include efficient contour algorithms, human movement image animation and textual modelling. (Contact: Dr Kevin Suffern)

Cooperative Systems Laboratory—focuses on the 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 or Professor Igor Hawryszkiewycz)

Software Research Laboratory—includes three groups:

Algorithms and Languages Group—investigates programming languages and paradigms, concurrency, software engineering and formal methods, category theory. (Contact: Dr Barry Jay)

Artificial Intelligence Group—interests include AI in design, Case-based Reasoning, cognitive modelling, Knowledge Engineering, PROLOG and LISP. (Contact: Professor John Debenham)

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: 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 bandwidth 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: David Wilson or Judy Hammond)

COTAR—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 above.

ATTENDANCE PATTERN

The Doctor of Philosophy degree is available on both a full-time and a part-time basis. The normal duration of enrolment is three years for full-time attendance and six years for part-time attendance. Candidates who already possess a degree at the Master's level may be permitted to complete in two years of full-time research, or three years of part-time research. The maximum duration of enrolment is five years for full-time students and seven-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 so that the total number of hours devoted to research is that expected of full-time attendance.

HOW TO APPLY

Application forms for all postgraduate courses may be obtained from the UTS Information Service. Applicants should hold a First Class, or Second Class (Division 1), 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 at least two supervisors for their research work, one of whom should be an academic staff member of the University and, normally, one of whom should hold a Doctoral degree. Of the two supervisors, one shall be the principal supervisor, and the other the co-supervisor.

Prospective applicants should seek agreement from a member of the School's academic staff to act as a (principal) supervisor for the proposed research if the application is successful. Once this agreement has been obtained, applicants may then apply formally for admission by completing an Application for Candidature Doctoral Degrees form and the Faculty's Supplementary Doctoral Application form. These forms must be signed by the applicant, the proposed supervisor and the Head of School.

COURSE FEES

Fees will be levied in accordance with University policies and DEET guidelines. Details will be available in early 1996.

PROGRESS REPORTS

All thesis students are required to submit, in consultation with their supervisors, a progress report at the end of each semester. The University Graduate School contacts each student and their supervisor/s to initiate this process.

SUBMISSION OF THESIS

Each candidate for the degree of Doctor of Philosophy should give the Academic Registrar two months' written notice of intention to submit their written thesis. Appropriate forms and the information brochure Presentation and Submission of Theses for Higher Degree are available from the University Graduate School.

RECENT THESES

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

Jalloul, G 1995, Concurrent Object-oriented Systems: A Disciplined Approach.

Marriot, N L 1995, DANCE—Describing, Animating, Notating, Classical, Enchainements.

Master of Science (MSc)

Course code MC51

The Master of Science 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 above.

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

Application forms for all postgraduate courses may be obtained from the UTS Information Service. 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.

Prospective applicants should seek agreement from a member of the School's academic staff to act as a supervisor for the proposed research if the application is successful. Once this agreement has been obtained, applicants may then apply formally for admission by completing an Application For Admission—Graduate Courses form, and the Faculty's Details of Proposed Study form. These forms must be signed by the applicant, the proposed supervisor and Head of School.

COURSE FEES

Fees will be levied in accordance with University policies and DEET guidelines. Details will be available in early 1996.

PROGRESS REPORTS

All thesis students are required to submit, in consultation with their supervisors, a progress report at the end of each semester. The University Graduate School contacts each student and their supervisor/s to initiate this process.

SUBMISSION OF THESIS

Each candidate for the degree of Master of Science should give the Academic Registrar two months' written notice of their intention to submit their written thesis. Appropriate forms and the information brochure *Presentation and Submission of Theses for Higher Degrees* are available from the University Graduate School.

RECENT THESES

Blair, A 1992, Managing Business Rules and Integrity Constraints in Relational Database Applications.

Lindley, C A 1992, The Knowledge Analyst's Assistant: A Computer-aided Knowledge Engineering Tool.

Phillips, M T 1993, Dynamic Load Sharing: A Prototype.

Wilson, D N 1993, Project Management for a Prototyping Environment.

Hargreave, G D 1994, Aspects of Computer Security Modelling.

Linn, C N 1994, A Performance Model for Loosely Coupled Heterogeneous Distributed Information Systems

Pearson, N R 1995, A General Purpose Parallelising Compiler for Sequential Code.

Ward, J A 1995, The Composer's Assistant.

Postgraduate coursework programs

Master of Science in Computing (MSc)

Course code MC53

The Master of Science in Computing is a professional course. Graduates select a program of study which suits their individual career goals. For example, a program may be chosen which develops specialised expertise in computer systems, which provides a general update of information science technology, or one which 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 normally 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 held 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 each year an 'Admission package' containing a copy of the Guide, the application forms and other relevant information is available from the UTS Information Service. Please note that completed application forms must be submitted to the University by the published deadline which is usually 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

The Master of Science in Computing is offered with a fixed quota of student places and the course fees have been set in accordance with University policy. In 1995, the tuition fees were $1,000 per semester for a normal attendance pattern. Course fees are revised from year to year in accordance with University and Government policy.

PREREQUISITE KNOWLEDGE

All subjects in the Master of Science in Computing 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 as advised by the Director, Postgraduate Studies.

For a subject offered by faculties or 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.

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 of 72 credit points, consisting of 48 credit points from coursework and 24 credit points from the Project subject. Students who are allowed to undertake such a 24cp 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 Master of Science in Computing if that student has already completed a similar subject in another course.

Principal subjects in the Master's course are subjects offered by the School of Computing Sciences on a regular basis. Elective subjects in the Master's course are subjects offered by the School of Computing Sciences on a periodic basis; 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 Master of Science 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. (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.)

Subject outline timetable

The principal subjects are as follows:

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

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 a selection chosen from the following elective subjects (credit point values are shown in parentheses).

ELECTIVE SUBJECTS

32501 Computer Graphics (6cp)
32502 Advanced Computer Graphics Techniques (6cp)
32503 Distributed Databases and Client/Server Computing (6cp)
32504 Tool-based Systems Development (6cp)
32505 Advanced Object-oriented Analysis and Design (6cp)
32506 Knowledge Systems (6cp)
32507 Performance Evaluation (6cp)
32508 Software Quality Management Systems (6cp)
32509 Human–Computer Interaction in Information Systems (6cp)
32510 Principles of Object-oriented Programming in C++ (6cp)
32511 Principles of Object-oriented Programming in Smalltalk (6cp)

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 or faculty for prerequisites.

School of Mathematical Sciences

34549 Linear Models and Experimental Design (4cp)
35443 Mathematical Programming 3 (4cp)
35448 Dynamic Optimisation (4cp)
35457 Multivariate Statistics (4cp)
35466 Advanced Stochastic Processes (4cp)
35467 Time Series Analysis (4cp)
35485 Advanced Financial Modelling (4cp)

Faculty of Business

21702 Industrial Relations (6cp)
21718 Organisation Analysis and Design (6cp)
21719 Organisational Behaviour (6cp)
21720 Employment Relations (6cp)
21722 Leadership and Management Action (6cp)
21724 Human Resource Management (6cp)
21741 Operations Management (6cp)
22747 Accounting for Managerial 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)

CHOOSING A PROGRAM IN 1996

Students may find this presentation of principal 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 coursework subjects.

Semester	Computer Methods	Computing Systems	Information Systems Technology	Information Systems Management
A 96	Recent Advances in Computer Science	Capacity Management	Advanced Data Management	Recent Advances in Information Systems
S 96	Specialist Topics in Artificial Intelligence	Operating Systems	Computer Communication Systems	Information Technology Environment
A 97	Object-oriented Software Development	Recent Advances in Computer Science	Recent Advances in Information Systems	Information Management
S 97	Formal Reasoning for Software Development	Computer Architecture	Advanced Information Systems Modelling	Information Processing Strategy
A 98	Recent Advances in Computer Science	Capacity Management	Advanced Data Management	Recent Advances in Information Systems
S 98	Specialist Topics in Artificial Intelligence	Operating Systems	Computer Communication Systems	Information Technology Environment

Note: The program shown for 1998 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 learnt 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 should be submitted before the end of the tenth

week of the semester in which the student wishes their 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 University Graduate School). 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 or 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 or 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 inquiries 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 Diploma

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

  or

- The prior successful completion of the Graduate Certificate in Information Technology Management (therefore exempt from Semester 1 and 2 subjects), where entry to the Graduate Certificate was based on a recognised Bachelor's degree (or equivalent) in an appropriate discipline such as Business or Computing

  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 the applicant's 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 faculties or schools other than the School of Computing Sciences and the Faculty of Business, 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 is higher, and for 1996 has been set at $3,000.

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 or 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 or she will be required to do an alternate subject from the electives available. Exemptions may only be considered on the basis of successfully completed subjects from these courses at Level 1 or above.

Level 1—Non Award

A student may take any number of subjects relevant to his or 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)

plus 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)
21808 Strategic Business Management (6cp)

plus **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 or 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][1]

Spring semester

Project [Y][1]

[1] Project [Y] is a year-long subject with a value of 18 credit points.

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

21806 Managing Organisational Change (6cp)
21807 Total Quality and Productivity Management (6cp)
21808 Strategic Business 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 or 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 or her current employment. Alternatively, a student may wish to choose a topic which should be of value to his or her future career. The project should be a vehicle for importing the knowledge learnt 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)

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 re-training 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 re-training emphasis of 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.

ADMISSION REQUIREMENTS

The Graduate Diploma in Information Technology is offered on the basis of a Spring semester intake only.

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 either contact the University Graduate School 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 to 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's Graduate Studies Officer, Bruce Irvine, on 330 1806, or the Director, Graduate Education, Jean Robb, on 330 1836.

FEES

Australian citizens and permanent residents currently contribute to the cost of the course through HECS (i.e. the Higher Education Contribution Scheme). In 1995, the fees for overseas students were set at $14,500 per annum. Fees are subject to annual review. In 1996, it is likely that the course will be offered on full-fee-paying basis rather than through HECS.

ATTENDANCE PATTERN

The course is normally taken on a part-time basis over two years, and will usually entail attending three to four evenings per week. Occasionally one afternoon per week (plus two to three 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 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

Students will have their registration discontinued for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80).

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. Credit point values are shown in parentheses.

Spring semester

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

Autumn semester

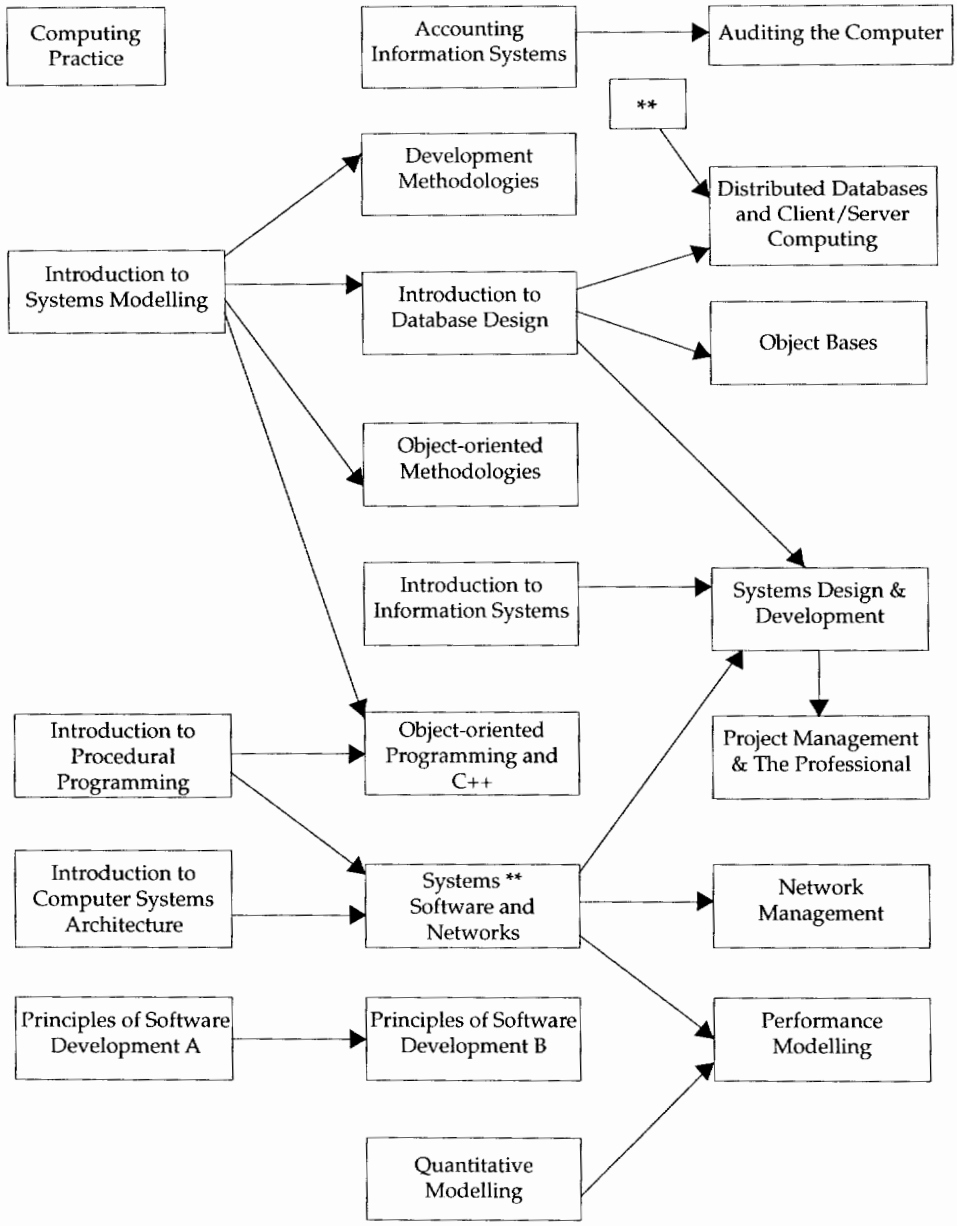
31934 Introduction to Database Design (4cp)

and at least one of

31415 Principles of Software Development A (6cp)
31941 Introduction to Procedural Programming (4cp)

The only prerequisite for the core subjects is that 31940 Introduction to Systems Modelling **must** precede 31934 Introduction to Database Design.

Graduate Diploma in Information Technology
Prerequisite Chart



The remaining 26 to 28 credit points are taken as electives. These electives may be taken from any elective, and most 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, Graduate Education. The subject 31436 Systems Software and Networks is strongly recommended. Some suggestions are:

31140 Introduction to Computer Graphics (4cp)
31163 Knowledge-based Systems (4cp)
31240 Topics in Computer Graphics (4cp)
31425 Principles of Software Development B (6cp)
31428 Quantitative Modelling (6cp)
31436 Systems Software and Networks (8cp)
31443 Distributed Databases and Client Server Computing (4cp)
31444 Systems Design and Development (10cp)
31447 Accounting Information Systems (4cp)
31454 Project Management and the Professional (8cp)
31860 Object-oriented Programming and C++ (4cp)
31875 Parallel Programming (4cp)
31876 Operating Systems Facilities (4cp)
31902 Auditing the Computer (4cp)
31904 Systems Programming (4cp)
31923 Office and Group Support (4cp)
31925 Smalltalk (4cp)

Students should refer to the 'Numerical listing' section for details of elective offerings. All students are permitted to take any modules they wish from the subject 31417 Computing Practice. These modules, which will not be liable for HECS, will be additional to the standard course program, and credit **will not** be given.

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)

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 1996.

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 either the Graduate Certificate in Information Systems 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.

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 that 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, contact Jean Robb, Director, Graduate Education, on 330 1836.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration, in the case of part-time students, not inclusive of periods of leave of absence.

UNSATISFACTORY PROGRESS

Students will have their registration discontinued for any two failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/95/26).

FEES

Full tuition fees will be charged. In 1995, the fee for this course was $3,200. 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, i.e. four semester hours per week per 6cp subject.

ATTENDANCE PATTERN

The course is usually offered as part of the School's normal program for Information Studies students.

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.

COURSE STRUCTURE

The subjects to be taken are as follows:

31521 Foundations of Computing and Programming (6cp)
31531 Systems Analysis and Design (6cp)
31551 Database (6cp)

For further information, contact Jean Robb, Director, Graduate Education, on 330 1836.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration, in the case of part-time students, not inclusive of periods of leave of absence.

UNSATISFACTORY PROGRESS

Students will have their registration discontinued for any two failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/95/26).

FEES

Full tuition fees will be charged. In 1995, the fee for this course was $1,800. This fee is subject to annual review.

Graduate Certificate in Computer Science

Course code MC60

This course provides students with a foundation in Computer Science. This foundation can later be consolidated by the Graduate Certificate in Advanced Information Technology, and/or complemented by the Graduate Certificate in Information Systems.

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.

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, contact Jean Robb, Director, Graduate Education, on 330 1836.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration, in the case of part-time students, not inclusive of periods of leave of absence.

UNSATISFACTORY PROGRESS

Students will have their registration discontinued for any two failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/95/26).

FEES

Full tuition fees will be charged. In 1995, the fee for this course was $3,200. This fee is subject to annual review.

Graduate Certificate in Human–Computer Interaction

Course code MC65

This course is 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. Students who are members of the Australian Computer Society will be credited with PCP points on completion of this certificate.

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)

For further information, contact Jean Robb, Director, Graduate Education, on 330 1836.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration, in the case of part-time students, not inclusive of periods of leave of absence.

UNSATISFACTORY PROGRESS

Students will have their registration discontinued for any two failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/95/26).

FEES

Full tuition fees will be charged. In 1995, 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 by the Graduate Certificate in Advanced Information Technology.

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 that class space is available. The precise attendance pattern will be developed as part of the business plan for any given course offering.

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, contact Jean Robb, Director, Graduate Education, on 330 1836.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration, in the case of part-time students, not inclusive of periods of leave of absence.

UNSATISFACTORY PROGRESS

Students will have their registration discontinued for any two failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/95/26).

FEES

Full tuition fees will be charged. In 1995, the fee for this course was $3,200. 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 i.e. six semester hours per week per 6cp subject.

ATTENDANCE PATTERN

The course is usually offered as part of the School's normal program for Information Studies students.

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.

COURSE STRUCTURE

The subjects to be taken are as follows:

31541 Commercial Programming (6cp)
31561 Data Communications (6cp)

For further information, contact Jean Robb, Director, Graduate Education, on 330 1836.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration, in the case of part-time students, not inclusive of periods of leave of absence.

UNSATISFACTORY PROGRESS

Students will have their registration discontinued for any two failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/95/26).

FEES

Full tuition fees will be charged. In 1995, the fee for this course was $1,200. This fee is subject to annual review.

Graduate Certificate in Software Quality Assurance

Course code MC56

This course is 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.

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.

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.

For further information, contact Jean Robb, Director, Graduate Education, on 330 1836.

MAXIMUM TIME RULE

Students will have their registration discontinued for failure to complete the course in three semesters from the time of registration, in the case of part-time students, not inclusive of periods of leave of absence.

UNSATISFACTORY PROGRESS

Students will have their registration discontinued for any two failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/95/26).

FEES

Full tuition fees will be charged. In 1995, the fee for this course was $2,100. This fee is subject to annual review.

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. (The prerequisites for these subjects are not shown.) All prerequisites are in terms of current undergraduate offerings. See the subject descriptions for details of other possible prerequisites.

In the case of some elective subjects, no 'Semester offered' is shown. Elective offerings will vary according to demand.

CORE SUBJECTS FOR BSC

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
31414	Information Systems	A	6	4	Nil
31415	Principles of Software Development A	A	6	9	31417 *c*
31416	Computer Systems Architecture	A,S	6	6	Nil
31417	Computing Practice	A	6	4	Nil
31424	Systems Modelling	S	6	3	Nil
31425	Principles of Software Development B	S	6	7	31415
31428	Quantitative Modelling	A,S	6	5	Nil
31429	Procedural Programming	S	6	4	31415, 31425 *c*
31434	Database Design	A	6	3	31424
31436	Systems Software and Networks	A,S	8	6	31425, 31429, 31416
31444	Systems Design and Development	A,S	10	2	31434, 31436 *c*
31447	Accounting Information Systems	A,S	4	3	Nil
31454	Project Management and the Professional	A	8	4	31444, 31697 or 31698
31455	Software Development Case Study	Y	10	6	31444, 31697 or 31698
31464	Information Technology Planning and Design	S	6	5	31428, 31454, 31697
31611	Information Systems	*	4		
31615	Discrete Mathematics	*	4		

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
31617	Accounting Fundamentals	*	4		
31621	Systems Analysis	*	4		
31622	Commercial Programming Development	*	4		
31623	Computer Systems Architecture 2	*	4		
31624	Data Structures and Algorithms	*	4		
31625	Software Engineering	*	4		
31626	Probability and Statistics	*	4		
31631	Database	*	4		
31632	Communications and Networks	*	4		
31633	Operating Systems	*	4		
31636	Simulation and Modelling	*	4		
31641	Systems Design	*	4		
31642	On-line Systems	*	4		
31647	Management Control Systems	*	4		
31648	Business Tools and Applications	*	4		
31653	Communications Software	*	4		
31655	Theory of Computer Science	A	4	4.5	31624, 31625
31658	Project Management	*	4		
31662	Information Systems Case Study	S	5	6	31641, 31642, 31454, 31666 *c*
31666	Performance Evaluation	A	4	6	31636
31669	Social Implications of Computers	S	3	3	31696–7 or 31698–9
31696	Industrial Training (F/T)	A	0	6	31414, 31424, 31434, 31436 plus[1]
31697	Industrial Training (F/T)	S	0	6	31696
31698	Industrial Training (P/T)	A,S	0	3	31414, 31424, 31434, 31436, plus[1]
31699	Industrial Training (P/T)	A,S	0	3	31698

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

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
31140	Introduction to Computer Graphics	A	4	3	31425, 31429
31163	Knowledge-based Systems	A	4	3	31425, 31429
31240	Topics in Computer Graphics	S	4	3	31140
31350	Project (2 semester)	A,S	8	6	31444
31351	Project (1 semester)	A,S	8	6	31444
31352	Project	A,S	4	3	31444
31443	Distributed Databases and Client/Server Computing	S	4	3	31434
31654	Languages and Translators	S	4	3	31416, 31429, 31425
31734	Information Systems and Organisations	A	4	3	Nil
31764	Information Technology Strategy	S	4	3	Nil
31768	Business Planning for IT Professionals	S	4	3	Nil
31737	Business Process Transformation	A	4	3	Nil
31777	Human–Computer Interaction	A	4	3	31444
31860	Object-oriented Programming and C++	S	4	3	31429, 31424
31875	Parallel Programming	S	4	3	31429, 31436
31876	Operating Systems Facilities	A	4	3	31429, 31436
31894	Project	A,S	4	3	31444
31897	Computer Systems Architecture 3	*	4	3	31436
31902	Auditing the Computer	A,S	4	3	31447
31904	Systems Programming	A	4	3	31429
31917	Commercial Programming	A	4	3	31429
31918	Development Methodologies	*	4	4	31424
31919	Distributed Software Programming	*	4	4	31436, 31920
31920	Network Management	*	4	4	31436
31921	Objectbases	*	4	3	31434
31922	Object-oriented Methodologies	*	4	3	31424
31923	Office and Group Support	S	4	3	31424
31924	Performance Modelling	*	4	4	31428, 31432
31925	Smalltalk	S	4	3	31415, 31424
31926	Paradigms of Intelligence	A	4	3	Nil
31931	Software Quality Assurance	S	4	3	31424

BACHELOR OF INFORMATION TECHNOLOGY

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
24105	Marketing Principles	A	6	3	Nil
25410	Corporate Financial Analysis	S	6	3	Nil
31414	Information Systems	A	6	4	Nil
31415	Principles of Software Development A	A	6	9	31718 *c*
31416	Computer Systems Architecture	A	6	6	Nil
31424	Systems Modelling	S	6	3	Nil
31434	Database Design	A	6	3	31729
31436	Systems Software and Networks	A	8	6	31416, 31729
31443	Distributed Databases and Client/Server Computing	S	4	3	31434
31444	Systems Design and Development	S	10	2	31434, 31436 *c*
31447	Accounting Information Systems	A	4	3	Nil
31464	Information Technology Planning and Design	S	6	5	31434, 31436
31611	Information Systems	*	4		
31613	Computer Systems Architecture 1	*	4		
31614	Programming Principles	*	5		
31615	Discrete Mathematics	*	4		
31617	Accounting Fundamentals	*	4		
31621	Systems Analysis	*	4		
31626	Probability and Statistics	*	4		
31631	Database	*	4		
31632	Communications and Networks	*	4		
31633	Operating Systems	*	4		
31641	Systems Design	*	4		
31642	On-line Systems	*	4		
31647	Management Control Systems	*	4		
31669	Social Implications of Computers	S	3	3	31756
31718	Contemporary Information Technology 1	A	6	4	Nil
31722	Commercial Programming	S	5	5	31414, 31415
31729	Information Systems Practice	Summer	2	2	31415
31734	Information Systems and Organisations	A	4	3	Nil
31737	Business Process Transformation	S	4	3	Nil
31756	Project Management	A	5	3	31788
31764	Information Technology Strategy	S	4	3	Nil

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
31766	Performance Modelling and Management	S	4	6	31626, 31633
31768	Business Planning for IT Professionals	S	4	3	31417
31769	Contemporary Information Technology 2	S	4	3	31718
31770	Industry Project 1	S	5	14	Nil
31771	Business Requirements Analysis	S	5	3	31414
31779	Applications of Information Technology 1	S	5	3	31414
31781	Business Systems Design	A	5	3	31641
31789	Applications of Information Technology 2	A	5	3	31779
31790	Industry Project 2	A	5	14	31770
31902	Auditing the Computer	S	4	3	31617

GRADUATE DIPLOMA IN INFORMATION TECHNOLOGY (FORMERLY KNOWN AS GRADUATE DIPLOMA IN DATA PROCESSING)

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
31415	Principles of Software Development A	A	6	9	Nil
31417	Computing Practice	A	6	4	Nil
31425	Principles of Software Development B	S	6	7	31415
31428	Quantitative Modelling	A, S	6	5	Nil
31436	Systems Software and Networks	A, S	8	6	31941 or 31415, 31942
31444	Systems Design and Development	A, S	4	3	31943, 31934, 31436
31447	Accounting Information Systems	A, S	4	3	Nil
31454	Project Management and the Professional	A	8	3	31444
31934	Introduction to Database Design	A	4	3	31940
31940	Introduction to Systems Modelling	S	4	4	Nil
31941	Introduction to Procedural Programming	S	4	3	Nil
31942	Introduction to Computer Systems Architecture	S	4	3	Nil
31943	Introduction to Information Systems	S	4	4	Nil

Note: Students may select any elective subjects, with the exception of Project, from the list of undergraduate electives.

MASTER OF SCIENCE IN COMPUTING

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
32106	Object-oriented Software Development	A97	6	3	Nil
32107	Formal Reasoning for Software Development	S97	6	3	Nil
32108	Specialist Topics in Artificial Intelligence	S96	6	3	Nil
32204	Advanced Data Management	A96	6	3	Nil
32205	Computer Communication Systems	S96	6	3	Nil
32206	Advanced Information Systems Modelling	S97	6	3	Nil
32207	Information Management	A97	6	3	Nil
32208	Information Processing Strategy	S97	6	3	32207
32306	Capacity Management	A96	6	3	Nil
32307	Operating Systems	S96	6	3	Nil
32308	Computer Architecture	S97	6	3	Nil
32402	Information Technology Environment	S96	6	3	Nil
32501	Computer Graphics	A	6	3	Nil
32502	Advanced Computer Graphics Techniques	S	6	3	32501
32503	Distributed Databases and Client/Server Computing	S	6	3	Nil
32504	Tool-based Systems Development		6	3	Nil
32506	Knowledge Systems	A96	6	3	Nil
32507	Performance Evaluation	A96	6	3	Nil
32508	Software Quality Management Systems		6	3	Nil
32509	Human–Computer Interaction in Information Systems	A	6	3	Nil
32510	Principles of Object-oriented Programming and C++	S	6	3	32106
32511	Principles of Object-oriented Programming in Smalltalk	S	6	3	32106
32901	Recent Advances in Computer Science	A96,A97	6	3	Nil
32902	Recent Advances in Information Systems	A96,A97	6	3	Nil
32912	Project			12	By arrangement
32924	Project	Y		24	By arrangement

MASTER OF BUSINESS IN INFORMATION TECHNOLOGY MANAGEMENT

Subject number	Subject name	Semester offered	CP	HPW	Prerequisites
21751	Management Research Methods	A	6	3	Grad Cert InfTechM
21788	Effective People Management	A	6	3	Nil
21789	Contemporary Management Practices	S	6	3	Nil
21806	Managing Organisational Change	A	6	3	Nil
21807	Total Quality and Productivity Management	A	6	3	Grad Cert InfTechM
21808	Strategic Business Management	S	6	3	Grad Cert InfTechM, 21806
21809	Managerial Analysis and Evaluation of Information Systems	S	6	3	Nil
24704	Managing Client Relations	S	6	3	Nil
32601	Advanced Project Management	A	6	3	Nil
32602	Impact of Information Technology	Summer	6	3	Nil
32603	Software Quality Management	S	6	3	Nil
32604	Systems Integration	S	6	3	32601
32701	Advances in Information Technology	S	6	3	Nil
32702	Contemporary Telecommunications	S	6	3	Nil
32703	Information Technology Strategy	S	6	3	Nil
32818	Project			18	GradDip InfTechM, 21751c

ALPHABETICAL LISTING OF SUBJECTS

UNDERGRADUATE SUBJECTS

Explanatory notes

[1] Serviced by other faculties

[2] BInfTech only

[3] GradDipInfTech and Graduate Certificates only

[4] Elective subject

[5] Not offered 1996

[6] Graduate Certificate only

[7] BSc only

[8] Service subject

Subject name	Subject number
Accounting Fundamentals[5]	31617
Accounting Information Systems	31447
Applications of Information Technology 1[2]	31779
Applications of Information Technology 2[2]	31789
Auditing the Computer[4]	31902
Business Planning for IT Professionals[4]	31768
Business Process Transformation	31737
Business Requirements Analysis[2]	31771
Business Systems Design[2]	31781
Business Tools and Applications[5]	31648
Commercial Programming[6]	31541
Commercial Programming[2]	31722
Commercial Programming[4]	31917
Commercial Programming Development[5]	31622
Communications and Networks[5]	31632
Communications Software[5]	31653
Computer Systems Architecture	31416
Computer Systems Architecture 2[5]	31623
Computer Systems Architecture 3[4]	31897
Computing Practice	31417
Contemporary Information Technology 1[2]	31718
Contemporary Information Technology 2[2]	31769
Corporate Financial Analysis[1]	25410
Data Communications[8]	31561
Database[8]	31551
Database[5]	31631
Database Design	31434
Data Structures and Algorithms[5]	31624
Development Methodologies[5]	31918
Discrete Mathematics[5]	31615
Distributed Databases and Client/Server Computing	31443
Distributed Software Programming[5]	31919
Foundations of Computing and Programming[6]	31521
Fundamentals of Human–Computer Interaction[6]	31862
Human–Computer Interaction[4]	31777
Human–Computer Interaction Tools and Techniques[6]	31863
Implementation of Human–Computer Interaction[6]	31864
Industrial Training (F/T)[7]	31696
Industrial Training (F/T)[7]	31697
Industrial Training (P/T)[7]	31698
Industrial Training (P/T)[7]	31699
Industry Project 1[2]	31770
Industry Project 2[2]	31790
Information Systems[5]	31611
Information Systems	31414
Information Systems and Organisations[4]	31734
Information Systems Case Study[7]	31662
Information Systems Practice[2]	31729
Information Technology Planning and Design[2,7]	31464
Information Technology Strategy[4]	31764
Introduction to Computer Graphics[4]	31140
Knowledge-based Systems[4]	31163
Languages and Translators[4]	31654
Management Control Systems[5]	31647

Marketing Principles[1,2]	24105
Network Management[5]	31920
Objectbases[5]	31921
Object-oriented Methodologies[5]	31922
Object-oriented Programming and C++[4]	31860
Office and Group Support	31924
On-line Systems[5]	31642
Operating Systems[5]	31633
Operating Systems Facilities[4]	31876
Paradigms of Intelligence[4]	31926
Parallel Programming[4]	31875
Performance Evaluation	31666
Performance Modelling[5]	31924
Performance Modelling and Management[2]	31766
Principles of Software Development A	31415
Principles of Software Development B	31425
Probability and Statistics	31626
Procedural Programming	31429
Project (1 semester) 8cp[4]	31351
Project (2 semester) 8cp[4]	31350
Project 4cp[4]	31352
Project 4cp[4]	31894
Project Management[5]	31658
Project Management[2]	31756
Project Management and the Professional	31454
Quality and Software Engineering[6]	31856
Quantitative Modelling	31428
Simulation and Modelling[5]	31636
Smalltalk	31925
Social Implications of Computers	31669
Software Development Case Study[7]	31455
Software Engineering[5]	31625
Software Quality Assurance[4]	31931
Software Quality Assurance Principles[6]	31855
Software Quality Techniques[6]	31857
Systems Analysis[5]	31621
Systems Analysis and Design[6]	31531
Systems Design[5]	31641
Systems Design and Development	31444
Systems Modelling	31424
Systems Programming[4]	31904
Systems Software and Networks	31436
Theory of Computer Science	31655
Topics in Computer Graphics[4]	31240

POSTGRADUATE SUBJECTS

Advanced Computer Graphics Techniques	32502
Advanced Data Management	32204
Advanced Information Systems Modelling	32206
Advanced Project Management	32601
Advances in Information Technology	32701
Capacity Management	32306
Computer Architecture	32308
Computer Communication Systems	32205
Computer Graphics	32501
Contemporary Management Practices	21789
Contemporary Telecommunications	32702
Distributed Databases and Client/Server Computing	32503
Effective People Management	21788
Formal Reasoning for Software Development	32107
Human–Computer Interaction in Information Systems	32509
Impact of Information Technology	32602
Information Management	32207
Information Processing Strategy	32208
Information Technology Strategy	32703
Information Technology Environment	32402
Introduction to Computer Systems Architecture	31942
Introduction to Database Design	31934
Introduction to Information Systems	31943

Introduction to Procedural Programming	31941
Introduction to Systems Modelling	31940
Knowledge Systems	32506
Management Research Methods	21751
Managerial Analysis and Evaluation of Information Systems	21809
Managing Client Relations	24704
Managing Organisational Change	21806
Object-oriented Software Development	32106
Operating Systems	32307
Performance Evaluation	32507
Principles of Object-oriented Programming in C++	32510
Principles of Object-oriented Programming in Smalltalk	32511
Project	32912
Project	32924
Project	32818
Recent Advances in Computer Science	32901
Recent Advances in Information Systems	32902
Software Quality Management	32603
Software Quality Management Systems	32508
Specialist Topics in Artificial Intelligence	32108
Strategic Business Management	21808
Systems Integration	32604
Tool-based Systems Development	32504
Total Quality and Productivity Management	21807

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.

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

31140

INTRODUCTION TO COMPUTER GRAPHICS

4cp; 3hpw
prerequisites: 31425 Principles of Software Development B; 31429 Procedural Programming or 31624 Data Structures and Algorithms or graduate subject 31941
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: 31425 Principles of Software Development B; 31429 Procedural Programming or 31624 Data Structures and Algorithms; 31625 Software Engineering or graduate subject 31941 or 31415
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.

It should be noted that from Spring semester 1996, this subject will be renamed Knowledge and Technology and its content will change.

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: 31444 Systems Design and Development or 31641 Systems Design
coordinator: Mr J Pouflis

31351

PROJECT (1 SEMESTER)

8cp; 6hpw
prerequisite: 31444 Systems Design and Development or 31641 Systems Design
coordinator: Mr J Pouflis

31352

PROJECT

4cp; 3hpw
prerequisite: 31444 Systems Design and Development or 31641 Systems Design
coordinator: Mr J Pouflis

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; 4hpw
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
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
coordinator: Mr C W 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; 4hpw
coordinator: Mr J Colville

Principles of responsible computer use. Computer skills: Touch typing. DOS commands. Microsoft Windows. The Macintosh environment. Introductory word processing, spreadsheets and graphics. The Unix environment, ftp, telnet, electronic mail. File conversions. Backups. Introductory library research skills. Introduction to report writing.

31424

SYSTEMS MODELLING

6cp; 6hpw
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 describes the relationships between these techniques and their application.

31425

PRINCIPLES OF SOFTWARE DEVELOPMENT B

6cp; 7hpw
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; 5hpw
coordinator: Associate Professor J Edwards

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 are developed. The language used is C.

31434

DATABASE DESIGN

6cp; 3hpw
prerequisite: 31424 Systems Modelling or graduate subject 31940
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; 6hpw
prerequisites: 31425 Principles of Software Development B; 31429 Procedural Programming; 31416 Computer Systems Architecture or graduate subjects 31941; 31942
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 or graduate subject 31934
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; 2hpw
prerequisite: 31434 Database Design or graduate subject 31934
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
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; 4hpw
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
prerequisite: 31444 Systems Design and Development
coordinator: Dr B Jay

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 (GUIs), 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; 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

FOUNDATIONS OF COMPUTING AND PROGRAMMING

6cp; 4hpw
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

SYSTEMS ANALYSIS AND DESIGN

6cp; 4hpw
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

COMMERCIAL PROGRAMMING

6cp; 6hpw
prerequisites: 31521 Foundations of Computing and Programming; 31531 Systems Analysis and Design
coordinator: Mr L Smith

COBOL language syntax and structures. Report layout principles. Indexed file concepts, design and implementation of a simple on-line enquiry/update package.

31551

DATABASE

6cp; 4hpw
prerequisite: 31531 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

DATA COMMUNICATIONS

6cp; 6hpw
prerequisites: 31521 Foundations of Computing and Programming; 31531 Systems Analysis and Design
coordinator: to be advised

Information coding and signal transmission codes. Voice and digital communications. Communications software. Data communications services. Network configurations. Local area networks. Network design and planning. Network management.

31654

LANGUAGES AND TRANSLATORS

4cp; 3hpw
prerequisites: 31416 Computer Systems Architecture; 31425 Principles of Software Development B; 31429 Procedural Programming or 31613 Computer Systems Architecture 1; 31624 Data Structures and Algorithms or graduate subjects 31941; 31942; 31425
coordinator: Mr J Colville

Translation and execution of expressions and statements. Syntactic analysis and parsing. Attribute grammars. Compile-time type checking. Syntax and table-driven compilers. Compiler-compilers. Code generation, error diagnostics and error correction of code. Code optimisation. Memory allocation during compilation and execution.

31662

INFORMATION SYSTEMS CASE STUDY

5cp; 6hpw
prerequisites: 31641 Systems Design; 31642 On-line Systems
corequisites: 31454 Project Management and the Professional; 31666 Performance Evaluation or 31658 Project Management
coordinator: Mr C S Johnson

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: Ms J Robb

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: 31414 Information Systems; 31424 Systems Modelling; 31434 Database Design; 31436 Systems Software and Networks and its prerequisites or 31621 Systems Analysis; 31622 Commercial Programming Development; 31624 Data Structures and Algorithms; 31633 Operating Systems; 51370 Human Communication; at least eight other core subjects from the BSc program
coordinator: Mr D Wilson

For subject details see 31697 Industrial Training (F/T).

31697

INDUSTRIAL TRAINING (F/T)

0cp; 6hpw
prerequisite: 31696 Industrial Training (F/T) (first semester)
coordinator: Mr D Wilson

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 of 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: see 31696
coordinator: Mr D Wilson

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: Mr D Wilson

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 of full-time employment.

31718

CONTEMPORARY INFORMATION TECHNOLOGY 1

6cp; 6hpw
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: 31414 Information Systems; 31415 Principles of Software Development A
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.

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
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
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.

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..

31764

INFORMATION TECHNOLOGY STRATEGY

4cp; 3hpw
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: 31417 Computing Practice or 51370 Human Communication
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: 31418 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
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 through 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 31790 Industry Project 2.

31771

BUSINESS REQUIREMENTS ANALYSIS

5cp; 3hpw
prerequisite: 31414 Information Systems
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: 31444 Systems Design and Development or 31641 Systems Design
coordinator: Ms J Hammond

Focuses on human factors and information systems 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, HCI methods such as requirements analysis, task analysis and usability testing, usability evaluation, and user-centred design support.

31778

RESOURCE MANAGEMENT FOR IT PROFESSIONALS

4cp; 3hpw
coordinator: Mr D Wilson

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: 31414 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.

31781

BUSINESS SYSTEMS DESIGN

5cp; 3hpw
prerequisite: 31424 Systems Modelling or 31641 Systems Design
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 BInfTech.

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.

31855

SOFTWARE QUALITY ASSURANCE PRINCIPLES

4cp; 3hpw
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 and which leads to the award of a Graduate Certificate.

31856

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.

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.

31860

OBJECT-ORIENTED PROGRAMMING AND C++

4cp; 3hpw
prerequisites: 31424 Systems Modelling; 31429 Procedural Programming or graduate subjects 31940; 31941
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
coordinator: Ms J Hammond

Introduces students to the fundamental knowledge required to understand the nature and scope of HCI, the contribution to HCI of 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 design and systems development process will be examined with an emphasis on how HCI can ensure more usable software and systems.

31863

HUMAN–COMPUTER INTERACTION TOOLS AND TECHNIQUES

6cp; 3hpw
prerequisite: 31862 Fundamentals of Human–Computer Interaction
coordinator: Ms J Hammond

Introduces students to the knowledge and skills required to use a variety of HCI tools and techniques used in different phases of the software design and systems development process, 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: Ms J Hammond

Provides students with the knowledge and practical skills to implement HCI approaches in the software and systems design and development process and integrate 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 is examined.

31875

PARALLEL PROGRAMMING

4cp; 3hpw
prerequisites: 31429 Procedural Programming; 31436 Systems Software and Networks or 31624 Data Structures and Algorithms; 31633 Operating Systems or graduate subjects 31941; 31436
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: 31429 Procedural Programming; 31436 Systems Software and Networks or 31624 Data Structures and Algorithms; 31633 Operating Systems or graduate subjects 31941; 31436
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.

31894

PROJECT

4cp; 3hpw
prerequisite: 31444 Systems Design and Development or 31641 Systems Design
coordinator: Mr J Pouflis

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.

31897

COMPUTER SYSTEMS ARCHITECTURE 3

4cp; 3hpw
prerequisite: 31436 Systems Software and Networks or 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.

31902

AUDITING THE COMPUTER

4cp; 3hpw
prerequisite: 31447 Accounting Information Systems or 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: 31429 Procedural Programming or graduate subject 31941
coordinator: Mr U Szewcow

This subject is intended to enhance the student's C and UNIX system knowledge. The student learns advanced C features, UNIX system calls, system utilities, shell and perl programming.

31917

COMMERCIAL PROGRAMMING

4cp; 4hpw
prerequisite: 31429 Procedural Programming or graduate subjects 31941 or 31415
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 or graduate subject 31940
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 with 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
prerequisites: 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. It furthers on understanding of distributed systems software. Students 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 or graduate subject 31934
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 or graduate subject 31940
coordinator: Professor B Henderson-Sellers

Two selected methodologies are presented in detail. Life cycle 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 or graduate subject 31940
coordinator: Professor IT 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
prerequisites: 31432 Systems Software and Networks; 31428 Quantitative Modelling
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; 31424 Systems Modelling or graduate subjects 31940; 31415
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.

31926

PARADIGMS OF INTELLIGENCE

4cp; 3hpw
coordinator: Dr R Rist

Topics include: fundamental issues in modelling intelligent behaviour; intentionality and knowledge-level; intelligent system as a problem solver; intelligence as adaptation and evolution; intelligence as belief revision; intelligence as an interaction with environment; memory and analogical reasoning; intelligent systems as learning systems; modelling the external world and the user environment; psychological, philosophical, computational and scientific issues in modelling intelligence.

31931

SOFTWARE QUALITY ASSURANCE

4cp; 3hpw
prerequisite: 31424 Systems Modelling or 31621 Systems Analysis or graduate subject 31940
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
coordinator: Dr G Feuerlicht

The 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 are described and the applicability of each approach to various problem domains discussed.

31940

INTRODUCTION TO SYSTEMS MODELLING

4cp; 4hpw
coordinator: Mr J El-Den

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
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 are developed. The language used is C.

31942

INTRODUCTION TO COMPUTER SYSTEMS ARCHITECTURE

4cp; 3hpw
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
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
coordinator: Professor B Henderson-Sellers

Basic principles of object-oriented 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
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
coordinator: Dr S Prabhakar

This subject covers some important areas of Artificial Intelligence 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
coordinator: Dr G Feuerlicht

The subject 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 viewpoint, but also includes discussions of management issues.

32205

COMPUTER COMMUNICATION SYSTEMS

6cp; 3hpw
coordinator: to be advised

Historical evolution. Architectural models. Standards. Requirements analysis and specification. Principles of design. Sizing estimates and calculations. Regulatory environment. Inter-organisational computer communications. Computer communications existing and emerging technologies. Integrated broadband networks. Computer communications management.

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
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: 32203 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
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
coordinator: Dr B Howarth

Topics in modern operating systems: concurrency in multiprocessor operating systems; programming support environments; user-friendly system interfaces; object-based systems; fault tolerant systems; secure systems.

32308

COMPUTER ARCHITECTURE

6cp; 3hpw
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
coordinator: Mr J Underwood

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
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- 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
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
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.

32506

KNOWLEDGE SYSTEMS

6cp; 3hpw
coordinator: Dr S Prabhakar

Symbol level description of Knowledge-based Systems (KBS). Knowledge level description of KBS. Problem-solving analysis of KBS. Acquisition and characterisation of knowledge. Role of KBS in work environments. Enhancing the capabilities of KBS.

32507

PERFORMANCE EVALUATION

6cp; 3hpw
coordinator: Dr B Howarth

Introduces students to performance modelling techniques for computers and networks. This elective is intended for students who have not covered similar material in their undergraduate studies.

32508

SOFTWARE QUALITY MANAGEMENT SYSTEMS

6cp; 3hpw
coordinator: Mr C S Johnson

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
coordinator: Ms 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.

32510

PRINCIPLES OF OBJECT-ORIENTED PROGRAMMING IN C++

6cp; 3hpw
prerequisite: 32106 Object-oriented Software Development
coordinator: Dr K Suffern

Review of object-oriented design principles and practice. Objects, classes, run-time instantiation, inheritance, information hiding, polymorphism and libraries and their implementation in C++.

32511

PRINCIPLES OF OBJECT-ORIENTED PROGRAMMING IN SMALLTALK

6cp; 3hpw
prerequisite: 32106 Object-oriented Software Development
coordinator: Professor B Henderson-Sellers

The subject aims to provide students with the principles of object-oriented programming, with practical experience in Smalltalk and its environment.

32601

ADVANCED PROJECT MANAGEMENT

6cp; 3hpw
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
coordinator: Mr D Wilson

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
coordinator: Mr D Wilson

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
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
coordinator: Associate Professor M Fry

Introduction to data communications and networks. Network architectures and standards. New communications technologies. Internetworking. Domestic and international communications environment. Application-oriented services. Network resource architectures. Client/server systems. Introduction to distributed processing. Distributed databases. Criteria for selection of communications systems. GOSIP. Migration to integrated systems.

32703

INFORMATION TECHNOLOGY STRATEGY

6cp; 3hpw
coordinator: Professor L Constantine

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; hpw 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
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 system, capacity planning, communications, distributed systems, computer architecture.

32902

RECENT ADVANCES IN INFORMATION SYSTEMS

6cp; 3hpw
coordinator: Mr J Underwood

Reviews some key developments in the information systems discipline. Some likely topics are: new techniques in data base 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
coordinator: Professor J Debenham

See 32924 Project below.

32924

PROJECT

24cp
coordinator: Professor J Debenham

Nature of research: academic and professional. Research methodologies. Cost of research. Evaluation of research. Significance of research. Timeliness of research. Execution of a research project.

SUBJECTS OFFERED BY OTHER FACULTIES

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

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
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
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 issue e.g. competencies relevant to people, organisational structures and issues and working in international environments.

21806

MANAGING ORGANISATIONAL CHANGE

6cp; 3hpw
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.

21808

STRATEGIC BUSINESS MANAGEMENT

6cp; 3hpw
prerequisites: Graduate Certificate in Information Technology Management; 21806 Managing Organisational Change
coordinator: to be advised

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.

21809

MANAGERIAL ANALYSIS AND EVALUATION OF INFORMATION SYSTEMS

6cp; 3hpw
coordinator: to be advised

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

MARKETING PRINCIPLES

5cp; 3hpw
coordinator: Ms R McGuiggan

Aims to develop an awareness and understanding of marketing concepts and how these concepts apply to profit and nonprofit 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
coordinator: Professor J Debenham

Reviews the nature of the business development process through focusing upon the specific needs of clients. 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.

25410

CORPORATE FINANCIAL ANALYSIS

5cp; 3hpw
coordinator: Mr K Chan

Corporate Financial Analysis 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. Corporate Financial Analysis is concerned primarily with investment project evaluation and risk analysis of securities.

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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.

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