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:
Publications Branch,
Corporate Responsibilities Unit

Cover design:
External Relations Unit
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  Bachelor of Information Technology
  Bachelor of Science in Computing Science /
  Bachelor of Arts in International Studies
  Bachelor of Science in Computing Science/Bachelor of Laws
  Double degree in Business and Computing Science
Postgraduate courses
  Postgraduate research degrees
  Doctor of Philosophy
  Master of Science
  Postgraduate coursework programs
  Master of Science in Computing
  Master of Business in Information Technology Management
  Graduate Diploma in Information Technology Management
  Graduate Certificate in Information Technology Management
  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
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  Faculty Graduate Studies Committee
  School Advisory Committees
  Course Advisory Committees

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PREFA ACE

Welcome to the University of Technology, Sydney (UTS), the fourth largest university in New South Wales. UTS has a reputation for delivering quality higher education that meets the needs of the professions, the technologies and the community. It is a multicampus university operating at three major locations in the Sydney metropolitan area – Broadway, Kuring-gai and St Leonards – and offering over 80 undergraduate and 200 postgraduate courses to nearly 22,000 students.

The main work of course development and delivery at UTS is carried out by the Faculties of Business; Design, Architecture and Building; Education; Engineering; Humanities and Social Sciences; Law; Mathematical and Computing Sciences; Nursing; and Science; and the Institute for International Studies. Each of these is responsible for a range of programs across a number of key disciplines.

Every year UTS produces 10 faculty/institute handbooks containing information about all the courses and subjects offered at UTS, and including details of course content, attendance patterns, credit point requirements and combined degrees, plus important faculty and student information.

These handbooks are part of a suite of publications which includes the UTS Calendar and the postgraduate and undergraduate student handbooks. The UTS Calendar contains the University Act, By-law and Rules, a list of courses offered at the University, and other useful University information. Copies are held in the University’s libraries and faculty offices, and may be purchased at the Co-op Bookshop. The student handbooks contain general information about application procedures, academic progression, assistance schemes, and services and facilities offered to students. You will be given a free copy of one of these when you enrol.

If you need more information about the University or its courses, you can contact the UTS Information Service or your faculty office. The University provides a whole range of services for students, and there are plenty of qualified people here to give you help and advice.

We hope you enjoy your time as a student at UTS, and wish you well in your studies.
ADDRESSES AND TELEPHONE NUMBERS

University of Technology, Sydney

Postal address
PO Box 123
Broadway
NSW 2007 Australia

Telephone
(02) 9514 2000
International: +61 2 9514 2000
Fax: (02) 9514 1551

World Wide Web
http://www.uts.edu.au

City campus

Broadway
• Building 1 (Tower Building)
  1 Broadway, Ultimo
• Building 2
  1 Broadway, Ultimo
• Building 3 (Bon Marche Building)
  Cnr Harris St and Broadway, Ultimo
• Building 4
  Cnr Thomas St and Harris St, Ultimo
• Building 6
  702–730 Harris St, Ultimo
• Broadway Terraces
  9, 11 and 13 Broadway, Ultimo
• Magic Pudding Childcare Centre
  Thomas St, Ultimo

Haymarket
• Building 5
  Cnr Quay St and Ultimo Rd, Ultimo

Blackfriars
• Cnr Blackfriars St and Buckland St,
  Chippendale
• Blackfriars Childrens Centre
  Buckland St, Chippendale

Smail Street
• 3 Smail St, Ultimo

Wembley House
• 839–847 George St, Sydney

Harris Street
• 645 Harris St, Ultimo

Student housing
• Bulga Ngurra
  23–27 Mountain St, Ultimo
• Geegal
  82–84 Ivy St, Ultimo

Kuring-gai campus
• Eton Rd, Lindfield
  (PO Box 222, Lindfield NSW 2070)

St Leonards campus
• Dunbar Building
  Cnr Pacific Highway and
  Westbourne St, Gore Hill
• Clinical Studies, Centenary Lecture
  Theatre and West Wing
  Reserve Rd, Royal North Shore Hospital
• Gore Hill Research Laboratories
  Royal North Shore Hospital

Yarrawood conference and
research centre
• Hawkesbury Rd
  Yarramundi NSW 2753

Stroud Field Station
• Lot AFP 161894
  The Bucketts Way
  Booral NSW 2425
CAMPUS MAPS

City campus

Haymarket

KEY

- Entry/Exit
- Disabled access
- Main bus stop
- UTS shuttle bus
- Parking
- Building numbers
- Child care
Kuring-gai campus
St Leonards campus
APPLYING FOR UTS COURSES

Undergraduate
Applications for the majority of those undergraduate courses which start at the beginning of each year must be lodged through the NSW and ACT Universities Admissions Centre (UAC) between August and October. Please check the application requirements in the UAC Guide, as some of these courses close for applications at the end of September. Some courses are also available by direct application to UTS. These are usually courses that are not available to school leavers.

A small number of UTS courses also start in the middle of the year. Applications for these should be made direct to UTS in May.

Contact the UTS Information Centres for more information.

Postgraduate
Applications for postgraduate courses should be made direct to UTS. For courses starting at the beginning of the year, most applications are open from August to October, but some may have earlier closing dates. For courses starting in the middle of the year, applications close in May.

Contact the UTS Information Centres for more information.

Non-award and External Award study
Non-award and External Award study allows individuals and students from other universities to study single subjects at UTS. There are four application periods, and closing dates are different for each of the semesters. Some faculties may have special application procedures which will vary depending on the subjects chosen.

Contact the UTS Information Centres for more information.

International students
International students need to satisfy the normal UTS entry requirements and be proficient in English. For details on courses, fees and application procedures, contact International Programs.

UTS INFORMATION CENTRES

<table>
<thead>
<tr>
<th>Street address</th>
<th>Postal address</th>
<th>Telephone/Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>City campus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foyer, Tower Building</td>
<td>UTS Information Service</td>
<td>Telephone: (02) 9514 1222</td>
</tr>
<tr>
<td>1 Broadway</td>
<td>PO Box 123</td>
<td>Fax: (02) 9514 1200</td>
</tr>
<tr>
<td></td>
<td>Broadway NSW 2007</td>
<td></td>
</tr>
<tr>
<td><strong>Kuring-gai campus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 5 or 6, Main Building</td>
<td>Kuring-gai Student Centre</td>
<td>Telephone: (02) 9514 5555</td>
</tr>
<tr>
<td>Eton Road</td>
<td>PO Box 222</td>
<td>Fax: (02) 9514 5032</td>
</tr>
<tr>
<td>Lindfield</td>
<td>Lindfield NSW 2070</td>
<td></td>
</tr>
<tr>
<td><strong>International Programs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 5, Tower Building</td>
<td>International Programs</td>
<td>Telephone: (02) 9514 1531</td>
</tr>
<tr>
<td>1 Broadway</td>
<td>PO Box 123</td>
<td>Fax: (02) 9514 1530</td>
</tr>
<tr>
<td></td>
<td>Broadway NSW 2007</td>
<td></td>
</tr>
<tr>
<td><strong>E-mail inquiries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Australia – <a href="mailto:info.office@uts.edu.au">info.office@uts.edu.au</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>International – <a href="mailto:intlprograms@uts.edu.au">intlprograms@uts.edu.au</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PRINCIPAL DATES FOR 1997

Autumn semester

January
7 Release of HSC results
10 Formal supplementary examinations for 1996 Spring semester students
10 Closing date for changes of preference to the Universities Admissions Centre (UAC) from 1996 NSW and ACT HSC applicants
21–28 Enrolment of students at City campus
24 Main Round of offers to UAC applicants
27 Australia Day – public holiday
29–31 Enrolment of new undergraduate students at City campus (and 3 February till noon)
31 Public school holidays end

February
3 Enrolment of new undergraduate students at City campus till noon (and 29–31 January*)
3–26 Enrolment of students at City campus

March
3 Classes begin
14 Last day to enrol in a course or add subjects
27 Last day to apply for leave of absence without incurring student fees/charges¹
27 Last day to withdraw from a subject without financial penalty¹
28 Public school holidays begin
28 Good Friday – public holiday
31 HECS census date
31 Easter Monday – public holiday
31 Vice-Chancellors’ Week (non-teaching) begins

April
1 Graduation period begins
4 Public school holidays end
4 Vice-Chancellors’ Week (non-teaching) ends
11 Last day to withdraw from a course or subject without academic penalty¹
24 Provisional examination timetable available
25 Anzac Day – public holiday
30 Last day to apply to graduate in Spring semester 1997

May
1 Applications available for undergraduate courses
6 Applications available for postgraduate courses
9 Graduation period ends
16 Examination Masters due
30 Final examination timetable available
30 Closing date for undergraduate and postgraduate applications for Spring semester

June
9 Queen’s Birthday – public holiday
13 Last teaching day of Autumn semester
14–30 Formal examination period (and 1–4 July)
30 Public school holidays begin

July
1–4 Formal examination period (and 14–30 June)
4 Autumn semester ends
7–11 Vice-Chancellors’ Week (non-teaching)
11 Public school holidays end
14–18 Formal alternative examination period for Autumn semester students
25 Release of Autumn semester examination results
28 Formal supplementary examinations for Autumn semester students
30–31 Enrolment of new and readmitted students and students returning from leave/concurrent study (and 1 August)

August
1 Enrolment of new and readmitted students and students returning from leave/concurrent study (and 30–31 July)
1 Applications available for undergraduate and postgraduate courses for Autumn semester 1998
Spring semester

August
4 Classes begin
8 Last day to withdraw from full year subjects without academic penalty
15 Last day to enrol in a course or add subjects
29 Last day to apply for leave of absence without incurring student fees/charges (Spring enrolments only)
29 Last day to withdraw from a subject without financial penalty
29 Last day to apply to graduate in Autumn semester 1998
31 HECS census date

September
12 Last day to withdraw from a course or subject without academic penalty
26 Provisional examination timetable available
29 Public school holidays begin
29 Graduation period begins
29 Vice-Chancellors’ Week (non-teaching) begins
30 Closing date for undergraduate applications via UAC (without late fee)
30 Closing date for postgraduate applications (some courses may have a later closing date)
30 Closing date for inpUTS Special Admission Scheme applications

October
3 Graduation period ends
3 Vice-Chancellors’ Week (non-teaching) ends
6 Labour Day – public holiday
10 Public school holidays end
17 Examination Masters due
31 Final examination timetable available
31 Closing date for undergraduate applications via UAC (with late fee)
31 Closing date for undergraduate applications direct to UTS (without late fee)

31 Closing date for Australian Postgraduate Award (research & coursework), the R L Werner and University Doctoral Research Scholarships

November
14 Last teaching day of Spring semester
15–28 Formal examination period (and 1–5 December)

December
1–5 Formal examination period (and 15–28 November)
5 Spring semester ends
15–19 Formal alternative examination period for Spring semester students
19 Release of Spring semester examination results
22 Public school holidays begin

1 HECS/postgraduate course fees will apply after the HECS census dates (31 March and 31 August or last working day before).

Note: Information is correct as at 28 October 1996. The University reserves the right to vary any information described in Principal Dates for 1997 without notice.
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 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. Furthermore, the Faculty provides life-long learning opportunities for practising professionals.

The last year has been one of consolidation and extension. The Management Development Program for IT professionals was successful in significantly expanding its student intake. The computer algebra system, Mathematica, became more widespread in mathematics teaching and learning. The University Statistical Consulting Service was launched within the Faculty to provide statistical services to the University and to the community at large. New professional programs covering the latest Internet technologies were developed and presented.

In the year 1997, and beyond, we are faced with many challenges arising from changes to the regulation and funding of the Higher Education system. A response to these challenges from this Faculty will be further development and promotion of our professional programs. We will complement our emphasis on relevance and currency of courses with an enhanced focus on quality.

The Faculty research profile has continued to expand with further success in obtaining research grants. The Faculty sees the existence of a strong corps of postgraduate research students as vital, and accommodation was improved for research students during 1996. Much of the Faculty's research continues to be focused around a number of dynamic and diverse groups including distributed systems and networking, algorithms and languages, parallel systems, computer-supported cooperative work, artificial intelligence, statistics and operations research.

This Faculty is an innovator in the use of technology for teaching and learning. In particular, the Faculty has significant expertise in Internet technologies and their application. The Faculty is extending its usage of the Internet to provide novel and flexible learning opportunities for its students.

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.
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 onto 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
INFORMATION FOR STUDENTS

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 degree 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, of both the work experience 'sandwich' form, and the 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 work. 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 University Statistical Consulting Service (USCS), a joint initiative of the School of Mathematical Sciences and the University Graduate School, has been established to provide a range of statistical services to support the research programs of UTS staff and graduate students. The Service, which is directed by Associate Professor Deborah Street, also offers its full range of service (which include both consultancy and short courses on statistical methods and software) to industry at a fee. At present, there are seven statisticians associated with the USCS having extensive consulting experience in the agricultural sciences and engineering, as well as in the design of biomedical trials, various areas of medical statistics, educational statistics, and the design and analysis of sample surveys.

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. 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. Further information can be obtained from the Head of School, Associate Professor Jenny Edwards.
The mission of the CRC for Distributed Systems Technology (DSTC) is to build the distributed information systems of the future through leading edge research, and to work with industry and government to apply and commercialise the results. The UTS participation in DSTC draws on expertise from the School of Computing Sciences and the School of Electrical Engineering. The primary focus of the UTS research is on Quality of Service (QoS) and the delivery of multimedia information in real time within various distributed systems frameworks such as the World Wide Web, JAVA and CORBA. For further information contact Associate Professor Michael Fry.

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.

When telephoning from outside the University, all extension numbers should be prefixed by 9514.

E-mail addresses should be suffixed with '@socs.uts.edu.au', unless indicated with an asterisk (*), where the suffix should be '@maths.uts.edu.au'.

<table>
<thead>
<tr>
<th>Ext</th>
<th>Bldg/Room</th>
<th>E-mail</th>
<th>Student administration responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dean</td>
<td>Associate Professor M Fry</td>
<td>1801 4/343 mike</td>
<td>—</td>
</tr>
<tr>
<td>Faculty Administrator</td>
<td>Miss F C Ma</td>
<td>1880 4/341 florence</td>
<td>—</td>
</tr>
<tr>
<td>Executive Assistant to the Dean</td>
<td>Vacant</td>
<td>1800 4/342</td>
<td>— —</td>
</tr>
<tr>
<td>Executive Officer</td>
<td>Mr G C Goodwin-Moore</td>
<td>1308 4/335 gerard</td>
<td>—</td>
</tr>
</tbody>
</table>

**Student administration**

- **Student Administration Manager**
  - Ms L G McCoy | 1867 4/373 leanne | All courses

- **Industry Liaison Officer**
  - Mr D A Saunders | 1804 4/374 des | BInfTech and Industrial Training

- **Graduate Studies Officer**
  - Vacant | 1806 4/335 gso | All postgraduate programs

- **Student Liaison Officers**
  - Ms I Chu | 1802 4/337 ivy | All BSc (Comp Sc)
  - Ms J C Smith | 2250 1/1520 jsmith* | All BSc (Maths), BMathFin, and related Honours programs

- **Information Assistants**
  - Ms L. Abraham | 1803 4/335 layla | General inquiries
  - Ms R Bow | 2246 1/1520 rosabow | General inquiries
Continuing Professional Education (CPE)

The Faculty offers a variety of CPE courses each semester.

The School of Computing Sciences offers courses in programming, such as Object-oriented Programming with C++, UNIX/C, Prototyping with Visual Basic, and Programming on the Internet, and professional courses in three-dimensional computer animation, database design, expert systems design and distributed databases, and client/server computing.

A range of CPE courses, such as the Introductory Statistics Workshop, are run under the auspices of the University Statistical Consulting Service. In addition, mathematics preparation courses such as Intensive Mathematics, Intensive Statistics and Preparation for Nursing are available through the Mathematics Study Centre.

Information on all CPE courses is available from the Faculty Information Offices on 9514 1803 or 9514 2246.

Sub-majors offered to students enrolled in other faculties

The Faculty offers a number of sub-majors to students enrolled in other faculties. Students wishing to enrol in a sub-major offered by the Faculty of Mathematical and Computing Sciences should first contact one of the Faculty Information Offices on 9514 1803 or 9514 2246.

In all cases, enrolment will be subject to students obtaining the permission of their home faculty, and their satisfying all prerequisite requirements.

Students should refer to the relevant School’s ‘Subject descriptions’ section elsewhere in this handbook for prerequisite details.

Sub-majors offered by the School of Mathematical Sciences

The following sub-majors are currently available to students enrolled in any faculty.

Mathematics (24cp)

The Mathematics sub-major provides a foundation of knowledge in mathematics sufficient for further development in the discipline and application to quantitative areas of business, particularly finance, and contributes key critical, analytical and quantitative skills.

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35101</td>
<td>Mathematics 1</td>
<td>6cp</td>
</tr>
<tr>
<td>35102</td>
<td>Mathematics 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35212</td>
<td>Linear Algebra</td>
<td>6cp</td>
</tr>
<tr>
<td>35231</td>
<td>Differential Equations</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Operations Research (24cp)

The Operations Research sub-major provides students with a level of knowledge necessary for application of the discipline in areas of relevance to business, particularly in mathematical programming (optimisation), scheduling and transportation, inventory analysis and financial modelling.

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Description</th>
<th>Credits</th>
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<tbody>
<tr>
<td>33401</td>
<td>Mathematics for Computing</td>
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</tr>
<tr>
<td>35524</td>
<td>Mathematical Programming</td>
<td>6cp</td>
</tr>
<tr>
<td>35340</td>
<td>Operations Research Practice</td>
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</tr>
<tr>
<td>35344</td>
<td>Network Optimisation</td>
<td>6cp</td>
</tr>
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</table>

Statistics (24cp)

The Statistics sub-major provides students with a level of knowledge necessary for application of the discipline in areas of relevance to business, particularly in the areas of regression methods, design and analysis of statistical experiments and stochastic processes.

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Description</th>
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</tr>
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<tbody>
<tr>
<td>33401</td>
<td>Mathematics for Computing</td>
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<tr>
<td>35252</td>
<td>Statistics 2</td>
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<tr>
<td>35353</td>
<td>Regression Analysis</td>
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</tr>
<tr>
<td>35361</td>
<td>Probability and Stochastic Processes</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Sub-majors offered by the School of Computing Sciences

The following sub-majors are currently available to students enrolled in any faculty.

Business Analysis and Design/ Databases (24cp)

This sub-major provides students with a detailed knowledge of current, state-of-the-art databases – relational, object-oriented and distributed – and the analysis and design needed to use them.

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Description</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>31424</td>
<td>Systems Modelling</td>
<td>6cp</td>
</tr>
<tr>
<td>31434</td>
<td>Database Design</td>
<td>6cp</td>
</tr>
<tr>
<td>31443</td>
<td>Distributed Databases and Client Server Computing</td>
<td>4cp</td>
</tr>
<tr>
<td>31921</td>
<td>Objectbases</td>
<td>4cp</td>
</tr>
<tr>
<td>31922</td>
<td>Object-oriented Methodologies</td>
<td>4cp</td>
</tr>
</tbody>
</table>
Business Information Technology (24cp)

This sub-major provides students with a broad overview of the basics of computer hardware and software and major applications.

Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>31414</td>
<td>Information Systems</td>
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<tr>
<td>31531</td>
<td>Systems Analysis and Design</td>
<td>6cp</td>
</tr>
<tr>
<td>31551</td>
<td>Database</td>
<td>6cp</td>
</tr>
<tr>
<td>31561</td>
<td>Data Communications</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Human Factors and Computing in Business (24cp)

The sub-major on Human Factors and Computing in Business provides students with an insight into the effect that computers and information technology have on staff and the workplace, particularly in a climate of change.

Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Points</th>
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<tbody>
<tr>
<td>31531</td>
<td>Systems Analysis and Design</td>
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<tr>
<td>31551</td>
<td>Database</td>
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<tr>
<td>31737</td>
<td>Business Process Transformation</td>
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<td>31777</td>
<td>Human–Computer Interaction</td>
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</tr>
<tr>
<td>31923</td>
<td>Office and Group Support</td>
<td>4cp</td>
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</tbody>
</table>

Programming and Design (24cp)

The Programming and Design sub-major provides students with skills in systems modelling and design, and object-oriented and procedural programming.

Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>31415</td>
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<tr>
<td>31424</td>
<td>Systems Modelling</td>
<td>6cp</td>
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<td>31429</td>
<td>Procedural Programming</td>
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<tr>
<td>31434</td>
<td>Database Design</td>
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</table>

International Studies electives

The Institute for International Studies at 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 at UTS or elsewhere. The Institute teaches some 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 1997 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. (Modern Standard Chinese is a program for students who are either complete beginners or who started to learn Chinese at school in Australia.) In addition, arrangements are in place for the delivery of French, German, Hindi, Italian, Korean and Thai. 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 cultures of the countries of East and South East Asia, Latin America and Western Europe, which are the areas of specialisation of the Institute.

In 1997 introductory subjects on the contemporary societies of China, Eastern Europe, Indonesia, Japan, Latin America, Malaysia, Spain, South East Asia, South China, Taiwan, Thailand 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, Sydney, NSW 2007, telephone 9514 1574, fax 9514 1578, or the Institute for International Studies Handbook, for further details.

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 achieved 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 own individual work.

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

**Graduation ceremonies**

University graduation ceremonies are held in the Autumn and Spring semesters of 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.

**Environmental Health and Safety**

The Faculty has an Environmental Health and Safety Plan, copies of which are available from either Information Office, or on the School and Faculty World Wide Web pages. Staff and students should familiarise themselves with the plan and comply with all hazard procedures outlined in it.

The names and locations of First Aid Officers, and of first aid kits, are indicated by appropriate signs in Faculty and School areas.

**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 that 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.

**Insearch Institute of Commerce**

The 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; telephone 9281 8188, fax 9281 9875.
## LIST OF COURSES AND CODES

<table>
<thead>
<tr>
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<tr>
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<tr>
<td>Bachelor of Mathematics and Finance</td>
<td>MM03</td>
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<tr>
<td>Bachelor of Mathematics and Finance (Honours)</td>
<td>MM04</td>
</tr>
<tr>
<td>Bachelor of Mathematics and Finance/Bachelor of Arts in International Studies</td>
<td>MM06</td>
</tr>
<tr>
<td>Bachelor of Science in Mathematics</td>
<td>MM01</td>
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<tr>
<td>Bachelor of Science (Honours) in Mathematics</td>
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<td>Bachelor of Science in Mathematics/Bachelor of Arts in International Studies</td>
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<td>Graduate Certificate in Mathematical Sciences</td>
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<td>Graduate Diploma in Applicable Mathematics</td>
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<td>Graduate Diploma in Mathematics and Finance</td>
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<tr>
<td>Graduate Diploma in Operations Research</td>
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<td>Graduate Diploma in Statistics</td>
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<tr>
<td>Master of Science in Operations Research (by coursework)</td>
<td>MM53</td>
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<td>Master of Science (by thesis)</td>
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<td>Doctor of Philosophy</td>
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<td>Bachelor of Science in Computing Science/Bachelor of Laws</td>
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<td>Graduate Certificate in Advanced Information Technology</td>
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<td>Graduate Certificate in Applied Computing</td>
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<td>Graduate Certificate in Human–Computer Interaction</td>
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<td>Graduate Certificate in Information Systems</td>
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<td>Graduate Certificate in Information Technology Management</td>
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<td>Graduate Certificate in Programming Practice</td>
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<td>Graduate Diploma in Information Technology Management</td>
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<tr>
<td>Doctor of Philosophy</td>
<td>MC54</td>
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</tbody>
</table>

All inquiries regarding courses should be directed to the Faculty Information Offices on 9514 1803 or 9514 2246.
The School of Mathematical Sciences offers four 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, offered in conjunction with the School of Finance and Economics;
- the combined Bachelor of Mathematics and Finance and Bachelor of Arts in International Studies which is a five-year degree, with an additional year of advanced study to fulfil the requirements of the Bachelor of Mathematics and Finance (Honours) degree, offered in conjunction with the Institute for International Studies and 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 combined Bachelor of Science in Mathematics and Bachelor of Arts in International Studies which is a five-year degree, with an additional year of advanced study to fulfil the requirements of the Bachelor of Science in Mathematics (Honours) degree, offered in conjunction with the Institute for International Studies;
- 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.

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 486 and Pentium compatible computers linked via the School’s Novell and Windows NT networks. 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 (X-terminals), image processing hardware, PostScript laser printers, and an extensive library of FORTRAN subroutines for both two- and three-dimensional 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 NSW Centre for Parallel Computing operates a Silicon Graphics Power Challenge parallel computer, located at the Australian Technology Park and available to registered users through
the AARNet. The Vislab Consortium provides scientific visualisation research facilities, with principal hardware components located at the University of Sydney and the Australian Technology Park (accessed via AARNet), and local nodes located at each of the partner institutions, including UTS.

**University Statistical Consulting Service**

The University Statistical Consulting Service (USCS) aims to provide statistical advice to research workers at UTS and to industrial clients. It is a joint initiative of the School of Mathematical Sciences and the University Graduate School. There are seven statisticians associated with the USCS. They have had extensive consulting experience with agricultural scientists, with engineering firms, in the design of biomedical trials and other aspects of medical statistics, in educational statistics, and in the design and analysis of sample surveys.

The major areas of expertise of the USCS are:

- design and analysis of experiments
- design of clinical trials
- analysis of data from biomedical areas
- engineering statistics
- quality control and quality management issues
- design and analysis of sample surveys
- data-based forecasting and prediction

The policy of the USCS is to encourage research workers at UTS to become self-sufficient in the carrying out of routine statistical analyses. Consultants will act in an advisory capacity, offering assistance with the planning and design of experiments and surveys, and with the interpretation of analyses, and will carry out non-routine analyses. Courses on statistical methods for research workers will be conducted by the consultants from time to time.

Routine statistical analyses are best carried out using statistical packages such as Minitab, SAS and SPSS. Courses on these packages will be conducted by the consultants from time to time.

All research workers, including postgraduate students, are encouraged to see a member of the USCS during the planning stage of their research programs. This will ensure that experiments are correctly designed to answer the research workers’ questions, that efficient use is made of resources and that the results are recorded in a form appropriate for future analysis. To assist the consultant, the research worker is requested to provide a written summary of the proposed research project, clearly stating the aims of all experiments. For postgraduate students, supervisors should participate in the initial meetings and in the interpretation of the results.

While all reasonable efforts will be made to complete the analysis expeditiously, no definite time can be estimated for the completion of an analysis and no guarantee can be given that useful results will be obtained.

The staff of the USCS are Associate Professor Deborah Street, Director, Dr Tania Prvan, Senior Lecturer, and Ms Jacqueline Allen, Assistant Statistical Consultant.

**Mathematics Study Centre**

Through its Mathematics Study Centre, the School of Mathematical Sciences provides a support service to all students of the University studying in various introductory mathematical or quantitative areas including statistics. The Mathematics Study Centre coordinates all mathematics support services across the University, and is available on both the City and Kuring-gai campuses.

**Drop in service**

The Centre is open each day during semester, including tutorial and study weeks. It is open two nights a week on the City campus to cater for part-time students. Students can drop in to the Centre to obtain help with problems specific to a particular course or they may choose to study in the Centre on a regular basis, obtaining assistance from a lecturer as needed.

A timetable of Centre lecturers with their particular areas of expertise is available from both branches of the Centre.

**Tutorial support**

The Mathematics Study Centre offers extra support tutorials for students who have difficulty with their mathematics and statistics studies at first-year level. Where a need exists, students enrol in one of the subjects listed below. This can be arranged separately for students in any faculty; the subjects have previously been run for students in Mathematical Sciences, Engineering, Business, Nursing, Teacher Education and Information Studies. Students may only enrol in one subject of the same number in each semester.
**Mathematics Tutorial 1, 2, 3**

These subjects consist of approximately one hour tuition per week during semester time. These subjects are free of HECS charges and carry no credit point value.

**Mathematics Study 1, 2, 3**

These subjects consist of approximately two hours tuition per week during semester time. These subjects are free of HECS charges and carry no credit point value.

**Workshops**

The Centre runs Saturday workshops during semester and in the final examination period for many first-year mathematics and statistics subjects. They are timed to assist students in their preparation for quizzes and the final examination, and are popular with students from all faculties. Students may only enrol in one subject of the same number in each semester.

**Mathematics Workshop 1, 2, 3, 4, 5, 6**

These subjects consist of approximately six hours of instruction, usually on a Saturday. These subjects are free of HECS charges and carry no credit point value.

**Individual assistance**

It is possible for students to arrange individual assistance with mathematics. This is particularly appropriate if a student has a record of failure in mathematics subjects or suffers from low self-confidence. It is also appropriate for students with disabilities. If required, arrangements may be made for a student to have an individual tutorial each week. Much of this is done with counselling support from Student Services.

**Bridging subjects**

The Mathematics Study Centre provides bridging subjects for students who need mathematics skills for their degree studies at UTS. If faculties have particular needs, Centre staff can design a bridging subject specifically to meet these needs.

**Introduction to Statistics**

This is a 12-hour subject, run over four evenings in February and also on four days in July, and is designed for students about to enter introductory statistics or research methods subjects. It is particularly popular with Information Studies students. This subject is free of HECS charges and carries no credit point value.

**Introduction to Computers for Beginners**

This is a 12-hour subject, run day and evening in February. It is designed for students who are not familiar with computers and aims to develop confidence, an understanding of terminology and some basic skills. This subject is free of HECS charges and carries no credit point value.

**Bridging Mathematics**

This is a 24-hour subject, run day and evening over two weeks in February between enrolment and the start of classes. It provides prerequisite mathematics skills at 2/3 Unit HSC level and is aimed at mature-age students, students who have studied mathematics overseas and students who have not studied a high enough level of mathematics at school for their needs. This subject is free of HECS charges and carries no credit point value.

**Mathematics Preparation for Nursing**

This is a 12-hour subject, run day and evening in February. It gives a general introduction to mathematics and science for students entering Nursing. This subject is free of HECS charges and carries no credit point value.

**Preparation courses**

The Centre runs three fee-paying courses each year to prepare students for university studies the following year. Students completing these courses have had success in gaining entry to university and in completing their degree studies.

*Intensive Mathematics* begins in July and runs for 15 weeks on two nights per week. The course covers the content of the HSC 2 Unit mathematics course and prepares students for entry into mathematics-based courses, such as Engineering and Science.
**Intensive Statistics** begins in July and runs for 15 weeks on two nights per week. The course is designed for people who will be studying statistics subjects as part of their tertiary studies or whose occupations involve the use of statistical information. No previous knowledge of statistics is assumed.

**Preparation for Nursing** is a course aimed at giving potential Nursing students the prerequisite knowledge in mathematics and science for their degree studies. This course runs in October and November each year.

**Location**
City campus: Building 1, Room 1615  
Kuring-gai campus: Room K2-522

**Opening hours**
Monday to Friday during semester, including tutorial and study weeks. The Centre will be open on some evenings to cater for part-time students. Detailed timetables are available at the Centre.

**Contact details**
For further information, students should contact the Director of the Mathematics Study Centre, Leigh Wood, telephone 9514 2268, e-mail L.Wood@maths.uts.edu.au

**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.

**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 non-profit 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 NSW 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.
School contacts

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 with 1ur9514.

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

<table>
<thead>
<tr>
<th>Name</th>
<th>Ext</th>
<th>Room</th>
<th>E-mail</th>
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<tr>
<td>Assistant Statistical Consultant</td>
<td>2273</td>
<td>1555</td>
<td>J.Allen</td>
</tr>
<tr>
<td>Ms Jacqueline Allen</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Associate Professor</td>
<td>2247</td>
<td>1520</td>
<td>L.Botten</td>
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<tr>
<td>Lindsay Botten</td>
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<tr>
<td>Senior Systems Programmer</td>
<td>2253</td>
<td>1618</td>
<td>M.Caden</td>
</tr>
<tr>
<td>Mr Martin Caden</td>
<td></td>
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<tr>
<td>Deputy Head of School, Director, Postgraduate Studies, and Head, Mathematics Unit</td>
<td>2262</td>
<td>1528</td>
<td>G.Cohen</td>
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<td>Associate Professor Graeme Cohen</td>
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<tr>
<td>inpLITS Coordinator for students with special needs and Academic Liaison Officer</td>
<td>2241</td>
<td>1535</td>
<td>M.Coupland</td>
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<td>Ms Mary Coupland</td>
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<td>Mr Peter Coutis</td>
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<td>Exemptions Coordinator</td>
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<tr>
<td>Ms Layna Groen</td>
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<td>Dr Jules Harnett</td>
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<td>Dr Ian Hoffman</td>
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<tr>
<td>Graduate Certificate Coordinator</td>
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<td>Dr Brian Lederer</td>
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<tr>
<td>Mr Ed Lidums</td>
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<tr>
<td>Mr Eric Lindsay</td>
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<tr>
<td>Dr Beverley Moore</td>
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<tr>
<td>Head of School</td>
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<tr>
<td>Associate Professor Gordon McLelland</td>
<td>2259</td>
<td>1520</td>
<td>G.McLelland</td>
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<tr>
<td>Mr Ken Ozanne</td>
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<td>1560</td>
<td>L.Park</td>
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<tr>
<td>Mr Larry Park</td>
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<tr>
<td>Dr Peter Petocz</td>
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<td>P.Petocz</td>
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<tr>
<td>Mr Denis Porteus</td>
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<tr>
<td><strong>Coordinator, University Statistical Consulting Service</strong></td>
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<tr>
<td>Dr Tania Prvan</td>
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<td>T.Prvan</td>
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<tr>
<td>Mr Bob Rozsasi</td>
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<tr>
<td>Professor Tony Shannon</td>
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<tr>
<td><strong>Director, Undergraduate Studies</strong></td>
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<tr>
<td>Dr Geoff Smith</td>
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<td>Ms Narelle Smith</td>
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<tr>
<td><strong>Head, Statistics and Operations Research Unit, and Director, University Statistical Consulting Service</strong></td>
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<td>Deborah Street</td>
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<td>Mr Ron Sorli</td>
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<td>Mr Brian Stephenson</td>
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<td>Professor Barry Thornton</td>
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<td><strong>Director, Mathematics Study Centre</strong></td>
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<tr>
<td>Ms Leigh Wood</td>
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<tr>
<td><strong>Executive Assistant to Head of School</strong></td>
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<td>Ms Nadene Wright</td>
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<td>Dr Yakov Zinder</td>
<td>2279</td>
<td>1523</td>
<td>Y.Zinder</td>
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Undergraduate courses

Bachelor of Science in Mathematics

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 – this 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 – this 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 their associated uncertainty and variability. The Mathematics major develops further geometric, analytic and algebraic tools and applies them in a variety of complex and practical situations.

Electives – these 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 per week during the first two years of the course, and on one afternoon and two evenings per 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 for the School of Mathematical Sciences in this handbook.

**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**

**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
35231 Differential Equations 6cp
35232 Advanced Calculus 6cp
Electives approx. 6cp

**Spring semester**
35241 Mathematical Programming 1 6cp
35252 Statistics 2 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

**Year 4**

**Autumn semester**
35102 Mathematics 2 6cp
Electives approx. 6cp

**Spring semester**
35231 Differential Equations 6cp
35232 Advanced Calculus 6cp

**Year 5**

**Autumn semester**
35241 Mathematical Programming 1 6cp
35252 Statistics 2 6cp
35281 Numerical Analysis 1 6cp
Electives approx. 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**

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

<table>
<thead>
<tr>
<th><strong>Autumn semester</strong></th>
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<tbody>
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<td>Mathematical Methods</td>
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**Applied Mathematics sequence**

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

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**Statistics major**

Full-time program

Year 3

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1997, students wishing to do the Statistics major may complete any four out of five subjects from the four shown above and 35354 Statistical Inference.

**Part-time program**

Year 5

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Year 6

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Note: See the note following the full-time program above.

**Operations Research major**

Full-time program

Year 3

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Part-time program

Year 5

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Year 6

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Note: A minor change to the Statistics major has been made starting in 1997. As a transition arrangement for
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

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 33376 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 following subjects: 35274 Computing Seminar A, 35275 Computing Seminar B, 35378 Computing Seminar C, or 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 with 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

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.

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 Project 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.

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.
**Sub-majors**

The following are available as sub-majors. In all cases, full details are available from the School Office.

**Computing sub-major**

- 35171 Computing 1 6cp
- 35272 Computing 2 6cp
- and any two of
  - 35373 Computing 3 6cp
  - 35376 Advanced Topics in Computing A 6cp
  - 35377 Advanced Topics in Computing B 6cp
  - 31414 Information Systems 6cp
  - or
  - 31424 Systems Modelling 6cp

**Sub-majors offered by other faculties**

Students may elect to do sub-majors offered by other faculties. It is necessary to discuss the choice with the Electives Coordinator in the School of Mathematical Sciences, and to obtain appropriate approval from the faculty concerned. The following are possible sub-majors.

**Aboriginal Studies sub-major**

The faculties of Humanities and Social Sciences and Education offer a range of Aboriginal Studies subjects that may be taken as a sub-major, or as elective subjects, as appropriate, within any undergraduate course. The sub-major provides Aboriginal and non-Aboriginal students with an opportunity to study subjects that are culturally appropriate to an understanding of Aboriginal culture, history and social/political structures. These initial studies serve as a basis for applying critical analysis skills to Aboriginal and non-Aboriginal perspectives on issues and trends which affect the cultural and social integrity of Aboriginal peoples. Consideration is also given to other indigenous people, including Torres Strait Islanders. The role of the media and written or spoken communication are the major focuses of these analyses.

- T5110 Aboriginal Cultures and Philosophies 8cp
- 54230 Aboriginal Social and Political History 8cp
- plus at least one of
  - 54231 Aboriginal People and the Media 8cp
  - 54330 The Politics of Aboriginal History 8cp
  - 54331 Aboriginal Forms of Discourse 8cp

**Finance sub-major**

The School of Finance and Economics offers a sub-major in Finance consisting of 30 credit points. To ensure completion of this sub-major it is normally necessary to commence it in the Autumn semester of Year 1.

**Physics sub-majors**

The Department of Applied Physics offers two sub-majors, one in Physics and one in Electronics. Both contain two compulsory subjects. The remaining subjects, with a value totalling eight credit points (or more), must be chosen from a selection of subjects appropriate to the field.
Bachelor of Science (Honours) in Mathematics

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 the 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.

Subjects offered in the various strands are as follows.

**Mathematics strand**

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<th>Code</th>
<th>Title</th>
<th>Credit Points</th>
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<tbody>
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<td>35418</td>
<td>Analytic Number Theory</td>
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<tr>
<td>35419</td>
<td>Advanced Algebra</td>
<td>4cp</td>
</tr>
<tr>
<td>35427</td>
<td>Functional Analysis</td>
<td>4cp</td>
</tr>
<tr>
<td>35428</td>
<td>Convexity and Optimisation</td>
<td>4cp</td>
</tr>
<tr>
<td>35436</td>
<td>Advanced Mathematical Methods</td>
<td>4cp</td>
</tr>
<tr>
<td>35437</td>
<td>Partial Differential Equations</td>
<td>4cp</td>
</tr>
<tr>
<td>35438</td>
<td>Nonlinear Dynamical Systems</td>
<td>4cp</td>
</tr>
<tr>
<td>35466</td>
<td>Advanced Stochastic Processes</td>
<td>4cp</td>
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**Operations Research strand**

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<tr>
<td>35446</td>
<td>Scheduling Theory</td>
<td>4cp</td>
</tr>
<tr>
<td>35447</td>
<td>Discrete Optimisation</td>
<td>4cp</td>
</tr>
<tr>
<td>35448</td>
<td>Dynamic Optimisation</td>
<td>4cp</td>
</tr>
<tr>
<td>35466</td>
<td>Advanced Stochastic Processes</td>
<td>4cp</td>
</tr>
<tr>
<td>35485</td>
<td>Advanced Financial Modelling</td>
<td>4cp</td>
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</table>
Bachelor of Science in Mathematics/Bachelor of Arts in International Studies

Course code: MM05

This course combines the Bachelor of Science in Mathematics with the University’s Bachelor of Arts in International Studies. Mathematics is integrated with a major in the language and culture of another country. Students spend the fourth year of study at a university overseas. Owing to timetabling constraints, the combined degree is only offered on a full-time basis over five years.

Studies in Mathematical Sciences

The Mathematical Sciences component of the combined degree aims to provide students with a broad education in the field, to prepare graduates for professional practice in industry, commerce and government, and to provide the foundation for graduate studies and research. It provides great flexibility by allowing students to follow a course of study that best suits their interests and aspirations. It aims to help the 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.

For further information, see the course outline for the Bachelor of Science in Mathematics in this handbook.

An Honours degree in Mathematics (with strands in Statistics, Operations Research and Mathematics), requiring an additional year of full-time study, is also available.

International Studies

The Bachelor of Arts in International Studies is designed to increase awareness and understanding of the non-English-speaking world.

Students take one of the following majors in the International Studies program: China, Eastern Europe, Indonesia, Japan, Latin America, Malaysia, South China, South-East Asia, Spain, Taiwan, Thailand or Western Europe. They study an appropriate language and culture; learn about the contemporary...
society of their country of specialisation; and then spend an academic year of study at a university in their country of specialisation. The costs of tuition and travel are borne by UTS. In many cases, there will be no additional costs for students. However, those studying in countries or regions where the cost of living is high – notably Japan, Argentina, Hong Kong and Taiwan – should be prepared to pay additional costs for accommodation and maintenance.

Course structure

The structure of the five-year course in Mathematical Sciences and International Studies is derived from the combination of the Bachelor of Science in Mathematics with the Bachelor of Arts in International Studies.

All arrangements currently in force for both the Bachelor of Science in Mathematics and the Bachelor of Arts in International Studies apply equally to the combined degree program in Mathematical Sciences and International Studies.

To graduate a student is required to have completed 240 credit points: 144 credit points in Mathematics and 96 credit points in International Studies.

The Mathematics component of the combined degree is structured in three distinct sections: core studies, a major in an area of the mathematical sciences, and an elective component, precisely as for the Bachelor of Science in Mathematics. The major is taken in the final (fifth) year of study.

The Bachelor of Arts in International Studies requires undergraduates to study a major – a region or country of specialisation – over a minimum of three years. Students study language and culture for at least two years in Sydney, and this is followed by a period of study overseas. In 1997 the following range of majors will be available: China, Eastern Europe, Indonesia, Japan, Latin America, Malaysia, South China, South-East Asia, Spain, Taiwan, Thailand and Western Europe. The specialisation on Western Europe is only available to students who have previously completed HSC studies or equivalent in either French, German or Italian. The Eastern Europe specialisation is only available to students with a sound working knowledge of an appropriate Eastern European language.

Each of the specialisations within the International Studies program is 96 credit points, and includes 32 credit points (four subjects) of instruction in an appropriate Language and Culture; 16 credit points (two subjects) of the study of Contemporary Society and its context; and 48 credit points (two semesters) of study at a university or institution of higher education in the country or region of specialisation.

The International Studies subjects listed in the course program are subjects of enrolment referring to common units of instruction across the University.

Language and Culture

Study of Language and Culture at UTS depends on the individual student’s level of language proficiency before entry to the UTS program. There is a range of entry levels to the various Language and Culture programs available. Most are available at beginner’s and post-HSC levels, and some at more advanced levels.

For 1997 the following Language and Culture programs will be available at UTS as part of the International Studies program: Cantonese, Chinese, Indonesian, Japanese, Malay, Modern Standard Chinese and Spanish. (Modern Standard Chinese is a program for students who are either complete beginners or who started to learn Chinese at school in Australia.) In addition, arrangements have been made for the delivery of Croatian, French, German, Greek, Italian, Polish, Russian, Serbian, Slovenian, Ukrainian and Thai.

Contemporary Society

For each specialisation of the International Studies program, students have a prescribed pair of units of instruction in Contemporary Society, taught by the Institute for International Studies in cooperation with the Faculty of Humanities and Social Sciences.

The first is a subject on Modernisation and Globalisation that provides a general introduction to comparative social and political change. It is designed to locate further study of the major in its intellectual and physical contexts.

The second is a subject that provides a more detailed introduction to the area of specialisation, and which is specific for each major:

- China: Contemporary China
- Eastern Europe: Contemporary Eastern Europe or Modern Greek History and Society or Contemporary Russia
• Indonesia: Contemporary South-East Asia
• Japan: Contemporary Japan
• Latin America: Contemporary South America
• Malaysia: Contemporary South-East Asia
• South China: Chinese East Asia
• South-East Asia: Contemporary South-East Asia
• Spain: Contemporary Europe
• Taiwan: Chinese East Asia
• Thailand: Contemporary South-East Asia
• Western Europe: Contemporary Europe

In-country Study
Arrangements for students to spend two semesters of study at an institution of higher education in the country or region of specialisation have already been made, or are in train. The first semester will largely be concerned with further language development and cultural appreciation. The second semester will continue the study of language and culture but, where possible, will attempt to direct study towards subjects related to the mathematical sciences. Where students have reached an appropriate level of language competence, arrangements may be made to substitute one or two semesters of industrial experience for periods of In-country Study. In-country industrial experience undertaken in this way will be assessed by UTS in a manner similar to subjects of In-country Study, though through cooperation between the Institute for International Studies and the School of Mathematical Sciences.

Course program

Year 1

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

Year 2

<table>
<thead>
<tr>
<th>Autumn semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>35212 Linear Algebra</td>
</tr>
<tr>
<td>35232 Advanced Calculus</td>
</tr>
<tr>
<td>971xxx Language and Culture 1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>35241 Mathematical Programming 1</td>
</tr>
<tr>
<td>35252 Statistics 2</td>
</tr>
<tr>
<td>35281 Numerical Analysis 1</td>
</tr>
<tr>
<td>972xxx Language and Culture 2</td>
</tr>
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</table>

Year 3

<table>
<thead>
<tr>
<th>Autumn semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>35231 Differential Equations</td>
</tr>
<tr>
<td>59341 Modernisation and Globalisation</td>
</tr>
<tr>
<td>973xxx Language and Culture 3</td>
</tr>
<tr>
<td>Electives</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>35251 Analysis 1</td>
</tr>
<tr>
<td>974xxx Language and Culture 4</td>
</tr>
<tr>
<td>976xxx Contemporary Society 2</td>
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</table>

Year 4

<table>
<thead>
<tr>
<th>Autumn semester</th>
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</thead>
<tbody>
<tr>
<td>977xxx In-country Study 1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>978xxx In-country Study 2</td>
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</table>

Year 5

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>353xx Mathematics Major 1</td>
</tr>
<tr>
<td>353xx Mathematics Major 2</td>
</tr>
<tr>
<td>Electives</td>
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<tr>
<td>Electives</td>
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<td>Electives</td>
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<table>
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<tr>
<th>Spring semester</th>
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</thead>
<tbody>
<tr>
<td>353xx Mathematics Major 3</td>
</tr>
<tr>
<td>353xx Mathematics Major 4</td>
</tr>
<tr>
<td>Electives</td>
</tr>
<tr>
<td>Electives</td>
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<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

Note: Students intending to complete the elective major in Computing will need to interchange Analysis 1 with an Elective from Year 5 Autumn semester.

Majors

The program for each of the majors corresponds precisely with that in the Bachelor of Science in Mathematics.
Arrangements for In-country Study

In general, students may expect that no additional costs will be incurred through following a period of In-country Study as part of this degree program. The two semesters of In-country Study are full-credit subjects at UTS for which HECS is payable. There are, however, no further tuition fees and the Institute for International Studies will provide travel subsidies. Students in receipt of Austudy in Australia are also able to receive it while they are engaged in In-country Study.

Some of the countries targeted in the International Studies program are relatively 'high-cost'. Though the Institute for International Studies will assist students enrolled in a period of In-country Study in one of those countries with their costs, it cannot guarantee to meet all additional costs. In such cases, students need to be prepared to shoulder a proportion of the costs themselves. Japan is the most obvious case in point.

Under normal circumstances, students can only proceed to a period of In-country Study within the International Studies program if they have successfully completed all earlier stages in the degree program. Students who have not successfully completed all earlier stages may only proceed to a period of In-country Study under exceptional circumstances and with the permission of both the Dean of the Faculty and the Director of the Institute for International Studies.

Before students leave UTS to engage in a period of In-country Study within the International Studies program, they may be required to meet appropriate financial and enrolment requirements by the Director of the Institute for International Studies. They will also be required to agree to be governed by the Institute's code of good conduct during their period of In-country Study.

Bachelor of Mathematics and Finance

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 will therefore 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 because 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

#### Year 1

<table>
<thead>
<tr>
<th>Autumn semester</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>22105 Accounting A</td>
<td>4cp</td>
</tr>
<tr>
<td>25110 Microeconomics</td>
<td>4cp</td>
</tr>
<tr>
<td>25308 Financial Markets</td>
<td>4cp</td>
</tr>
<tr>
<td>35101 Mathematics 1</td>
<td>6cp</td>
</tr>
<tr>
<td>35170 Introduction to Computing</td>
<td>6cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>25209 Macroeconomics</td>
<td>4cp</td>
</tr>
<tr>
<td>25314 Business Finance</td>
<td>4cp</td>
</tr>
<tr>
<td>35100 Mathematical Practice</td>
<td>3cp</td>
</tr>
<tr>
<td>35102 Mathematics 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35151 Statistics 1</td>
<td>6cp</td>
</tr>
</tbody>
</table>

#### Year 2

<table>
<thead>
<tr>
<th>Autumn semester</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>35111 Discrete Mathematics</td>
<td>3cp</td>
</tr>
<tr>
<td>35212 Linear Algebra</td>
<td>6cp</td>
</tr>
<tr>
<td>35231 Differential Equations</td>
<td>6cp</td>
</tr>
<tr>
<td>35232 Advanced Calculus</td>
<td>6cp</td>
</tr>
<tr>
<td>79101 Business Law</td>
<td>4cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td>25905 Capital Budgeting and Valuation (Honours)</td>
<td>6cp</td>
</tr>
<tr>
<td>25906 Investment Analysis (Honours)</td>
<td>6cp</td>
</tr>
<tr>
<td>35252 Statistics 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35281 Numerical Analysis 1</td>
<td>6cp</td>
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</tbody>
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#### Year 3

<table>
<thead>
<tr>
<th>Autumn semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>25621 Financing Decisions and Capital Market Theory</td>
<td>6cp</td>
</tr>
<tr>
<td>25620 Derivative Securities</td>
<td>6cp</td>
</tr>
<tr>
<td>or 25210 Microeconomic Theory and Policy</td>
<td>6cp</td>
</tr>
<tr>
<td>35321 Analysis 1</td>
<td>6cp</td>
</tr>
<tr>
<td>35353 Regression Analysis</td>
<td>6cp</td>
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<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>25421 International Financial Management</td>
<td>6cp</td>
</tr>
<tr>
<td>25606 Financial Time Series Analysis</td>
<td>6cp</td>
</tr>
<tr>
<td>35241 Mathematical Programming 1</td>
<td>6cp</td>
</tr>
<tr>
<td>or 35322 Analysis 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35361 Probability and Stochastic Processes</td>
<td>6cp</td>
</tr>
</tbody>
</table>

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

#### Year 1

<table>
<thead>
<tr>
<th>Autumn semester</th>
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</thead>
<tbody>
<tr>
<td>25110 Microeconomics</td>
<td>4cp</td>
</tr>
<tr>
<td>35101 Mathematics 1</td>
<td>6cp</td>
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<table>
<thead>
<tr>
<th>Spring semester</th>
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</thead>
<tbody>
<tr>
<td>22105 Accounting A</td>
<td>4cp</td>
</tr>
<tr>
<td>35100 Mathematical Practice</td>
<td>3cp</td>
</tr>
<tr>
<td>35170 Introduction to Computing</td>
<td>6cp</td>
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#### Year 2

<table>
<thead>
<tr>
<th>Autumn semester</th>
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</thead>
<tbody>
<tr>
<td>25209 Macroeconomics</td>
<td>4cp</td>
</tr>
<tr>
<td>35102 Mathematics 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35111 Discrete Mathematics</td>
<td>3cp</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>25308 Financial Markets</td>
<td>4cp</td>
</tr>
<tr>
<td>25314 Business Finance</td>
<td>4cp</td>
</tr>
<tr>
<td>35212 Linear Algebra</td>
<td>6cp</td>
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</tbody>
</table>

#### Year 3

<table>
<thead>
<tr>
<th>Autumn semester</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>35151 Statistics 1</td>
<td>6cp</td>
</tr>
<tr>
<td>79101 Business Law</td>
<td>4cp</td>
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</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td>35231 Differential Equations</td>
<td>6cp</td>
</tr>
<tr>
<td>35232 Advanced Calculus</td>
<td>6cp</td>
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</table>

#### Year 4

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>35252 Statistics 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35281 Numerical Analysis 1</td>
<td>6cp</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
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</tr>
</thead>
<tbody>
<tr>
<td>25905 Capital Budgeting and Valuation (Honours)</td>
<td>6cp</td>
</tr>
<tr>
<td>25906 Investment Analysis (Honours)</td>
<td>6cp</td>
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#### Year 5

<table>
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</thead>
<tbody>
<tr>
<td>25621 Financing Decisions and Capital Market Theory</td>
<td>6cp</td>
</tr>
<tr>
<td>35353 Regression Analysis</td>
<td>6cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester</th>
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</thead>
<tbody>
<tr>
<td>25606 Financial Time Series Analysis</td>
<td>6cp</td>
</tr>
<tr>
<td>35321 Analysis 1</td>
<td>6cp</td>
</tr>
</tbody>
</table>
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)

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 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 of 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.

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 (cont.) 6cp
35456 Nonlinear Statistical Models 4cp
35487 Optimal Control 2 4cp
Bachelor of Mathematics and Finance/Bachelor of Arts in International Studies

Course code: MM06

This course combines the Bachelor in Mathematics and Finance with the University's Bachelor of Arts in International Studies. Studies in mathematics and finance are integrated with a major in the language and culture of another country. Students spend the fourth year of study at a university overseas. Because of timetabling constraints, the combined degree is available only on a full-time basis over five years.

Studies in Mathematics and Finance

Students graduating from this degree will have undertaken an integrated sequence of study in mathematics, statistics, finance, economics, accounting, business law and computing, and thus will have sound training in both the traditional theory of finance and the mathematical aspects of modern portfolio management techniques. With such skills, graduates should find interesting and rewarding employment in major financial institutions including banks, insurance companies and government instrumentalties.

For further information, see the course outline for the Bachelor of Mathematics and Finance in this handbook.

The Mathematics and Finance components of the course occupy three effective full-time years. An Honours degree, leading to the qualification of BMathFin(Hons) and requiring an additional year of full-time study, is also available.

International Studies

The Bachelor of Arts in International Studies is designed to increase awareness and understanding of the non-English-speaking world.

Students take one of the following majors in the International Studies program: China, Eastern Europe, Indonesia, Japan, Latin America, Malaysia, South China, South-East Asia, Spain, Taiwan, Thailand or Western Europe. They study an appropriate language and culture; learn about the contemporary society of their country of specialisation; and then spend an academic year of study at a university in their country of specialisation. The costs of tuition and travel are borne by UTS. In many cases, there will be no additional costs for students. However, those studying in countries or regions where the cost of living is high – notably Japan, Argentina, Hong Kong and Taiwan – should be prepared to pay additional costs for accommodation and maintenance.

Course structure

The structure of the five-year course in Mathematics and Finance and International Studies is derived from the combination of the Bachelor of Mathematics and Finance with the Bachelor of Arts in International Studies.

All arrangements in force for both the Bachelor of Mathematics and Finance and the Bachelor of Arts in International Studies apply equally to the combined degree program in Mathematics and Finance and International Studies.

To graduate a student is required to have completed 240 credit points: 144 credit points in Mathematics and Finance and 96 credit points in International Studies.

The Mathematics and Finance components of the course include an integrated sequence of subjects in mathematics, statistics, finance, economics, accounting, business law and computing.

The Bachelor of Arts in International Studies requires undergraduates to study a major – a region or country of specialisation – over a minimum of three years. Students study language and culture for at least two years in Sydney, and this is followed by a period of study overseas. In 1997 the following range of majors will be available: China, Eastern Europe, Indonesia, Japan, Latin America, Malaysia, South China, South-East Asia, Spain, Taiwan, Thailand and Western Europe. The specialisation on Western Europe is only available to students who have previously completed HSC studies or equivalent in either French, German or Italian. The Eastern Europe specialisation is only available to students with a sound knowledge of an appropriate Eastern European language.

Each of the specialisations within the International Studies program is 96 credit points, and includes 32 credit points (four subjects) of instruction in an appropriate
Language and Culture; 16 credit points (two subjects) of the study of Contemporary Society and its context; and 48 credit points (two semesters) of study at a university or institution of higher education in the country or region of specialisation.

The International Studies subjects listed in the course program are subjects of enrolment referring to common units of instruction across the University.

Language and Culture

Study of Language and Culture at UTS depends on the individual student's level of language proficiency before entry to the UTS program. There is a range of entry levels to the various Language and Culture programs available. Most are available at beginner's and post-HSC levels, and some at more advanced levels.

For 1997 the following Language and Culture programs will be available at UTS as part of the International Studies program: Cantonese, Chinese, Indonesian, Japanese, Malay, Modern Standard Chinese and Spanish. (Modern Standard Chinese is a program for students who are either complete beginners or who started to learn Chinese at school in Australia.) In addition, arrangements have been made for the delivery of Croatian, French, German, Greek, Italian, Polish, Russian, Serbian, Slovenian, Ukrainian and Thai.

Contemporary Society

For each specialisation of the International Studies program, students have a prescribed pair of units of instruction in Contemporary Society, taught by the Institute for International Studies in cooperation with the Faculty of Humanities and Social Sciences.

The first is a subject on Modernisation and Globalisation that provides a general introduction to comparative social and political change. It is designed to locate further study of the major in its intellectual and physical contexts.

The second is a subject that provides a more detailed introduction to the area of specialisation, and which is specific for each major:

- China: Contemporary China
- Eastern Europe: Contemporary Eastern Europe or Modern Greek History and Society or Contemporary Russia
- Indonesia: Contemporary South-East Asia
- Japan: Contemporary Japan
- Latin America: Contemporary South America
- Malaysia: Contemporary South-East Asia
- South China: Chinese East Asia
- South-East Asia: Contemporary South-East Asia
- Spain: Contemporary Europe
- Taiwan: Chinese East Asia
- Thailand: Contemporary South-East Asia
- Western Europe: Contemporary Europe

In-country Study

Arrangements for students to spend two semesters of study at an institution of higher education in the country or region of specialisation have already been made, or are in train. The first semester will largely be concerned with further language development and cultural appreciation. The second semester will continue the study of language and culture but, where possible, will attempt to direct study towards subjects related to mathematics and finance. Where students have reached an appropriate level of language competence, arrangements may be made to substitute one or two semesters of industrial experience for periods of In-country Study. In-country industrial experience undertaken in this way will be assessed by UTS in a manner similar to subjects of In-country Study, though through cooperation between the Institute for International Studies and the School of Mathematical Sciences.

Course program

Year 1

Autumn semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>22105</td>
<td>Accounting A</td>
<td>4cp</td>
</tr>
<tr>
<td>25110</td>
<td>Microeconomics</td>
<td>4cp</td>
</tr>
<tr>
<td>25308</td>
<td>Financial Markets</td>
<td>4cp</td>
</tr>
<tr>
<td>35101</td>
<td>Mathematics 1</td>
<td>6cp</td>
</tr>
<tr>
<td>35170</td>
<td>Introduction to Computing</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Spring semester

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>25209</td>
<td>Macroeconomics</td>
<td>4cp</td>
</tr>
<tr>
<td>25314</td>
<td>Business Finance</td>
<td>4cp</td>
</tr>
<tr>
<td>35100</td>
<td>Mathematical Practice</td>
<td>3cp</td>
</tr>
<tr>
<td>35102</td>
<td>Mathematics 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35151</td>
<td>Statistics 1</td>
<td>6cp</td>
</tr>
</tbody>
</table>
Arrangements for In-country Study

In general, students may expect that no additional costs will be incurred through following a period of In-country Study as part of this degree program. The two semesters of In-country Study are full-credit subjects at UTS for which HECS is payable. There are, however, no further tuition fees and the Institute for International Studies will provide travel subsidies. Students in receipt of Austudy in Australia are also able to receive it while they are engaged in In-country Study.

Some of the countries targeted in the international Studies program are relatively "high-cost". Though the Institute for International Studies will assist students enrolled in a period of In-country Study in one of those countries with their costs, it cannot guarantee to meet all additional costs. In such cases, students need to be prepared to shoulder a proportion of the costs themselves. Japan is the most obvious case in point.

Under normal circumstances, students can only proceed to a period of In-country Study within the International Studies program if they have successfully completed all earlier stages in the degree program. Students who have not successfully completed all earlier stages may only proceed to a period of In-country Study under exceptional circumstances and with the permission of both the Dean of the Faculty and the Director of the Institute for International Studies.

Before students leave UTS to engage in a period of In-country Study within the International Studies program they may be required to meet appropriate financial and enrolment requirements by the Director of the Institute for International Studies. They will also be required to agree to be governed by the Institute’s code of good conduct during their period of In-country Study.

Note: Students intending to proceed to the Honours degree in Mathematics and Finance should substitute 35240 Microeconomic Theory and Policy for the subject 25210 Microeconomic Theory and Policy for the subject 25620 Derivative Securities and 35621 Analysis 1 for the subject 35241 Mathematical Programming 1 in their final year.
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; and 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; and computer-aided instruction in mathematics.

**Differential Geometry**
Topology and Ricci curvature; and 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; and radio frequency propagation in coal seams.

**Mathematics Education**
PhD education of industrial mathematicians; mathematical education of engineers; tertiary education in applied mathematics; and statistical education.

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

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

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

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

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 DEETYA guidelines. Details will be available in early 1997.

**Recent theses**
PhD theses
Olleton, R L 1990, Adaptive control and the insulin dependent diabetic.
Dobson, R J 1992, Modelling host regulation of trichostrongylus colubriformis, a nematode parasite of sheep.


**MSc theses**

Reuben, A J 1990, Mathematical models of erythrocyte sedimentation.

Haggar, F 1991, An account of the behaviour of some pairs of e(1) variables.


Thornton, F 1996, Combining diagnostic modalities to aid breast screening effectiveness.

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**Doctor of Philosophy**

**Course code: MM54**

The Doctor of Philosophy (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.

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**Master of Science**

**Course code: MM51**

The Master of Science (MSc) program provides an opportunity for graduates to acquire research skills and deepen their knowledge in some areas of the mathematical sciences. Students work 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 their 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 per week to work towards the degree. All students are expected to maintain regular contact (at least weekly) with their supervisor.

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**POSTGRADUATE COURSEWORK PROGRAMS**

**Master of Science in Operations Research**

**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 1997 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) (Rule 3.3.7.1), or for recording any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/92/70) (Rule 3.3.7.2).

Course program

Part-time program

<table>
<thead>
<tr>
<th>Semester 1</th>
<th>35447 Discrete Optimisation</th>
<th>4cp</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>35448 Dynamic Optimisation</td>
<td>4cp</td>
</tr>
<tr>
<td></td>
<td>Electives (approx. 4cp)</td>
<td></td>
</tr>
</tbody>
</table>

| Semester 2 | 35443 Mathematical Programming 3 | 4cp |
|            | 35446 Scheduling Theory         | 4cp |
|            | Electives (approx. 4cp)         |     |

| Semester 3 | 35449 Operations Research Models and Methodology | 4cp |
|            | 35486 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 per week to the Report in Semester 3 and six hours per week in Semester 4.
Graduate Diploma in Applicable Mathematics

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.

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 (Rule 3.2.6.1), or for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80) (Rule 3.2.6.2).

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

 Semester 1
35231 Differential Equations  6cp
35252 Statistics 2  6cp
 Semester 2
35232 Advanced Calculus  6cp
35321 Analysis 1  6cp
 Semester 3
35353 Regression Analysis  6cp
 Elective  6cp
 Semester 4
35222 Analysis 2  6cp
35361 Probability and Stochastic Processes  6cp

Graduate Diploma in Mathematics and Finance

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. Exemptions 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 (Rule 3.2.6.1), or for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80) (Rule 3.2.6.2).

Fees
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Course program

Part-time program

Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>34201</td>
<td>Mathematics for Computing</td>
<td>6cp</td>
</tr>
<tr>
<td>35252</td>
<td>Statistics 2</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Semester 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35361</td>
<td>Probability and Stochastic Processes</td>
<td>6cp</td>
</tr>
<tr>
<td>35384</td>
<td>Financial Modelling</td>
<td>4cp</td>
</tr>
</tbody>
</table>

Semester 3

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>35241</td>
<td>Mathematical Programming 1</td>
<td>6cp</td>
</tr>
<tr>
<td>35467</td>
<td>Time Series Analysis</td>
<td>4cp</td>
</tr>
<tr>
<td>35596</td>
<td>Project (Part 1)</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Semester 4

<table>
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35485</td>
<td>Advanced Financial Modelling</td>
<td>4cp</td>
</tr>
<tr>
<td>35596</td>
<td>Project (Part 2)</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Graduate Diploma in Operations Research

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. The expected pattern of attendance is part time over two years. Attendance at daytime classes may be unavoidable for some subjects.

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.

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 (Rule 3.2.6.1), or for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80) (Rule 3.2.6.2).
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 1997 the tuition fees have been set at $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

Semester 1
- 35241 Mathematical Programming 1 6cp
- 35252 Statistics 2 6cp

Semester 2
- 35361 Probability and Stochastic Processes 6cp
- 35363 Stochastic Methods in Operations Research 6cp

Semester 3
- 35342 Mathematical Programming 2 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

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 course has a value of 48 credit points, comprising 40 credit points of coursework (six subjects) and a project worth 8 credit points. The expected pattern of attendance is part time over two years. Attendance at daytime classes may be unavoidable for some subjects.

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 as miscellaneous students or as part of 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 (Rule 3.2.6.1), or for any three failures in the course (unsatisfactory progress as defined by the Faculty Board resolution, FBMC/94/80) (Rule 3.2.6.2).

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 1997 the tuition fees have been set at $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

Semester 1
35252  Statistics 2  6cp
35356  Design and Analysis of Experiments  6cp

Semester 2
35353  Regression Analysis  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 in the School of Mathematical Sciences is 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 (Rule 3.2.6.1).

Fees

Full tuition fees will be charged for this course. In 1997 a fee of $900 per subject will be 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 for the School of Mathematical Sciences in this handbook.

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)
**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.

**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)

**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 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*
- 35356 Design and Analysis of Experiments 6cp  
- 35361 Probability and Stochastic Processes 6cp
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 that 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 can be found in that School’s ‘Subject descriptions’ section later in this handbook.

33401
Mathematics for Computing
6cp; 3hpw

35101
Mathematics 1
6cp; 6hpw

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’s 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

35151
Statistics I
6cp; 6hpw

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 spread-sheets, illustrating the complementary nature of these approaches to computing.

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

35205
History of Mathematics
6cp; 4hpw

35212
Linear Algebra
6cp; 4hpw; prerequisite: 35101 Mathematics I

35231
Differential Equations
6cp; 4hpw; prerequisites: 35102 Mathematics 2

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 I
6cp; 4hpw; prerequisites: 35212 Linear Algebra; 35232 Advanced Calculus
35252

Statistics 2
6cp; 4hpw; prerequisite: 35151 Statistics 1

35272

Computing 2
6cp; 6hpw; prerequisites: 35111 Discrete Mathematics; 35171 Computing 1

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 that 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 I
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; 35322 Advanced Calculus

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 I
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:

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

35333
Applied Mathematics 3A
6cp; 4hpw; prerequisite: 35232 Advanced Calculus; corequisite: 35335 Mathematical Methods

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

35335
Mathematical Methods
6cp; 4hpw; prerequisite: 35231 Differential Equations

35340
Operations Research Practice
6cp; 4hpw; prerequisites: 35241 Mathematical Programming I; 35252 Statistics 2
Financial modelling: mathematics of finance, compound interest, various types of annuities, perpetuities, bond pricing, contingent payments, consumption and investment decisions under certainty, investment decisions under uncertainty, utility theory and risk analysis, Markowitz portfolio theory, single index model, capital asset pricing model. Inventory control: economic order quantity, production lot size model, quantity discounts, shortage models, single period model, safety stock approach, service level approach, periodic review system, dynamic EOQ, classical optimisation methods, materials requirements planning.

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

35344
Network Optimisation
6cp; 4hpw; prerequisite: 35241 Mathematical Programming I

35353

Regression Analysis
6cp; 4hpw; prerequisite: 35252 Statistics 2

35354

Statistical Inference
6cp; 4hpw; prerequisite: 35252 Statistics 2

35355

Quality Control
6cp; 4hpw; prerequisite: 35361 Probability and Stochastic Processes
Total quality management; process control; acceptance sampling; process capability analysis; tolerance analysis; reliability analysis.

35356

Design and Analysis of Experiments
6cp; 4hpw; prerequisite: 35252 Statistics 2
Introduction to general concepts of the design of experiments. Completely randomised, randomised complete block and Latin square designs. Multiple comparisons. Factorial designs. Introduction to Taguchi designs and response surface designs.

35361

Probability and Stochastic Processes
6cp; 4hpw; prerequisite: 35252 Statistics 2

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, but may include: computer graphics, computing machinery, cryptology, formal analysis of business processes, formal specification, high-performance computing, language translation, and neural networks.
Module: Computer Graphics
prerequisites: 35212 Linear Algebra; 35272 Computing 2

Module: Computing Machinery
prerequisite: 35272 Computing 2
Historical and social context of computing. Digital logic and digital systems. Finite state machines and their implementation in hardware. Representation of basic data types and associated machine level operations. Structure of processor units and design of a simple central processor unit. Organisation of memory and control of peripheral devices.

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. Application to the analysis and design of selected business processes, including financial processes. Effective work practices and communication skills.

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

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

Module: Language Translation
prerequisite: 35272 Computing 2

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

35377
Advanced Topics in Computing B
6cp; 4hpw; prerequisite: see 35376 Advanced Topics in Computing A
The content of this subject will be drawn from two of the modules described under 35376 Advanced Topics in Computing A. The modules chosen by a student for this subject should 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; prerequisite: see 35376 Advanced Topics in Computing A
As for 35274.

35382
Numerical Analysis 2
6cp; 4hpw; prerequisite: 35281 Numerical Analysis I

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 problems; 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 1*


35428

**Convexity and Optimisation**

*4cp; 3hpw; prerequisite: 35322 Analysis 1*


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*


35438

**Nonlinear Dynamical Systems**

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


35443

**Mathematical Programming 3**

*4cp; 3hpw; prerequisite: 35342 Mathematical Programming 2*


35446

**Scheduling Theory**

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


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

35448
Dynamic Optimisation
4cp; 3hpw; prerequisites: 35241 Mathematical Programming I; 35361 Probability and Stochastic Processes; corequisite: 35447 Discrete Optimisation


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; 35467 Time Series Analysis


35457
Multivariate Statistics
4cp; 3hpw; prerequisites: 35353 Regression Analysis; 35356 Design and Analysis of Experiments


35458
Loglinear Modelling
4cp; 3hpw; prerequisite: 35353 Regression Analysis


35459
Linear Models and Experimental Design
4cp; 3hpw; prerequisites: 35353 Regression Analysis; 35457 Multivariate Statistics; 35356 Design and Analysis of Experiments

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


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; 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  

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  

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.

015110
Aboriginal Cultures and Philosophies
8cp; 3hpw
This subject will introduce participants to Aboriginal culture and social organisation as expressions of Aboriginal cosmology. Contemporary Aboriginal culture will be presented as an evolving response to colonialism and as a reassertion of cultural empowerment.

22105
Accounting A
4cp; 3hpw
This subject provides an introduction to accounting, 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 deals 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

25209
Macroeconomics
4cp; 3hpw; prerequisite: 25110 Microeconomics

25210
Microeconomic Theory and Policy
6cp; 4hpw; prerequisite: 25110 Microeconomics

25308
Financial Markets
4cp; 3hpw; prerequisite: 25209 Macroeconomics

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

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

25906
Investment Analysis (Honours)
6cp; 4hpw; prerequisites: 25308 Financial Markets; 25314 Business Finance

25907
Theory of Financial Decision Making
4cp; 3hpw; prerequisite: by consent

25908
Derivative Security Pricing
4cp; 3hpw; prerequisite: by consent

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

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

54230
Aboriginal Social and Political History
8cp; 3hpw
Examines and analyses the impact of colonialism on indigenous peoples, with particular reference to the Aboriginal inhabitants of this region. The emergence of Aboriginal social and political movements will be presented as the basis for repossessing of their traditional heritage in land and culture.

54231
Aboriginal People and the Media
8cp; 3hpw; prerequisites: 015110 Aboriginal Cultures and Philosophies; 54230 Aboriginal Social and Political History
Familiarises students with the field of debate in relation to the representation of Aborigines in the media, and with the productions of Aboriginal media organisations. Where possible, some written, video or film production could become part of the course assessment.

54330
The Politics of Aboriginal History
8cp; 3hpw; prerequisites: Aboriginal Studies subjects at 100 and 200 levels
Introduces students to the wide range of historical work by Aboriginal and non-Aboriginal people over the last three decades, and encourages students to develop skills in the critical evaluation of this work in its political and social contexts. Students will enhance their knowledge of primary research materials for the field of Aboriginal history, and will develop their skills in the analysis and use of these sources.

54331
Aboriginal Forms of Discourse
8cp; 3hpw; prerequisites: 015110 Aboriginal Cultures and Philosophies; one Aboriginal Studies subject at the 200 level
Familiarises students with a broad range of Aboriginal forms of discourse - novels, plays, films, oral narratives - and introduces them to methods of analysis, of both text and content, deriving from the disciplines of cultural studies and textual studies.

59341
Modernisation and Globalisation
8cp; 4hpw
The importance of the comparative analysis of social change has been emphasised since the late 1980s with the end of the Cold War and rapid social, economic and political changes that have taken place in Eastern Europe, East Asia and South-East Asia. There have been various claims that the homogenising influences of capitalism and democracy have triumphed, amid a renewed emphasis on cultural determinism and a questioning of the Eurocentricity of the social sciences. Through an examination of key elements of modernisation and globalisation, this subject provides an overview of the social changes in Western Europe, Latin America, East Asia and South-East Asia, and deals with academic discussions on the processes of social change.

79101
Business Law
4cp; 3hpw
Legal philosophy; legal history; constitutional law; torts; crime; property; contracts; consumer protection.
INTERNATIONAL STUDIES SUBJECTS

971101, 972101, 973101, 974101

Modern Standard Chinese 1

Bcp; 1st semester, 6hpw; prerequisite: nil

Modern Standard Chinese 1 is the first unit in the Modern Standard Chinese program. It is designed to provide students who have no prior knowledge of Chinese with basic survival skills in language and culture, and the ability to undertake In-country Study in China. Modern Standard Chinese 1 aims at developing in students a survival communicative ability in basic social interactions. It teaches students Pinyin, the official transcription system, as a guide to the pronunciation of the Chinese language, and some basic structures and devices of the language. Students are expected to know about 300 Chinese characters by the end of this unit.

Modern Standard Chinese 2

Bcp; 2nd semester, 6hpw; prerequisite: Modern Standard Chinese 1

Modern Standard Chinese 2 is the second unit in the Modern Standard Chinese program. It is designed to provide students who have no prior knowledge of Chinese with basic survival skills and the ability to undertake In-country Study in China. Modern Standard Chinese 2 aims at developing in students a survival communicative ability in basic social interactions. It also introduces students to some of the basic structures and devices of the language. Students are expected to know about 600–800 Chinese characters by the end of this unit.

Modern Standard Chinese 3

Bcp; 1st semester, 6hpw; prerequisite: Modern Standard Chinese 2 or HSC Chinese

Modern Standard Chinese 3 is the third unit in the Modern Standard Chinese program. It is designed to provide students who have no prior knowledge of Chinese with basic communicative skills and the ability to undertake In-country Study in China. This is also the entry point for students who have completed HSC-level Chinese and who first learnt Chinese at school in Australia. Modern Standard Chinese 3 aims at further developing students' oral communicative competence in basic social interactions. More written texts will be gradually introduced to enhance the ability of students to use Chinese characters. The basic structures and devices of the language will be reinforced. Students are expected to know about 1,200 Chinese characters by the end of this unit.

Modern Standard Chinese 4

Bcp; 2nd semester, 6hpw; prerequisite: Modern Standard Chinese 3

Modern Standard Chinese 4 is the fourth unit in the Modern Standard Chinese program. It is designed to provide students who have no prior knowledge of Chinese with basic communicative skills and the ability to undertake In-country Study in China. This is also the second unit for students who have completed HSC-level Chinese and who first learnt Chinese at school in Australia. Modern Standard Chinese 4 aims at further developing students' communicative competence in basic social interactions. More written texts are introduced to enhance the ability of students to use Chinese characters. The basic structures and devices of the language are also reinforced. Students are expected to know about 1,600 Chinese characters by the end of this unit.

Modern Standard Chinese 5

Bcp; 1st semester, 6hpw; prerequisite: Modern Standard Chinese 4

Modern Standard Chinese 5 is the third unit for students who first learnt Chinese at school and obtained HSC-level Chinese. It is designed to provide the students with basic cultural and communicative skills, and the ability to undertake In-country Study in China. Modern Standard Chinese 5 aims at further developing students' communicative competence in general social interactions. While reinforcing the basic structures and devices of the language, this unit will also teach students practical writing skills. Students are expected to know about 2,000 Chinese characters by the end of this unit.

Modern Standard Chinese 6

Bcp; 2nd semester, 6hpw; prerequisite: Modern Standard Chinese 5

Modern Standard Chinese 6 is the fourth unit of the second entry point in the Modern Standard Chinese program designed to provide students who first learnt Chinese at school and obtained HSC-level Chinese with
basic communicative skills and the ability to undertake In-country Study in China.

Modern Standard Chinese 6 aims at further developing students’ communicative competence in general social interactions. While reinforcing basic structures and devices of the language, this unit will also teach practical writing. Students are expected to know about 2,500 Chinese characters by the end of this unit.

971111, 972111, 973111, 974111

Chinese 1
8cp; 1st semester, 4hpw; prerequisite: a working knowledge of one of the Chinese languages

Chinese 1 is the first unit in a series of four units of the Chinese Language and Culture program, which is for students who have a working knowledge of at least one Chinese language. Its aim is to prepare students for a year of study in China.

This unit aims at developing oral communicative competence to meet students’ needs in social and professional interactions where Modern Standard Chinese (also known as Mandarin, Putonghua or Guoyu) is spoken. Simplified characters, pronunciation and intonation, and situational Chinese usages are the focus of class instruction. This unit also provides an introduction to Chinese word processing using Pinyin.

Chinese 2
8cp; 2nd semester, 4hpw; prerequisite: Chinese 1 or HSC Chinese (for background speakers) or equivalent

Chinese 2 is the second unit in a series of four units of the Chinese Language and Culture program, which is for students who have a working knowledge of at least one Chinese language. Its aim is to prepare students for a year of study in China. This is also the usual entry point for those who have completed HSC-level Chinese (for background speakers).

This unit primarily aims at developing communicative competence in reading and writing to meet students’ needs in social and professional interactions where Modern Standard Chinese (also known as Mandarin, Putonghua or Guoyu) is used. Students are exposed to a range of Chinese texts in varied genres so that they may master written Chinese for different purposes, and are provided with opportunities to maintain their speaking and listening skills through discussions of the texts.

Chinese 3
8cp; 1st semester, 4hpw; prerequisite: Chinese 2

Chinese 3 is the third unit in a series of four units of the Chinese Language and Culture program, which is for students who have a working knowledge of at least one Chinese language. Its aim is to prepare students for a year of study in China.

This unit aims at developing in students the high level of communicative competence that is required to be able to understand various electronic and published media texts, contemporary literature, and texts relating to contemporary society where Modern Standard Chinese (also known as Mandarin, Putonghua or Guoyu) is used. Students are exposed to a range of Chinese texts in varied genres so that they may master Chinese for different purposes, and are provided with opportunities to maintain their speaking and listening skills through discussions of the texts.

Students interested in studying classical Chinese are advised to make inquiries at the Institute regarding the possibility of undertaking relevant subjects at Sydney University.

Chinese 4
8cp; 2nd semester, 4hpw; prerequisite: Chinese 3

Chinese 4 is the fourth unit in a series of four units of the Chinese Language and Culture program, which is for students who have a working knowledge of at least one Chinese language. Its aim is to prepare students for a year of study in China.

This unit aims at developing in students a high level of communicative competence to enable them to examine a variety of texts such as articles, correspondence and texts related to their particular field of study, and to make cross-cultural comparisons. Students are provided with opportunities to maintain their speaking and listening skills through discussions of the texts. In this unit, there is also a greater focus on the development of translation skills than there is in previous units.

971121, 972121, 973121, 974121

Cantonese A-I
8cp; 1st semester, 6hpw; prerequisite: nil

Cantonese A-I is the first subject in the Cantonese A program. It is designed to provide students who have no prior knowledge of Cantonese with basic survival skills in
language and culture, and the ability to undertake In-country Study in South China. This subject aims at developing in students a survival communicative ability in basic social interactions. It also deals with the basic language structures and devices of Cantonese. Students will be taught the basic structures of Chinese writing and are expected to know about 150 Chinese characters by the end of the subject.

Cantonese A-1 consists of 78 hours of classroom instruction, involving many interactive group and pair-work activities. Audiovisual equipment and computers will be used to facilitate teaching and learning. A communicative approach is adopted for classroom instruction and students are expected to participate actively in all classroom activities in the process of acquiring language skills. The teaching incorporates an introduction to Cantonese culture and helps students to appreciate the wider cultural ramifications of Cantonese in various contexts.

Cantonese A-2
8cp; 2nd semester, 6hpw; prerequisite: Cantonese A-1
Cantonese A-2 is the second subject in the Cantonese A program. It is designed to provide students who have no prior knowledge of Cantonese with basic survival skills in language and culture, and the ability to undertake In-country Study in South China. This subject aims at developing in students a communicative and linguistic competence in basic social interactions. It also deals with some of the basic structures and devices of Cantonese. Students will be taught the basic structures of Chinese writing and are expected to know about 300 Chinese characters by the end of the subject.

Cantonese A-2 consists of 78 hours of classroom instruction, involving many interactive group and pair-work activities. Audiovisual equipment and computers will be used to facilitate teaching and learning. A communicative approach is adopted for classroom instruction and students are expected to participate actively in all classroom activities in the process of acquiring language skills. The teaching incorporates an introduction to Cantonese culture and helps students to appreciate the wider cultural ramifications of Cantonese in various contexts.

Cantonese A-3
8cp; 1st semester, 6hpw; prerequisite: Cantonese A-2
Cantonese A-3 is the third subject in the Cantonese A program. It is designed to provide students who have no prior knowledge of Cantonese with basic survival skills in language and culture, and the ability to undertake In-country Study in South China. This subject aims at developing in students a communicative and linguistic competence in general social interactions. It also deals with the language structures and devices of Cantonese. Discourse features such as registers and polite forms will be discussed. More Cantonese vocabulary and idiomatic expressions will be introduced. Students are expected to know about 500 Chinese characters by the end of the subject.

Cantonese A-3 consists of 78 hours of classroom instruction, involving many interactive group and pair-work activities. Audiovisual equipment and computers will be used to facilitate teaching and learning. A communicative approach is adopted for classroom instruction and students are expected to participate actively in all classroom activities in the process of acquiring language skills. The teaching incorporates an introduction to Cantonese culture and helps students to appreciate the wider cultural ramifications of Cantonese in various contexts.

Cantonese A-4
8cp; 2nd semester, 6hpw; prerequisite: Cantonese A-3
Cantonese A-4 is the last subject in the Cantonese A program. It is designed to provide students who have no prior knowledge of Cantonese with basic survival skills in language and culture, and the ability to undertake In-country Study in South China. This subject aims at developing in students a communicative and linguistic competence in general social interactions. It deals with the more complex language structures and devices of Cantonese. A number of Cantonese discourse features will be discussed. More Cantonese vocabulary and idiomatic expressions will be introduced. Students are expected to know about 800 Chinese characters by the end of the subject.

Cantonese A-4 consists of 78 hours of classroom instruction, involving many interactive group and pair-work activities. Audiovisual equipment and computers will be
used to facilitate teaching and learning. A communicative approach is adopted for classroom instruction and students are expected to participate actively in all classroom activities in the process of acquiring language skills. The teaching incorporates an introduction to Cantonese culture and helps students to appreciate the wider cultural ramifications of Cantonese in various contexts.

Cantonese B-1
8cp; 1st semester, 4hpw; prerequisite: a working knowledge of one of the Chinese languages
Cantonese B-1 is the first of a two-subject language program for students who have a working knowledge of at least one Chinese language to prepare them for a year of In-country Study in South China. This subject aims at developing the students’ communicative and linguistic competence in general social interactions where Cantonese is used. The Yale romanisation for transcribing Cantonese and pronunciation will be discussed in class. Situational Cantonese usages in different contexts are the main focus of class instruction. The teaching incorporates an introduction to Cantonese culture and helps students to appreciate the wider cultural ramifications of Cantonese in various contexts. Cantonese B-1 consists of 52 contact hours of classroom instruction, involving many interactive group and pair-work activities. Audiovisual equipment and computers will be used to facilitate teaching and learning. The teaching approach adopted is ‘communicative’ and students are expected to participate actively in all classroom activities in the process of acquiring language skills.

Cantonese B-2
8cp; 2nd semester, 4hpw; prerequisite: Cantonese B-1
Cantonese B-2 is the second of a two-subject language program for students who have a working knowledge of at least one Chinese language to prepare them for a year of In-country Study in South China. This subject aims at further developing the students’ communicative and linguistic competence in general social interactions where Cantonese is used. Situational Cantonese usages and vocabulary in different contexts are the main focus of class instruction. Discourse features of Cantonese will also be discussed. The teaching incorporates an introduction to Cantonese culture and helps students to appreciate the wider cultural ramifications of Cantonese in various contexts. This subject consists of 52 contact hours of classroom instruction, involving many interactive group and pair-work activities. Audiovisual equipment and computers will be used to facilitate teaching and learning. The teaching approach adopted is ‘communicative’ and students are expected to participate actively in all classroom activities in the process of acquiring language skills.

971211, 972211, 973211, 974211

Japanese I
8cp; 1st semester, 6hpw; prerequisite: nil
This is the first subject in the Japanese Language and Culture program. It is designed as the first step in providing students with no prior knowledge of Japanese with the basic survival language skills and socio-cultural awareness to enable them to undertake In-country Study in Japan. While focusing primarily on the development of speaking and listening skills, this subject also provides a working knowledge of the hiragana and katakana scripts and approximately 30 kanji. Socio-cultural aspects are integrated into the program as they relate to the need for students to learn to use the language appropriately in various social and cultural contexts.

Japanese 2
8cp; 2nd semester, 6hpw; prerequisite: Japanese I
This is the second in a series of four units for students with no prior knowledge of the Japanese language. By the completion of this subject, students should be able to demonstrate the language and socio-cultural skills required to establish and maintain relationships in social or work-related spheres, and fulfil basic survival needs in a Japanese-speaking environment. Emphasis is given to the development of speaking and listening skills, but students will also further develop their reading and writing skills. Besides kana they will know approximately 100 kanji by the end of the unit. Socio-cultural aspects are introduced into the program as they relate to the need for students to learn to use the language appropriately in various social and cultural contexts.
Japanese 3
8hp; 1st semester, 6hpw; prerequisite: Japanese 2 or HSC Japanese

Japanese 3 is the third in a series of four units for students with no prior knowledge of the Japanese language, or first in a series of four units for students who have successfully completed HSC-level Japanese. By the end of the subject, students are expected to have achieved survival proficiency, and be able to satisfy survival needs and limited social demands relating to topics and situations covered.

At the end of the subject, students are expected to have developed their listening, speaking, reading and writing skills in order to be able to communicate in everyday situations, and be able to demonstrate an awareness of the social implications of language and behaviour. It is expected that students will know approximately 170 kanji by the end of the unit.

Japanese 4
8hp; 2nd semester, 6hpw; prerequisite: Japanese 3

Japanese 4 is the fourth in a series of four units for beginners. It is also the second in a series of four units for those who have successfully completed the 2-unit HSC course or its equivalent and aim to further develop Japanese listening, speaking, reading and writing skills. By the end of the subject, students are expected to have achieved limited social proficiency, and be able to interact in limited social, study and work contexts with Japanese speakers in Japan or Australia. They will also have learnt approximately 250 kanji.

Japanese 5
8hp; 1st semester, 6hpw; prerequisite: Japanese 4

Japanese 5 is the third in a series of four units in the post-HSC series, and is for those who have successfully completed either Japanese 4 or its equivalent and aim to further develop listening, speaking, reading, writing and cultural skills. By the end of the subject, students are expected to have achieved limited social proficiency, and be able to satisfy routine social and limited work demands. The emphasis is on the development of the language and cultural sensitivity required in both formal and informal situations. By the end of the subject, students are expected to be able to read and write approximately 350 kanji.

Japanese 6
8hp; 2nd semester, 6hpw; prerequisite: Japanese 5

Japanese 6 is the final subject in a series of four units in the post-HSC series and is for those who have successfully completed either Japanese 5 or its equivalent. By the end of this subject, students are expected to have achieved minimal vocational proficiency, and be able to speak the language with sufficient structural accuracy and vocabulary to participate effectively in many formal and informal conversations on practical, social and limited vocational topics. The emphasis is on the development of the language and cultural sensitivity required in both formal and informal situations. By the end of the subject, students should be able to read simple prose and read and write approximately 500 kanji.

Indonesian 1
8hp; 1st semester, 6hpw; prerequisite: nil

Indonesian 1 is the first in a series of four units for students with no prior knowledge of Indonesian. By the end of the subject, students are expected to have achieved elementary proficiency and be able to satisfy immediate needs using learnt utterances and phrases relating to the following 10 themes: self and family; direction and location; time; food and drink; buying and selling; description; archipelago and continent; travel and transport; media and the press; and love and sex.

Students are expected to develop a vocabulary of about 800–1,000 words, a knowledge of basic word-order patterns, and a familiarity with the alphabet and pronunciation patterns. This subject prepares people to exchange basic personal information using spelling and numeracy skills for names, addresses and time references etc.; engage in brief conversations within the range of themes covered; and express immediate needs with socially appropriate phrases. Students should be able to understand a limited amount of everyday written language e.g. on signs and in menus.

Indonesian 2
8hp; 2nd semester, 6hpw; prerequisite: Indonesian 1

Indonesian 2 is the second in a series of four units for students with no prior knowledge of Indonesian. By the end of the subject, students are expected to have achieved minimum
survival proficiency, and be able to satisfy basic survival needs and minimum courtesy requirements relating to the following 10 themes: health; house and home; contacts and appointments; education and study; career and occupations; city and village; religion and beliefs; personalities and biography; letters; and Australia-Indonesia relations.

Students are expected to develop a vocabulary of about 1,600–2,000 words, a knowledge of common word-order patterns and the ability to recognise common affixational patterns. This subject prepares students to make simple appointments and arrangements with people, exchange personal background information, engage in five- to ten-minute conversations on the themes covered, and express feelings, likes and dislikes. Students should be able to understand short, practical pieces of written information, such as familiar signs, commands and timetables, and develop skills for reading longer, less familiar written forms.

**Indonesian 3**

*Bcp; 1st semester, 6hpw; prerequisite: Indonesian 2 or HSC Indonesian*

Indonesian 3 is the third in a series of four units for students with no prior knowledge of Indonesian, or first in a series of four units for students who have successfully completed HSC-level Indonesian. By the end of the subject, students are expected to have achieved survival proficiency, and be able to satisfy survival needs and limited social demands relating to the following themes: personal relations; education – young generation; students; politics; ‘pop’ culture; religion and beliefs; tourism and its influences; trade; and economics and business.

Students are expected to develop a vocabulary of about 3,000 words by the end of the subject, a knowledge of common word-order patterns, and the ability to recognise, predict and use common affixational patterns. This subject prepares students to engage in short conversations on familiar issues without undue hesitation and with an ability to express their opinion. Students should also be able to comprehend simple texts, such as messages, instructions and directions, and write simple formulaic letters.

**Indonesian 4**

*Bcp; 2nd semester, 6hpw; prerequisite: Indonesian 3*

Indonesian 4 is the fourth in a series of four units for students with no prior knowledge of Indonesian, or second in a series of four units for students who have successfully completed HSC-level Indonesian. By the end of the subject, students are expected to have begun to develop minimum social proficiency, and be able to satisfy limited routine social and work demands. The subject covers the following themes: the role of women; employment/labour; employers; mainstream/marginal cultures; literature; unity and diversity (multiculturalism); the environment; and Australia-Indonesia relations.

Students are expected to have developed a vocabulary of about 4,000 words by the end of the subject. They should also have developed an ability to recognise, predict and use common word-order and affixational patterns, and to participate in a limited range of social situations with appropriate language. This subject prepares students to be able to discuss familiar events and topics, and give opinions without undue hesitation and with the ability to justify themselves. Students should also be able to deal with short texts and correspond with Indonesians on familiar topics.

**Indonesian 5**

*Bcp; 1st semester, 6hpw; prerequisite: Indonesian 4*

Indonesian 5 is the third in a series of four units for students who have successfully completed HSC-level Indonesian. By the end of the subject, students are expected to have developed minimum social proficiency, and be able to satisfy routine social and limited work demands. The subject covers the following themes: perceptions of the past; the origin of the New Order; aspirations; achievements; problems; political culture and participation; class and social stratification; and gender.

Students completing the subject should have a vocabulary of about 5,000 words. They should have the ability to recognise and reflect on ways in which vocabulary and grammatical patterns vary in different situational contexts, and how choices in grammar and vocabulary can convey the point of view of the writer and speaker beyond the basic transmission of information. This subject prepares students to discuss a range of social topics and a limited range of work topics, and present rudimentary arguments or points of view expressed with socially appropriate phrases to limit possible misunderstanding or offence. Students should also be able to understand the general thread of articles and documents on familiar topics, and write short texts, such as letters and instructions.
Indonesian 6
8cp; 2nd semester, 6hpw; prerequisite: Indonesian 5
Indonesian 6 is the fourth in a series of four units for students who have successfully completed HSC-level Indonesian. By the end of the subject, students are expected to have begun to develop a minimum vocational language proficiency, and be able to satisfy all routine social and a significant range of work demands. The subject covers the following themes: social and cultural pluralism; national and economic development; science; technical and scientific development; religion and popular culture; and internationalisation.

Students should have a vocabulary of about 6,000 words by the end of the subject. They should also have the ability to vary their language appropriately in accordance with a range of social and work situations, and be able to recognise and manipulate vocabulary and grammatical patterns. This subject prepares students to be able to present arguments or points of view, with the ability to frame them in a style that is appropriate to the social, cultural and interpersonal factors present.

Students are expected to develop a vocabulary of about 800–1,000 words, a knowledge of basic word order patterns and familiarity with the alphabet and pronunciation patterns. This subject prepares people to exchange basic personal information using spelling and numeracy skills for names, addresses and time references, to engage in brief conversations within the range of themes covered, and express immediate needs with socially appropriate phrases. Students should be able to understand a limited range of everyday written language, such as signs and items and prices on menus.

Malaysian 2
8cp; 2nd semester, 6hpw; prerequisite: Malaysian 1
Malaysian 2 is the second in a series of four units for students with no prior knowledge of Malaysian. By the end of the subject, students are expected to have achieved minimum survival proficiency and to be able to satisfy basic survival needs and minimum courtesy requirements relating to the following 10 themes: health; house and home; contacts and appointments; education and study; career and occupations; city and village; religion and belief; personalities and biography; letters; and Australia-Malaysia relations.

Malaysian 3
8cp; 1st semester, 6hpw; prerequisite: nil
Malaysian 3 is the third in a series of four units for students with no prior knowledge of Malaysian, or first in a series of four for students who have prior knowledge or experience in Malaysian. By the end of the subject, students are expected to have achieved survival proficiency and be able to satisfy survival needs and limited social demands relating to the following themes: personal relations; education – young generation; students; politics; 'pop' culture; religion and
belief; tourism and its influences; trade; economics; and business.

Students are expected to develop a vocabulary of about 3,000 words by the end of the subject, a knowledge of common word order patterns and the ability to recognise, predict and use common affixational patterns. This subject prepares students to engage in short conversations on familiar issues without undue hesitation and with a limited ability to express opinions. Students should also be able to comprehend simple texts, such as messages, instructions and directions and write simple formulaic letters.

**Malaysian 4**

8cp; 2nd semester, 6hpw; prerequisite: Malaysian 3

Malaysian 4 is the fourth in a series of four units for students with no prior knowledge of Malaysian, or second in a series of four units for students who have prior knowledge or experience of Malaysian. By the end of the subject, students are expected to have begun to develop ‘minimum social proficiency’ and be able to satisfy limited routine social and work demands demonstrating the following themes: role of women; employment/labour; employers; mainstream/marginal cultures; literature; unity and diversity (multiculturalism); the environment; and Australia–Malaysia relations.

Students are expected to have developed a vocabulary of about 4,000 words and an ability to recognise, predict and use common word order and affixational patterns and recognise and respond to a limited range of social situations. This subject prepares students to discuss familiar events and topics and give opinions without undue hesitation and with a limited ability to justify these opinions. Students should also be able to deal with short texts and correspond with Malaysians on familiar topics.

**Malaysian 5**

8cp; 1st semester, 6hpw; prerequisite: Malaysian 4

Malaysian 5 is the third in a series of four units for students who have had prior experience of Malaysian. By the end of the subject, students are expected to have developed minimum social proficiency and be able to satisfy routine social and limited work demands. The subject covers the following themes: perceptions of the past; aspirations, achievements, problems; political culture and participation; class and social stratification; and gender.

Students completing the subject should have a vocabulary of about 5,000 words, and the ability to recognise and reflect on ways in which vocabulary and grammatical patterns vary according to situation, and how choices in grammar and vocabulary can convey the point of view of the reader and speaker beyond the basic transmission of information. This subject prepares students to discuss a range of social topics and limited range of work topics and present rudimentary arguments or points of view expressed with socially appropriate phrases to limit possible misunderstanding or offence. Students should also be able to understand the general thread of articles and documents on familiar topics and write short texts, such as letters and instructions.

**Malaysian 6**

8cp; 2nd semester, 6hpw; prerequisite: Malaysian 5

Malaysian 6 is the fourth in a series of four units for students who have had prior experience of Malaysian. By the end of the subject, students are expected to have begun to develop minimum vocational proficiency and to be able to satisfy all routine social and a significant range of work demands relating to the following themes: social and cultural pluralism; national and economic development; science; technical and scientific development; religion and popular culture; and internationalisation.

Students should have a vocabulary of about 6,000 words by the end of the subject, the ability to vary their language appropriately in accordance with a limited range of social and work situations, be able to recognise and manipulate a choice of vocabulary and grammatical patterns on a limited level and to convey certain points of view. This subject prepares students to discuss a range of social topics and limited range of work topics, to present arguments or points of view, and to frame these in a style appropriate to the social, cultural and interpersonal factors present. Students should also be able to understand articles and documents on familiar topics and write short texts, such as letters, descriptions and simple explanations.

**French**

The French language programs offered through the Institute for International Studies are those taught at the University of Sydney
and Macquarie University. Both universities teach the language at various levels, accommodating different levels of proficiency. The French subjects develop communicative skills in listening, speaking, reading and writing, and introduce students to literary texts. Students also learn about French culture and contemporary society.

971424/5, 972424/5, 973424/5, 974424/5

German

The German language programs offered through the Institute for International Studies are those taught at the University of Sydney and Macquarie University. Both universities teach the language at various levels, accommodating different levels of proficiency. The German subjects develop communicative skills in listening, speaking, reading and writing, and introduce students to literary texts. Students also learn about German culture and contemporary society.

971434/5, 972434/5, 973434/5, 974434/5

Italian

The Italian language programs offered through the Institute for International Studies are those taught at the University of Sydney and Macquarie University. Both universities teach the language at various levels, accommodating different levels of proficiency. The Italian subjects develop communicative skills in listening, speaking, reading and writing, and introduce students to literary texts. Students also learn about Italian culture and contemporary society.

971501, 972501, 973501, 974501

Spanish 1

Bcp; 1st semester, 6hpw; prerequisite: nil

Spanish 1 is the first in a series of four units designed to provide students who have no prior knowledge of the Spanish language with basic survival skills in language and culture, and the ability to undertake In-country Study in Latin America or Spain.

By the end of the subject, students would be expected to have achieved 'elementary proficiency' and be able to satisfy immediate communication needs using expressions and phrases they have learnt that are required in basic social interaction. The program allows for the development of listening, speaking, reading and writing skills, and an understanding of the socio-cultural contexts in which the language is used. Students gain, in particular, an awareness of the background of Hispanic countries. Students also develop strategies for predicting the meaning of new expressions and anticipating ways of expressing new meanings.

Spanish 1 consists of 78 hours of classroom instruction. The approach adopted is 'communicative' and provides students with many opportunities to interact and use the language in various social and cultural contexts. Audiovisual equipment and computers will be used to facilitate learning.

Spanish 2

Bcp; 2nd semester, 6hpw; prerequisite: Spanish 1

Spanish 2 is the second in a series of four units designed to provide students who have no prior knowledge of the Spanish language with basic survival skills in language and culture, and the ability to undertake In-country Study in Latin America or Spain.

By the end of the subject, students would be expected to have achieved 'minimum survival proficiency' in speaking, listening, reading and writing, and be able to satisfy immediate communication needs and minimum courtesy requirements in basic social interactions. Students will also develop an understanding of the socio-cultural contexts in which the language is used and further communication strategies.

Spanish 2 consists of 78 hours of classroom instruction. The approach adopted is 'communicative' and provides many opportunities for the students to interact and use the language in various social and cultural contexts. Audiovisual equipment and computers will be used to facilitate learning.

Spanish 3

Bcp; 1st semester, 6hpw; prerequisite: Spanish 2 or HSC Spanish

Spanish 3 is the third in a series of four units for students with no prior knowledge of the Spanish language, or first in a series of four units for students who have successfully completed HSC-level Spanish or its equivalent. It provides students with basic survival skills in language and culture, and the ability to undertake In-country Study in Latin America or Spain.

By the end of the subject, students would be expected to have achieved a communicative
competence in speaking, listening, reading and writing skills in order to be able to satisfy all 'survival' needs and limited social needs. They would also be expected to have developed an awareness of the various social and cultural contexts in which the language is used. In this subject, students develop the ability to understand the general content of magazine and newspaper articles.

Spanish 3 consists of 75 hours of classroom instruction. The approach adopted is 'communicative' and provides many opportunities for the students to interact and use the language in various social and cultural contexts. Audiovisual equipment and computers will be used to facilitate learning.

Spanish 4
8cp; 2nd semester, 6hpw; prerequisite: Spanish 3
Spanish 4 is the fourth in a series of four units for students with no prior knowledge of the Spanish language, or second in a series of four units for students who have successfully completed Spanish 3 and HSC-level Spanish or its equivalent. It provides students with basic survival skills in language and culture, and the ability to undertake In-country Study in Latin America or Spain.

By the end of the subject, students would be expected to have begun to develop the communication skills required to satisfy limited routine social and work demands. They would also be expected to have developed an awareness of the various social and cultural contexts in which the language is used. In this subject, students learn to express opinions, discuss education, entertainment and travel, and develop the language skills and background knowledge required to find accommodation.

Spanish 4 consist of 78 hours of classroom instruction. The approach adopted is 'communicative' and provides many opportunities for the students to interact and use the language in various social and cultural contexts. Audiovisual equipment and computers will be used to facilitate learning.

Spanish 5
8cp; 1st semester, 6hpw; prerequisite: Spanish 4
Spanish 5 is the third in a series of four units designed to provide students who have successfully completed Spanish 4 and HSC-level Spanish or its equivalent with the ability to consolidate and extend their knowledge during a period of In-country Study in Latin America or Spain.

By the end of the subject, students would be expected to have achieved the communicative competence in speaking, listening, reading and writing to be able to satisfy routine social demands and limited work requirements. They would have developed an awareness of the various social and cultural contexts in which the language is used. Students learn to communicate in Spanish to compare lifestyles, university life and education, and practise interview techniques in preparation for In-country Study.

Spanish 5 consists of 78 hours of classroom instruction. The approach adopted is 'communicative' and provides many opportunities for the students to interact and use the language in various social and cultural contexts. There are discussions and debates on set topics. Audiovisual equipment and computers will be used to facilitate learning.

Spanish 6
8cp; 2nd semester, 6hpw; prerequisite: Spanish 5
Spanish 6 is the fourth in a series of four units designed to provide students who have successfully completed Spanish 5 and HSC-level Spanish or its equivalent with the ability to consolidate and extend their knowledge during a period of In-country Study in Latin America or Spain.

By the end of the subject, students would be expected to be able to speak the language with sufficient accuracy to participate in limited formal and informal conversations on practical and social topics. Students would also be expected to be able to read and write with sufficient accuracy to meet a limited range of social and work needs. Language focuses on topics such as the economy, class and social stratification, gender roles, religion and beliefs, literature, and the arts.

Spanish 6 consists of 78 hours of classroom instruction. The approach adopted is 'communicative' and provides many opportunities for the students to interact and use the language in various social and cultural contexts. There are discussions and debates on set topics. Audiovisual equipment and computers will be used to facilitate learning.

Greek is offered to UTS students through arrangements with other universities in Sydney. Combined degree students with a sound working knowledge of the language are
admitted to study Greek. Students are placed in classes appropriate to their level of competence. The program focuses on furthering writing and oral skills in contemporary Greek and learning about literature, society and culture.

971724, 972724, 973724, 974724

Serbian
Serbian is offered to UTS students through an arrangement with Macquarie University. Combined degree students with a sound working knowledge of the language are admitted to study Serbian. Students are placed in classes appropriate to their level of competence. The aim of the Serbian language program is to provide students with a sound knowledge of the language to enable their independent exploration of Serbian language and literature.

971734, 972734, 973734, 974734

Russian
Russian is offered to UTS students through an arrangement with Macquarie University. Combined degree students with a sound working knowledge of the language are admitted to study Russian. Students are placed in classes appropriate to their level of competence. The aim of the Russian language program is to give students a good working knowledge of modern written and spoken Russian and to enable them to express themselves in the language correctly and with reasonable facility.

971744, 972744, 973744, 974744

Croatian
Croatian language is offered to UTS students through an arrangement with Macquarie University. Combined degree students are admitted to study Croatian only at a minimum post-HSC level of language proficiency. Students are placed in classes appropriate to their level of competence with particular emphasis in furthering pronunciation and writing skills and learning about the history of the Croatian language.

971754, 972754, 973754, 974754

Slovenian
Slovenian is offered to UTS students through an arrangement with Macquarie University. Combined degree students with a sound working knowledge of the language are admitted to study Slovenian. Students are placed in classes appropriate to their level of competence. The aim of the Slovenian language program is to provide students with a sound knowledge of the language to enable them to communicate effectively, with particular emphasis placed on broadening their vocabulary and grammar.

971764, 972764, 973764, 974764

Polish
Polish is offered to UTS students through an arrangement with Macquarie University. Combined degree students with a sound working knowledge of the language are admitted to study Polish. Students are placed in classes appropriate to their level of competence. The Polish language program allows students to improve their linguistic competence through practice in speaking and writing skills while consolidating their previous knowledge of grammar.

971774, 972774, 973774, 974774

Ukrainian
Ukrainian is offered to UTS students through an arrangement with Macquarie University. Combined degree students with a sound working knowledge of the language are admitted to study Ukrainian. Students are placed in classes appropriate to their level of competence. The Ukrainian language program allows students to improve their reading, writing and oral skills with particular emphasis placed on the study of grammar and syntax.

976101

Chinese East Asia
8cp; 2nd semester, 4hpw
South China – Hong Kong, Taiwan and the Southern Chinese provinces of Fujian and Guangdong – is a region of global importance. It is a dynamo of economic growth for the East Asia region that has grown out of the economic integration of Hong Kong, Taiwan and South China, and is now expanding to include East China. Yet its constituent parts have developed separately in different and often inimical political systems. As a result of all of these factors, South China is likely to be of increasing importance strategically, economically and politically. This subject examines the development of Hong Kong, Taiwan and South China and their interaction. It is an introductory subject that requires no prior knowledge of the region or of any Chinese language.
976111
Contemporary China
8cp; 2nd semester, 4hpw
This subject examines the contours and dynamics of social, political and economic change in the People’s Republic of China since the death of Mao Zedong and the start of the reform era. A central theme is the emerging relationship between state and society in a state socialist system in the process of change and reform. It is an introductory subject that requires no prior knowledge of the People’s Republic of China or of any Chinese language.

976211
Contemporary Japan
8cp; 2nd semester, 4hpw
This subject provides an introduction to the political, social and economic contexts of Japan’s emergence as an economic superpower. It focuses on the political process and social change, and examines conventional wisdom about a whole range of topics, such as Japan’s collectivism, social welfare provision and political stability. In the process, it offers an introduction to Japan’s culture and the causes and consequences of social change. It is an introductory subject that requires no prior knowledge of Japan or of Japanese.

976301
Contemporary South-East Asia
8cp; 2nd semester, 4hpw
Australia’s political, social and economic interaction with the countries of South-East Asia has increased dramatically over the last 30 years, and South-East Asia has consequently become a region of crucial significance for Australia. Its relations with individual countries and with regional bodies such as ASEAN and APEC are now at least as important as its relations with England and Europe. This subject presents an introduction to the cultures and societies of South-East Asia. No prior knowledge of South-East Asia or any South-East Asian language is required. All classes are taught in English.

976401
Contemporary Europe
8cp; 2nd semester, 5hpw
This unit is an introduction and an overview laying the groundwork for the study of contemporary Europe. It surveys present-day European Union institutions and sociopolitical developments and provides a comparative study of political and social developments in the countries of Western and Eastern Europe. It aims to provide students with an understanding of the historical background of the present-day Europe and enable them to identify major contemporary policy issues in this region of the world.

976501
Contemporary Latin America
8cp; 2nd semester, 4hpw
Latin America has been a crucible for social, political and economic change in the 19th and 20th centuries. The struggles for nationalism, democracy, modernisation and secularisation have all resonated in the countries of Latin America. In the last half of the 20th century, Latin America’s primary concerns have focused on the political economy of neo-colonialism and underdevelopment. In Latin America, as it has come out from behind the shadow of the USA, there has been greater awareness of community and identity at both national levels and in the international arena. This subject examines three of the countries of Latin America – Chile, Mexico and Argentina – and their interaction against this background. The subject requires no prior knowledge of Latin America, or of Spanish or Portuguese.

977111
In-country Study I: China
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97712x
In-country Study I: Guangdong or Hong Kong
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97713x
In-country Study I: Taiwan
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97721x
In-country Study I: Japan
24cp; prerequisite: completion of 4 semesters of study in the International Studies program
977311
In-country Study I: Indonesia
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977322
In-country Study I: Thailand
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977331
In-country Study I: Malaysia
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97741x
In-country Study I: France
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97742x
In-country Study I: Germany
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977431
In-country Study I: Italy
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977451
In-country Study I: Spain
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97751x
In-country Study I: Argentina
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97751x or 97752x
In-country Study I: Argentina or Chile
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

97752x
In-country Study I: Chile
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977710
In-country Study I: Greece
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977720
In-country Study I: Serbia
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977730
In-country Study I: Russia
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977741
In-country Study I: Croatia
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977750
In-country Study I: Slovenia
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977760
In-country Study I: Poland
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

977770
In-country Study I: Ukraine
24cp; prerequisite: completion of 4 semesters of study in the International Studies program

978111
In-country Study 2: China
24cp; prerequisite: 977111

97812x
In-country Study 2: Guangdong or Hong Kong
24cp; prerequisite: 97712x

97813x
In-country Study 2: Taiwan
24cp; prerequisite: 97713x
97821x
In-country Study 2: Japan
24cp; prerequisite: 97721x

97831x
In-country Study 2: Indonesia
24cp; prerequisite: 97731x

97832x
In-country Study 2: Thailand
24cp; prerequisite: 97732x

97833x
In-country Study 2: Malaysia
24cp; prerequisite: 97733x

97841x
In-country Study 2: France
24cp; prerequisite: 97741x

97842x
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24cp; prerequisite: 97742x

97843x
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24cp; prerequisite: 97743x

97845x
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97851x
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24cp; prerequisite: 97751x

97851x or 97752x
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24cp; prerequisite: 97751x or 97752x

97852x
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97871x
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24cp; prerequisite: 97771x

97872x
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24cp; prerequisite: 97772x

97873x
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24cp; prerequisite: 97773x

97874x
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24cp; prerequisite: 97774x

97875x
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24cp; prerequisite: 97775x

97876x
In-country Study 2: Poland
24cp; prerequisite: 97776x

97877x
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24cp; prerequisite: 97777x
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 the 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.

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Note: In the case of International Studies subjects, x indicates one of four levels of study.
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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 Arts in International Studies
Bachelor of Science in Computing Science/Bachelor of Laws
Bachelor of Business/Bachelor of Science in Computing Science

**Postgraduate courses**

**Research degrees**
Doctor of Philosophy
Master of Science

**Coursework degree**
Master of Science in Computing

**Management Development Program**
Master of Business in Information Technology Management
Graduate Diploma in Information Technology Management
Graduate Certificate 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

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**Academic advisers for 1997**

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 9514.

<table>
<thead>
<tr>
<th>Undergraduate courses</th>
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<tr>
<td>Bachelor of Science in Computing Science</td>
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<tr>
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<td>Mr Cedric Richardson</td>
<td>1866</td>
<td>368</td>
</tr>
<tr>
<td>Projects Coordinator</td>
<td>1855</td>
<td>522</td>
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<tr>
<td>Mr Chris W Johnson</td>
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<td>Bachelor of Information Technology</td>
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<tr>
<td>Mr David Wilson</td>
<td>1859</td>
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<tr>
<td>Mr Chris W Johnson</td>
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</tr>
</tbody>
</table>

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**Postgraduate courses**

All Graduate Certificates
Mr Peter Bebbington 1828 353

Graduate Diploma in Information Technology
Mr Peter Bebbington 1828 353

Master of Business in Information Technology Management and articulated courses
Mr David Wilson 1832 354

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

Each adviser has specific consultation times. These are displayed on the Ground Floor noticeboards.
Computing facilities
The School provides a number of network-connected laboratories used in both teaching and research. The network, together with a number of SUN UNIX servers, provides the application software required and a number of network services (www, ftp, e-mail, news), which can be used to access resources and information throughout the University and the world. The School's URL is: http://www.socs.uts.edu.au

General purpose laboratories
- UNIX laboratories - A combination of X-terminals and UNIX workstations provides students with access to the UNIX environment. They are used by many of the School's subjects.
- PC laboratories - A number of PC laboratories provide access to the PC/Windows-type environment. They are used by a number of programming and business application subjects.
- Access - General access to these laboratories is between the hours of 9.00 a.m. and 9.00 p.m., Monday to Friday, during semester. On some occasions, these laboratories are booked for different subjects and, during these booked times, students not enrolled in those subjects should vacate that laboratory. Timetable bookings will be located on the door of each laboratory, and are available on the School's Web site. After the first week of each semester examination period, and also during vacation periods, the laboratories are available only between 9.00 a.m. and 6.00 p.m.
- Extended hours of access to specialist laboratories can be gained through the use of the electronic security door system for which an E-card is required.

Specific purpose laboratories
- Graphics laboratory - A number of Silicon Graphics UNIX computers provide practical graphics usage.
- Parallel processing - This laboratory provides transputer-based systems and is the home of the Australian Transputer Centre.
- Collaborative systems - A research laboratory involved in applying computer and communications technology to improving work practices.
- Distributed Systems Technology Centre and Multimedia Laboratory - A laboratory used for research into distributed systems, in particular software protocols, network management, and interaction between multimedia and networks.
- Usability laboratory - A studio set-up for the testing, evaluation and analysis of interaction between computers and the human operators.
- Access - Access to these specific purpose laboratories will be arranged by the academic involved in a particular subject or research project.

Remote access facility
The remote access facility provides modem access for students and staff through either terminal emulation or remote network connection using PPP. This allows users to access some of the School's computing systems and perform work from home.

Help desk facility
The School's help desk - which is located in the Interface Room, Room 447, Building 4 - provides users with information on usage of the equipment, software and facilities, help with problems and a point of contact for reporting faults. The telephone number is 9514 1869.

Information Technology Division (ITD) facilities
ITD is a University division that provides general computing facilities for all students at UTS. It provides a University-wide network interconnection, a number of large UNIX servers, and laboratories throughout the different campuses. The University provides access to Internet resources through its connection to AARNet.

Laboratories
- ITD provides UNIX, PC and Macintosh laboratories throughout the University which are available for use by all students.
- Access to ITD's UNIX servers is available from all laboratories provided by ITD and the School of Computing Sciences.
- Building 2 laboratories - provide 24-hour, seven-day-per-week access.
- Building 4 UNIX and PC laboratories - provide 9.00 a.m. to 9.00 p.m. access, Monday to Friday only.
Remote access facility
The remote access facility provides modem access by students and staff through terminal emulation or shell access (text only). This allows users to access the University’s computing systems and perform work from home.

Resource Centre facility
ITD’s Resource Centre and help desk – located on Level 9, Building 1 – provides assistance to the users of the academic computing facilities. During semester, the Resource Centre is open from 9.00 a.m. to 10.00 p.m., Monday to Friday. On weekends, and during semester breaks, it is open from 9.00 a.m. to 5.00 p.m. The help desk telephone number is 9514 2222.

PRIZES AND SCHOLARSHIPS
The School of Computing Sciences awards the following prizes and scholarship on a yearly basis.

Asia Pacific Computer Consultants Tuition Scholarship
This tuition scholarship, established in 1995 by Asia Pacific Computer Consultants, may be 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.

Atmosphera Prize for Interface Programming
This Prize was established in 1996 by Atmosphera Pty Ltd. It is awarded annually to the student enrolled in the Bachelor of Science in Computing Science degree who achieves the highest mark in the subject Operating Systems Facilities. The prize is a cash award of $500.

CABS Information Technology Planning and Design Prize
Established in 1985 by Computer Automated Business Systems Pty Ltd, this prize is awarded annually to the group of final-year students, enrolled in either the Bachelor of Science in Computing Science or the Bachelor of Information Technology, who obtain the highest mark in the subject Information Technology Planning and Design. The cash award of $1,000 is shared among all students in the group.

Claude Lalanne-SITA Prize
Established in 1996 by SITA, this prize is awarded annually to the student enrolled in the Bachelor of Science in Computing Science who achieves the best overall performance in the final year of the degree and who has completed the course within the minimum time. The prize is a cash award of $1,000.

CSC Australia Prize for Communications
Since 1971, Computer Sciences Corporation Australia Pty Ltd has made available an award in the interests of furthering education and knowledge in the field of telecommunications. The prize is awarded to the student enrolled in the Bachelor of Science in Computing Science who achieves the best combined performance in the subjects Systems Software and Networks, and Distributed Software Programming. 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 Client Server Computing, and Database Design. The prize has a cash value of $1,000.

Westpac Information Systems 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 prize has a cash value of $500.
## School contacts

All staff of 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 9514. All e-mail addresses should be suffixed with ‘@socs.uts.edu.au’.

<table>
<thead>
<tr>
<th>Name</th>
<th>Ext</th>
<th>Room</th>
<th>E-mail</th>
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<tbody>
<tr>
<td><strong>Director, Graduate Education</strong></td>
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<tr>
<td>Mr Peter Bebbington</td>
<td>1828</td>
<td>353</td>
<td>peterb</td>
</tr>
<tr>
<td><strong>Secretary/WPO</strong></td>
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<tr>
<td>Ms Lyn Chamas</td>
<td>2154</td>
<td>335</td>
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<td>Mr John Colville</td>
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<tr>
<td><strong>Deputy Head of School and</strong></td>
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<td><strong>Director, Postgraduate Studies</strong></td>
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<td>Professor John Debenham</td>
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<tr>
<td><strong>Head of School</strong></td>
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<tr>
<td>Associate Professor Jenny Edwards</td>
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<td>Mr Jamal El-Den</td>
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<td>366</td>
<td>jamal</td>
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<tr>
<td>Dr George Feuerlicht</td>
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<td>iiri</td>
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<td>Mr Nigel Hamilton</td>
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<tr>
<td>Mrs Judy Hammond</td>
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<tr>
<td>Professor Igor Hawryszkiewycz</td>
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<td>Associate Professor Tom Hintz</td>
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<tr>
<td><strong>Director, Undergraduate Studies</strong></td>
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<td>530</td>
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<tr>
<td>Professor John Hughes</td>
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<tr>
<td>Dr Barry Jay</td>
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<tr>
<td>Mr Sanjay Jha</td>
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<tr>
<td>Mr Chris S Johnson</td>
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<td>Mrs Elaine Lawrence</td>
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<td>Dr Sattiraju Prabhakar</td>
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<td>Mr Richard Raban</td>
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<td>Dr Kevin Suffern</td>
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<td><strong>Director, Australian Transputer Centre</strong></td>
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<td>Mr Ury Szewcow</td>
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<td>Mr John Tu</td>
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<td>Mr Jim Underwood</td>
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<td>Dr Ron van der Meyden</td>
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<td>Mr David Wilson</td>
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<td>Mr Bernard Wong</td>
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</tr>
<tr>
<td><strong>Executive Assistant</strong></td>
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<tr>
<td>Ms Marie Woessner</td>
<td>1258</td>
<td>335</td>
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<tr>
<td><strong>Interface Room</strong></td>
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<td></td>
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</tbody>
</table>
Undergraduate courses

Bachelor of Science in Computing Science

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 information technology, 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 that 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 the first year of the full-time course. All core subjects must be passed. Any of those subjects that have been failed and subsequently passed will be included with a raw mark of 50 per cent.

Qualifying

Pass degree

A student who has accumulated 144 credit points and has 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 1995 and 1996 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.

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 for the School of Computing Sciences in this handbook. 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 will receive a copy of this Guide at the Industrial Training information session held in May each year.
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 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.

**Exemptions**

Exemptions may be granted on the basis of recent academic study (within the last three 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 coincided 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 three years of the date of entry to UTS.

**Associate Diploma of Business (Commercial Data Processing)**

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

**Associate Diploma of Business (Microcomputer Systems)**

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

22615 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 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 that 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 that 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 for which there is no equivalent at UTS.

Pre-1989 course

Students who commenced the BSc prior to 1989 should consult the Director, Undergraduate Studies, to determine their course program.

Program for students who commenced before 1995

Recommended full-time program

This program is included to assist pre-1995 students. These subjects are no longer offered, and cannot be claimed for exemptions.

Year 2

<table>
<thead>
<tr>
<th>Autumn semester</th>
<th>Spring semester</th>
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<tbody>
<tr>
<td>31631 Database</td>
<td>31641 Systems Design</td>
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<tr>
<td>31632 Communications and Networks</td>
<td>31642 On-line Systems</td>
</tr>
<tr>
<td>31633 Operating Systems</td>
<td>31647 Management Control Systems</td>
</tr>
<tr>
<td>31636 Simulation and Modelling</td>
<td>31648 Business Tools and Applications</td>
</tr>
<tr>
<td>CS/IS Elective 1</td>
<td>CS/IS Elective 2</td>
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<td>Elective 1</td>
<td>Elective 2</td>
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Year 3

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<tr>
<td>31696 Industrial Training</td>
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Year 4

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<tr>
<td>31653 Communications Software</td>
<td>31662 Information Systems Case Study</td>
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<tr>
<td>31655 Theory of Computer Science</td>
<td>31666 Performance Evaluation</td>
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<tr>
<td>31658 Project Management</td>
<td>31669 Social Implications of Computers</td>
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<tr>
<td>CS/IS Elective 3</td>
<td>CS/IS Elective 4</td>
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<td>Elective 3</td>
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<td>Elective 4</td>
<td>Elective 6</td>
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Recommended part-time program

This program is included to assist pre-1995 students. These subjects are no longer offered, and cannot be claimed for exemptions.

Year 1

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<tbody>
<tr>
<td>31611 Information Systems</td>
<td>31621 Systems Analysis</td>
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<tr>
<td>31613 Computer Systems Architecture 1</td>
<td>31622 Commercial Programming</td>
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<tr>
<td>31614 Programming Principles</td>
<td>Development</td>
</tr>
<tr>
<td>31615 Discrete Mathematics</td>
<td>31623 Computer Systems Architecture 2</td>
</tr>
<tr>
<td>31617 Accounting Fundamentals</td>
<td>31624 Data Structures and Algorithms</td>
</tr>
<tr>
<td>51370 Human Communication</td>
<td>31625 Software Engineering</td>
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<td></td>
<td>31626 Probability and Statistics</td>
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<th>Autumn semester</th>
<th>Spring semester</th>
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<tbody>
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<td>31611 Information Systems</td>
<td>31613 Computer Systems Architecture 1</td>
</tr>
<tr>
<td>31615 Discrete Mathematics</td>
<td>31614 Programming Principles</td>
</tr>
<tr>
<td>31617 Accounting Fundamentals</td>
<td>51370 Human Communication</td>
</tr>
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</table>
Pre-1995 course electives information

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. This 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 that are needed 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.
Transferring to the post-1995 course

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

**Full-time**

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**Part-time**

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

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

These students will take an elective instead of 22615 Accounting Information Systems.

Approximate equivalents between pre-1995 and post-1995 BSc subjects

<table>
<thead>
<tr>
<th>Post-1995</th>
<th>Pre-1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>22615 Accounting Information Systems</td>
<td>31617 Accounting Fundamentals</td>
</tr>
<tr>
<td>31414 Information Systems</td>
<td>31611 Information Systems</td>
</tr>
<tr>
<td>31415 Principles of Software</td>
<td>31614 Programming Principles Development A</td>
</tr>
<tr>
<td>31416 Computer Systems Architecture</td>
<td>31613 Computer Systems Architecture 1</td>
</tr>
<tr>
<td>31417 Computing Practice</td>
<td>31623 Computer Systems Architecture 2</td>
</tr>
<tr>
<td>31424 Systems Modelling</td>
<td></td>
</tr>
<tr>
<td>31425 Principles of Software</td>
<td>31615 Discrete Mathematics Development B</td>
</tr>
<tr>
<td>31428 Quantitative Modelling</td>
<td>31625 Software Engineering</td>
</tr>
<tr>
<td>31429 Procedural Programming Development</td>
<td>31626 Probability and Statistics</td>
</tr>
<tr>
<td>31434 Database Design</td>
<td>31627 Simulation and Modelling</td>
</tr>
<tr>
<td>31436 Systems Software and Networks</td>
<td>31632 Commercial Programming</td>
</tr>
<tr>
<td>31444 Systems Design and Development</td>
<td>31624 Data Structures and Algorithms</td>
</tr>
<tr>
<td>31454 Project Management and the Professional</td>
<td>31904 Systems Programming</td>
</tr>
<tr>
<td>31455 Software Development Case Study</td>
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</tr>
<tr>
<td>31464 Information Technology Planning and Design</td>
<td>31631 Database</td>
</tr>
<tr>
<td></td>
<td>31632 Communications and Networks</td>
</tr>
<tr>
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<td>31633 Operating Systems</td>
</tr>
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<td>31641 Systems Design</td>
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<td></td>
<td>31642 On-line Systems</td>
</tr>
<tr>
<td></td>
<td>31658 Project Management</td>
</tr>
<tr>
<td></td>
<td>31669 Social Implications of Computers</td>
</tr>
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<td></td>
<td>31655 Theory of Computer Science</td>
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<tr>
<td></td>
<td>31625 Software Engineering</td>
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Program for students who commenced from 1995 onwards

Recommended full-time program

**Year 1**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Units</th>
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<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
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</tr>
<tr>
<td>31414</td>
<td>Information Systems 6cp</td>
</tr>
<tr>
<td>31415</td>
<td>Principles of Software Development A 6cp</td>
</tr>
<tr>
<td>31416</td>
<td>Computer Systems Architecture 6cp</td>
</tr>
<tr>
<td>31417</td>
<td>Computing Practice 6cp</td>
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<tr>
<td><strong>Spring semester</strong></td>
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</tr>
<tr>
<td>31424</td>
<td>Systems Modelling 6cp</td>
</tr>
<tr>
<td>31425</td>
<td>Principles of Software Development B 6cp</td>
</tr>
<tr>
<td>31428</td>
<td>Quantitative Modelling 6cp</td>
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<td>Procedural Programming 6cp</td>
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**Year 2**

<table>
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<tr>
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<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
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</tr>
<tr>
<td>22615</td>
<td>Accounting Information Systems 4cp</td>
</tr>
<tr>
<td>31434</td>
<td>Database Design 6cp</td>
</tr>
<tr>
<td>31436</td>
<td>Systems Software and Networks Electives 8cp</td>
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<tr>
<td><strong>Spring semester</strong></td>
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</tr>
<tr>
<td>31444</td>
<td>Systems Design and Development Electives 10cp</td>
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<tr>
<td>31444</td>
<td>Electives 12cp</td>
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**Year 3**

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<tr>
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<td>31697</td>
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**Year 4**

<table>
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<th>Units</th>
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<tbody>
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</tr>
<tr>
<td>31454</td>
<td>Project Management and the Professional 8cp</td>
</tr>
<tr>
<td>31455</td>
<td>Software Development Case Study Electives 5cp</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
<td></td>
</tr>
<tr>
<td>31455</td>
<td>Software Development Case Study (cont.) 5cp</td>
</tr>
<tr>
<td>31464</td>
<td>Information Technology Planning and Design Electives 6cp</td>
</tr>
<tr>
<td>31464</td>
<td>Electives 12cp</td>
</tr>
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</table>

**Year 5**

<table>
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<tr>
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</tr>
<tr>
<td>31455</td>
<td>Software Development Case Study Electives 5cp</td>
</tr>
<tr>
<td>31698</td>
<td>Industrial Training 8cp</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
<td></td>
</tr>
<tr>
<td>31455</td>
<td>Software Development Case Study (cont.) Elective 4cp</td>
</tr>
<tr>
<td>31698</td>
<td>Industrial Training 0cp</td>
</tr>
</tbody>
</table>

**Year 6**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
<tr>
<td>31454</td>
<td>Project Management and the Professional 8cp</td>
</tr>
<tr>
<td>31454</td>
<td>Elective 4cp</td>
</tr>
</tbody>
</table>

---

1 Pre-1995 students who have passed 31617 Accounting Fundamentals should take an elective in place of 22615 Accounting Information Systems.
31699 Industrial Training 0cp

**Spring semester**

31464 Information Technology Planning and Design 6cp
Electives 8cp
31699 Industrial Training 0cp

**Electives**

Students should refer to the post-1995 Bachelor of Science prerequisite chart.

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 be aware that they may enrol in subjects in another faculty, only if a class place is available. This applies particularly to the Faculties of Business, and Humanities and Social Sciences.

**Projects**

In lieu of one or two elective subjects, 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 queries. 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.

Students may not use work done in the normal course of duties as an Industrial Training student, or as a part-time student, as a project. Students may, however, do a project that is related to their work if it is done outside 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 100 hours on the project.

**Sub-majors**

**University-wide sub-majors**

**Aboriginal Studies sub-major (24cp)**

Telephone 9514 2057

The Faculties of Humanities and Social Sciences and Education offer a range of Aboriginal Studies subjects that may be taken as a sub-major, or as elective subjects, as appropriate, within any undergraduate course.

The sub-major provides Aboriginal and non-Aboriginal students with an opportunity to study subjects that are culturally appropriate to an understanding of Aboriginal culture, history and social/political structures. These initial studies serve as a basis for applying critical analysis skills to Aboriginal and non-Aboriginal perspectives on issues and trends which affect the cultural and social integrity of Aboriginal peoples. Consideration is also given to other indigenous people, including Torres Strait Islanders. The role of the media and written or spoken communication are the major focuses of these analyses.

T5110 Aboriginal Cultures and Philosophies 8cp
54230 Aboriginal Social and Political History 8cp
54231 Aboriginal People and the Media 8cp
54330 The Politics of Aboriginal History 8cp
54331 Aboriginal Forms of Discourse 8cp

**Mathematical Sciences**

Contact person: J Hogg
Telephone 9514 2238; Room 1524, Building 1

**Operations Research sub-major (24cp)**

**Compulsory subjects**

33401 Mathematics for Computing 6cp
35241 Mathematical Programming 1 8cp
35340 Operations Research Practice 6cp
35344 Network Optimisation 6cp
Prerequisites for Industrial Training are: Computing Practice, Information Systems, Database Design, and Systems Software and Networks and its prerequisites.
SCHOOL OF COMPUTING SCIENCES

Statistics

Compulsory subjects

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>33401</td>
<td>Mathematics for Computing</td>
<td>6cp</td>
</tr>
<tr>
<td>35252</td>
<td>Statistics 2</td>
<td>6cp</td>
</tr>
<tr>
<td>35333</td>
<td>Regression Analysis</td>
<td>6cp</td>
</tr>
<tr>
<td>35361</td>
<td>Probability and Stochastic Processes</td>
<td>6cp</td>
</tr>
</tbody>
</table>

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 in 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 on 9514 2277.

Communication, History, Politics and Society (24cp)

200 Level

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>54201</td>
<td>Communication, Culture and the Law</td>
<td>8cp</td>
</tr>
<tr>
<td>54210</td>
<td>International Politics</td>
<td>8cp</td>
</tr>
<tr>
<td>54211</td>
<td>Australian Politics</td>
<td>8cp</td>
</tr>
<tr>
<td>54212</td>
<td>Power and Social Regulation</td>
<td>8cp</td>
</tr>
<tr>
<td>54213</td>
<td>Australian History</td>
<td>8cp</td>
</tr>
<tr>
<td>54230</td>
<td>Aboriginal Social and Political History</td>
<td>8cp</td>
</tr>
<tr>
<td>53212</td>
<td>Australian History</td>
<td>8cp</td>
</tr>
<tr>
<td>51369</td>
<td>Technical and Professional Communications</td>
<td>6cp</td>
</tr>
<tr>
<td>50712</td>
<td>Communication Skills in English</td>
<td>6cp</td>
</tr>
<tr>
<td>59326</td>
<td>Professional Communication</td>
<td>4cp</td>
</tr>
<tr>
<td>59325</td>
<td>Science, Technology and Human Values</td>
<td>8cp</td>
</tr>
<tr>
<td>59324</td>
<td>Issues in Science Technology and Human Values</td>
<td>8cp</td>
</tr>
<tr>
<td>52231</td>
<td>Industrial Relations</td>
<td>8cp</td>
</tr>
<tr>
<td>59329</td>
<td>Issues in Industrial Relations</td>
<td>4cp</td>
</tr>
</tbody>
</table>

300 Level

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>54300</td>
<td>Communication History</td>
<td>8cp</td>
</tr>
<tr>
<td>54301</td>
<td>International Communication</td>
<td>8cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>54302</td>
<td>Media, Culture and Identity</td>
<td>8cp</td>
</tr>
<tr>
<td>54310</td>
<td>Issues in Australian Politics</td>
<td>8cp</td>
</tr>
<tr>
<td>54311</td>
<td>Asian and Pacific Politics</td>
<td>8cp</td>
</tr>
<tr>
<td>54312</td>
<td>The Making of the Third World</td>
<td>8cp</td>
</tr>
<tr>
<td>54314</td>
<td>Australia in the World Economy</td>
<td>8cp</td>
</tr>
<tr>
<td>54315</td>
<td>Comparative Religions</td>
<td>8cp</td>
</tr>
<tr>
<td>54316</td>
<td>Power, Race and Ethnicity</td>
<td>8cp</td>
</tr>
<tr>
<td>54318</td>
<td>Urban Culture</td>
<td>8cp</td>
</tr>
<tr>
<td>54319</td>
<td>Public and Social Policy</td>
<td>8cp</td>
</tr>
<tr>
<td>54320</td>
<td>Social Movements</td>
<td>8cp</td>
</tr>
<tr>
<td>54330</td>
<td>The Politics of Aboriginal History</td>
<td>8cp</td>
</tr>
<tr>
<td>52339</td>
<td>Organising EEO</td>
<td>8cp</td>
</tr>
<tr>
<td></td>
<td>or</td>
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<tr>
<td>59335</td>
<td>Issues in Organising EEO</td>
<td>4cp</td>
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Public Relations (24cp)

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>56013</td>
<td>Public Relations Process and Practice</td>
<td>6cp</td>
</tr>
<tr>
<td>56011</td>
<td>Public Relations Strategies and</td>
<td>6cp</td>
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<tr>
<td></td>
<td>Management</td>
<td></td>
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<tr>
<td>56012</td>
<td>Public Relations Contexts and</td>
<td>6cp</td>
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<td></td>
<td>Applications</td>
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<tr>
<td>56014</td>
<td>Public Relations Professional Practice</td>
<td>6cp</td>
</tr>
</tbody>
</table>

Business

The following sub-majors are offered to Computing Science students by the Faculty of Business. Students may undertake other sub-majors if they have the necessary prerequisites. Further information on these sub-majors can be obtained from the Student Liaison Unit, Faculty of Business, or by telephoning the relevant School as indicated.

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

Telephone 9514 3560

Financial Reporting (22cp)

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>22205</td>
<td>Accounting B</td>
<td>4cp</td>
</tr>
<tr>
<td>22320</td>
<td>Accounting for Business Combinations</td>
<td>6cp</td>
</tr>
<tr>
<td>22420</td>
<td>Accounting Standards and Regulation</td>
<td>6cp</td>
</tr>
<tr>
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<td>plus one of the following</td>
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<tr>
<td>22319</td>
<td>Issues in Financial Statement</td>
<td>6cp</td>
</tr>
<tr>
<td></td>
<td>Analysts</td>
<td></td>
</tr>
<tr>
<td>22240</td>
<td>International Accounting</td>
<td>6cp</td>
</tr>
<tr>
<td>22206</td>
<td>Government Accounting</td>
<td>6cp</td>
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<tr>
<td>22610</td>
<td>Accounting for Insolvency</td>
<td>6cp</td>
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Management Reporting (22cp)

<table>
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<tr>
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<th>Subject Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>22205</td>
<td>Accounting B</td>
<td>4cp</td>
</tr>
<tr>
<td>22318</td>
<td>Contemporary Issues in Management</td>
<td>6cp</td>
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<tr>
<td></td>
<td>Accounting</td>
<td></td>
</tr>
<tr>
<td>22321</td>
<td>Cost Management Systems</td>
<td>6cp</td>
</tr>
<tr>
<td>22421</td>
<td>Managerial Decisions and Control</td>
<td>6cp</td>
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</table>
### Small Business Accounting (22cp)
- 22205 Accounting B 4cp
- 22566 Accounting for Small Business 1 6cp
- 22309 Accounting for Overseas Transactions 6cp
- 22567 Accounting for Small Business 2 6cp

Note: 22615 Accounting Information Systems will be accepted as the prerequisite subject for 22205 Accounting B.

These combinations have 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 to complete the sub-major.

### School of Finance and Economics

**Telephone:** 9514 3633

#### Economics (26cp)
- 25209 Macroeconomics 4cp
- 25210 Microeconomic Theory and Policy 6cp
- 25303 Industry Economics 6cp
- 25110 Microeconomics 4cp
- 25309 Macroeconomic Theory and Policy 6cp

### School of Management

**Contact:** 9514 3600

#### Employment Relations (24cp)
- 21125 International Business Environment 4cp
- 21130 Management and Organisations 4cp
- 21306 International Employment Relations 6cp
- 21407 Strategic Human Resource Management 6cp
- 31734 Information Systems and Organisations 4cp

#### International Management (24cp)
- 21125 International Business Environment 4cp
- 21130 Management and Organisations 4cp
- 21591 International Management 6cp
- 21531 Managing the International Organisation 6cp
- 31734 Information Systems and Organisations 4cp

### School of Marketing

**Telephone:** 9514 3422

#### Introductory Advertising (28cp)
- 24105 Marketing Principles 4cp
- 24202 Consumer Behaviour 6cp
- 24210 Advertising and Promotions Management 6cp
- 24309 Introductory Marketing Research 6cp
- 59330 Advertising Practice 6cp
- 59333 Advertising Strategies 6cp

#### Introductory Marketing (28cp)
- 24105 Marketing Principles 4cp
- 24202 Consumer Behaviour 6cp
- 24205 Business Marketing 6cp
- 24220 International Marketing 6cp
- 24309 Introductory Marketing Research 6cp

### School of Leisure and Tourism Studies

**Telephone** 9514 5367

#### Leisure Management (offered at Kuring-gai campus) (24cp)
- 27126 Leisure in Australia 6cp
- 27216 Leisure Services Management 6cp
- 27523 Leisure Tourism Planning plus one of the following
  - 27179 Festivals and Special Events 6cp
  - 27306 Marketing Leisure Services 6cp
- 27316 Leisure and Fitness Centre Operations 6cp
- 27628 Law for Leisure, Sport and Tourism 6cp

#### Sports Management (offered at Kuring-gai campus) (24cp)
- 27161 Sports Marketing 6cp
- 27177 Event and Facility Management 6cp
- 27307 The Administration of Australian Sport plus one of the following
  - 27103 The Olympic Games 6cp
  - 27172 Applied Sports Psychology 6cp
- 27316 Leisure and Fitness Centre Operations 6cp
- 27628 Law for Leisure, Sport and Tourism 6cp

#### Tourism Management (24cp)
- 27184 Introduction to Tourism Systems 6cp
- 27631 Tourism Services Management 6cp
- 27648 The Tourism Industry plus one of the following
  - 27185 Introduction to Tourist Behaviour 6cp
  - 27523 Leisure and Tourism Planning 6cp
- 27628 Law for Leisure, Sport and Tourism 6cp
- 27642 Tourism Services Marketing 6cp
Science

Physics (General) (24cp)

This sub-major provides a grounding in general 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:

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
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<tbody>
<tr>
<td>68711</td>
<td>Physics 1 S</td>
<td>A,S</td>
<td>8</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>68721</td>
<td>Physics 2 S</td>
<td>A,S</td>
<td>8</td>
<td>6</td>
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<tr>
<td></td>
<td><strong>plus two of the following</strong></td>
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<td></td>
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<tr>
<td>68731</td>
<td>Physics 3 S</td>
<td>A</td>
<td>4</td>
<td>3</td>
<td>Physics 2 S</td>
</tr>
<tr>
<td>68732</td>
<td>Applied Optics S</td>
<td>A</td>
<td>4</td>
<td>3</td>
<td>Physics 2 S</td>
</tr>
<tr>
<td>68743</td>
<td>Thermodynamics and Energy S</td>
<td>S</td>
<td>4</td>
<td>3</td>
<td>Physics 1 S</td>
</tr>
<tr>
<td>68741</td>
<td>Quantum Physics 1 S</td>
<td>S</td>
<td>4</td>
<td>3</td>
<td>Physics 3 S</td>
</tr>
<tr>
<td>68751</td>
<td>Nuclear Physics S</td>
<td>A</td>
<td>4</td>
<td>3</td>
<td>Quantum Physics 1 S</td>
</tr>
</tbody>
</table>

Electronics (24cp)

This sub-major enables students to complement knowledge of software with a knowledge of hardware. It is useful to students contemplating a career in microprocessors or computer interfacing. The minimum of 24 credit points may be made up as follows:

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>68713</td>
<td>Physics for Electronics S</td>
<td>A,S</td>
<td>8</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>68734</td>
<td>Electronics 1 S</td>
<td>S, A</td>
<td>8</td>
<td>6</td>
<td>Physics 2 S</td>
</tr>
<tr>
<td>68744</td>
<td>Electronics 2 S</td>
<td>S, S</td>
<td>4</td>
<td>3</td>
<td>Electronics 1 S</td>
</tr>
<tr>
<td>68754</td>
<td>Microprocessors in</td>
<td>S, A</td>
<td>4</td>
<td>3</td>
<td>Electronics 2 S</td>
</tr>
<tr>
<td></td>
<td>Instrumentation S</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Engineering

Electrical Computer Systems (21cp)

Contact persons: Ms E With; Mr J Leaney

Telephone 9514 2432, Room 2423, Building 1; telephone 9514 2389, 2221A, Building 1

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

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>33401</td>
<td>Mathematics for Computing</td>
<td>A</td>
<td>6</td>
<td>3</td>
<td>31415, 31428</td>
</tr>
<tr>
<td>45163</td>
<td>Real Time Software</td>
<td>A,S</td>
<td>3</td>
<td>3</td>
<td>45143</td>
</tr>
<tr>
<td></td>
<td>and Interfacing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45364</td>
<td>Digital Systems</td>
<td>A,S</td>
<td>3</td>
<td>3</td>
<td>45143</td>
</tr>
<tr>
<td>45372</td>
<td>Computer Systems Analysis</td>
<td>S</td>
<td>3</td>
<td>3</td>
<td>45143, 33401</td>
</tr>
<tr>
<td>45382</td>
<td>Computer Systems Design</td>
<td>A</td>
<td>6</td>
<td>6</td>
<td>45372</td>
</tr>
</tbody>
</table>
This combination has a value of 21 credit points. A sub-major must consist of a minimum of 24 credit points. Students should undertake a four credit point elective subject offered by the School of Computing Sciences to complete the sub-major.

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

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.

Bachelor of Information Technology

Course code: MC03

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

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

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

The central curriculum of the course is information systems; this is supported by studies in management, accounting, finance and marketing as well as the necessary background subjects in computing science and programming. The active participation of industry practitioners in course design and course delivery will further ensure that graduates of the course are well equipped with skills that are 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 associate membership of the Australian Computer Society, the industry's professional body.

Grading of awards

The BInfTech is awarded as a Pass degree, a degree with Credit, or a degree with Distinction.
The grading is based on the Weighted Average Mark (WAM) of core subjects, with the exception of the industry-based semester and Contemporary Information Technology 1 and 2, 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: the overall assessment, by industry, of the final industry-based semester.

Program for students who commenced from 1995 onwards

Year 1

<table>
<thead>
<tr>
<th>Autumn semester – UTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>31414 Information Systems</td>
<td>6cp</td>
</tr>
<tr>
<td>31415 Principles of Software Development A</td>
<td>6cp</td>
</tr>
<tr>
<td>31416 Computer Systems Architecture</td>
<td>6cp</td>
</tr>
<tr>
<td>31718 Contemporary Information Technology 1</td>
<td>6cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester – Industry</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>31722 Commercial Programming</td>
<td>5cp</td>
</tr>
<tr>
<td>31770 Industry Project 1</td>
<td>5cp</td>
</tr>
<tr>
<td>31771 Business Requirements Analysis</td>
<td>5cp</td>
</tr>
<tr>
<td>31779 Applications of Information Technology 1</td>
<td>5cp</td>
</tr>
</tbody>
</table>

Year 2

<table>
<thead>
<tr>
<th>Summer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>31729 Information Systems Practice</td>
<td>2cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Autumn semester – UTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>22615 Accounting Information Systems</td>
<td>4cp</td>
</tr>
<tr>
<td>31434 Database Design</td>
<td>6cp</td>
</tr>
<tr>
<td>31436 Systems Software and Networks</td>
<td>8cp</td>
</tr>
<tr>
<td>31734 Information Systems and Organisations</td>
<td>4cp</td>
</tr>
<tr>
<td>Elective</td>
<td>4cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester – UTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>22321 Cost Management Systems</td>
<td>6cp</td>
</tr>
<tr>
<td>31424 Systems Modelling</td>
<td>6cp</td>
</tr>
<tr>
<td>31444 Systems Design and Development</td>
<td>10cp</td>
</tr>
<tr>
<td>31443 Distributed Databases and Client-Server Computing</td>
<td>4cp</td>
</tr>
<tr>
<td>31737 Business Process Transformation</td>
<td>4cp</td>
</tr>
</tbody>
</table>

Year 3

<table>
<thead>
<tr>
<th>Autumn semester – Industry</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>31756 Project Management</td>
<td>5cp</td>
</tr>
<tr>
<td>31781 Business Systems Design</td>
<td>5cp</td>
</tr>
<tr>
<td>31789 Applications of Information Technology 2</td>
<td>5cp</td>
</tr>
<tr>
<td>31790 Industry Project 2</td>
<td>5cp</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spring semester – UTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24105 Marketing Principles</td>
<td>4cp</td>
</tr>
<tr>
<td>31464 Information Technology Planning and Design</td>
<td>6cp</td>
</tr>
<tr>
<td>31764 Information Technology Strategy</td>
<td>4cp</td>
</tr>
<tr>
<td>31769 Contemporary Information Technology 2</td>
<td>4cp</td>
</tr>
<tr>
<td>Elective</td>
<td>4cp</td>
</tr>
</tbody>
</table>

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 Bachelor of Information Technology 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
Bachelor of Information Technology prerequisite chart

Computer Systems Architecture
Principles of Software Development A
Commercial Programming
Information Systems Practice
Systems Software and Networks
Database Design
Distributed Databases and Client/Server Computing
Systems Design and Development
Information Systems
Business Requirements Analysis
Applications of IT 1
Accounting Information Systems
Corporate Financial Analysis
Systems Modelling
Project Management
Business Systems Design
Applications of IT 2
Contemporary IT 2
IT Planning and Design
Industry Project 1
Industry Project 2
IT Strategy
Information Systems and Organisations
Business Process Transformation
Marketing Principles
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
• immediately prior to the commencement of an industry-based semester, a student 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.

Industry semesters
The dates of the industry-based semesters for 1997 are as follows:

Spring semester (first-year students): Monday 7 July 1997–Friday 19 December 1997

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 change. BInfTech students must also inform Des Saunders, Industry Liaison Officer, of any changes to personal details. Students who wish to change the method of payment of the scholarship should contact the Salaries Office of the University’s Financial Services Unit on 9514 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 1997 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 Arts in International Studies

Course code: MC05
This course combines the Bachelor of Science in Computing Science with the University’s Bachelor of Arts in International Studies. Computing Science is integrated with a major in the language and culture of another country. The course is of six years’ duration, and students spend the fourth year of study at a university overseas. The fifth and sixth years are completed part time.

Studies in Computing Sciences
The Computing Science component of the combined degree aims to provide a sound education in all aspects of computing for students who intend to follow a career in the profession. It is intended that the course will provide a suitable background covering all aspects of information technology, short of the actual design and construction of hardware systems.

For further information, see the course outline for the Bachelor of Science in Computing Science in this handbook.

International Studies
The Bachelor of Arts in International Studies is designed to increase awareness and understanding of the non-English-speaking world.
Students take one of the following majors in the International Studies program: China, Eastern Europe, Indonesia, Japan, Latin America, Malaysia, South China, South-East Asia, Spain, Taiwan, Thailand or Western Europe. They study an appropriate language and culture; learn about the contemporary society of their country of specialisation; and then spend an academic year of study at a university in their country of specialisation. The costs of tuition and travel are borne by UTS. In many cases, there will be no additional costs for students. However, those studying in countries or regions where the cost of living is high — notably Japan, Argentina, Hong Kong and Taiwan — should be prepared to pay additional costs for accommodation and maintenance.

For native speakers, there may be opportunities for students to undertake Industrial Training during In-country Study.

**Course structure**

The structure of the six-year course in Computing Science and International Studies is derived from the combination of the Bachelor of Science in Computing Science with the Bachelor of Arts in International Studies. All arrangements currently in force for both the Bachelor of Science in Computing Science and the Bachelor of Arts in International Studies apply equally to the combined degree program in Computing Science and International Studies.

To graduate, a student is required to have completed 240 credit points: 144 credit points in Computing Science and 96 credit points in International Studies.

All students enrolled in the Bachelor of Science in Computing Science are required to pass two Industrial Training subjects. There are a substantial number of prerequisites for Industrial Training, which in this combined degree program is normally undertaken in part-time Years 5 and 6. To gain credit for Industrial Training, students are required to obtain an approved, full-time job within the information industry.

The Bachelor of Arts in International Studies requires undergraduates to study a major — a region or country of specialisation — over a minimum of three years. Students study language and culture for at least two years in Sydney, and this is followed by a period of study overseas. In 1997 the following range of majors will be available: China, Eastern Europe, Indonesia, Japan, Latin America, Malaysia, South China, South-East Asia, Spain, Taiwan, Thailand and Western Europe. The specialisation on Western Europe is only available to students who have previously completed HSC studies or equivalent in either French, German or Italian. The Eastern Europe specialisation is available only to students with an existing sound working knowledge of an appropriate Eastern European language.

Each of the specialisations within the International Studies program is 96 credit points, and includes 32 credit points (four subjects) of instruction in an appropriate Language and Culture; 16 credit points (two subjects) of the study of Contemporary Society and its context; and 48 credit points (two semesters) of study at a university or institution of higher education in the country or region of specialisation.

The International Studies subjects listed in the course structure are subjects of enrolment referring to common units of instruction across the University.

**Language and Culture**

Study of Language and Culture at UTS depends on the individual student's level of language proficiency before entry to the UTS program. There is a range of entry levels to the various Language and Culture programs available. Most are available at beginner's and post-HSC levels, and some at more advanced levels.

For 1997 the following Language and Culture programs will be available at UTS as part of the International Studies program: Cantonese, Chinese, Indonesian, Japanese, Malay, Modern Standard Chinese and Spanish. (Modern Standard Chinese is a program for students who are either complete beginners or who started to learn Chinese at school in Australia.) In addition, arrangements have been made for the delivery of Croatian, French, German, Greek, Italian, Polish, Russian, Serbian, Slovenian, Ukrainian and Thai.

**Contemporary Society**

For each specialisation of the International Studies program, students have a prescribed pair of units of instruction in Contemporary Society, taught by the Institute for International Studies in cooperation with the Faculty of Humanities and Social Sciences. The first is a subject on Modernisation and Globalisation that provides a general
introduction to comparative social and political change. It is designed to locate further study of the major in its intellectual and physical contexts.

The second is a subject that provides a more detailed introduction to the area of specialisation, and which is specific for each major:

- China: Contemporary China
- Eastern Europe: Contemporary Eastern Europe or Modern Greek History and Society or Contemporary Russia
- Indonesia: Contemporary South-East Asia
- Japan: Contemporary Japan
- Latin America: Contemporary South America
- Malaysia: Contemporary South-East Asia
- South China: Chinese East Asia
- South-East Asia: Contemporary South-East Asia
- Spain: Contemporary Europe
- Taiwan: Chinese East Asia
- Thailand: Contemporary South-East Asia
- Western Europe: Contemporary Europe

**In-country Study**

Arrangements for students to spend two semesters of study at an institution of higher education in the country or region of specialisation have already been made, or are in train. The first semester will largely be concerned with further language development and cultural appreciation. The second semester will continue the study of language and culture but, where possible, will attempt to direct study towards subjects related to the computing sciences. Where students have reached an appropriate level of language competence, arrangements may be made to substitute one or two semesters of industrial experience for periods of In-country Study. In-country industrial experience undertaken in this way will be assessed by UTS in a manner similar to subjects of In-country Study, though through cooperation between the Institute for International Studies and the School of Computing Sciences.

**Course program**

For details of International Studies subjects, students should refer to the School of Mathematical Sciences' ‘Subject descriptions’ section in this handbook.

<table>
<thead>
<tr>
<th>Year 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>31434 Information Systems</td>
</tr>
<tr>
<td>31415 Principles of Software Development A</td>
</tr>
<tr>
<td>31416 Computing Systems Architecture</td>
</tr>
<tr>
<td>31417 Computing Practice</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>31424 Systems Modelling</td>
</tr>
<tr>
<td>31425 Principles of Software Development B</td>
</tr>
<tr>
<td>31428 Quantitative Modelling</td>
</tr>
<tr>
<td>31429 Procedural Programming</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>31434 Database Design</td>
</tr>
<tr>
<td>59341 Modernisation and Globalisation</td>
</tr>
<tr>
<td>971xxx Language and Culture 1</td>
</tr>
<tr>
<td>Computing Science elective</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>31436 Systems Software and Networks</td>
</tr>
<tr>
<td>972xxx Language and Culture 2</td>
</tr>
<tr>
<td>Computing Science elective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>31444 Systems Design and Development</td>
</tr>
<tr>
<td>973xxx Language and Culture 3</td>
</tr>
<tr>
<td>Computing Science elective</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>22615 Accounting Information Systems</td>
</tr>
<tr>
<td>974xxx Language and Culture 4</td>
</tr>
<tr>
<td>976xxx Contemporary Society</td>
</tr>
<tr>
<td>Computing Science elective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>977xxx In-country Study 1</td>
</tr>
<tr>
<td><strong>Spring semester</strong></td>
</tr>
<tr>
<td>978xxx In-country Study 2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn semester</strong></td>
</tr>
<tr>
<td>31455 Software Development Case Study</td>
</tr>
<tr>
<td>31698 Industrial Training</td>
</tr>
<tr>
<td>Computing Science electives</td>
</tr>
</tbody>
</table>
Spring semester
31455 Software Development Case Study  5cp
31698 Industrial Training  Computing Science elective  4cp

Year 6

Autumn semester
31454 Project Management and the Professional  8cp
31699 Industrial Training  Computing Science elective  4cp

Spring semester
31464 Information Technology Planning and Design  6cp
31699 Industrial Training  Computing Science electives  8cp

Bachelor of Science in Computing Science/Bachelor of Laws

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 program will allow students the option of undertaking a legal practice major as part of their undergraduate studies.

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

Students enrol with the Faculty of Law, and are required to complete a total of 240 credit points, 94 in Computing Science and 146 in Law. In addition, students must complete a period of industrial training before graduation, ideally in a legal environment.

Students will be awarded two degrees and therefore will receive two testamurs on graduation. Students who elect not to complete the joint degree may be permitted to complete a Bachelor of Science in Computing Science or a Bachelor of Laws as a stand-alone degree.

The Faculty of Law administers the course. The current program is shown below. For full details of law subjects, students should consult the Faculty of Law Handbook. Inquiries should be directed to the Faculty of Law on 9281 2699.

<table>
<thead>
<tr>
<th>Course program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
</tr>
<tr>
<td>Stage 1</td>
</tr>
<tr>
<td>31415 Principles of Software Development A  6cp</td>
</tr>
<tr>
<td>31417 Computing Practice  6cp</td>
</tr>
<tr>
<td>70105 Legal Research  4cp</td>
</tr>
<tr>
<td>70113 Legal Process and History  10cp</td>
</tr>
<tr>
<td>Stage 2</td>
</tr>
<tr>
<td>31425 Principles of Software Development B  6cp</td>
</tr>
<tr>
<td>31429 Procedural Programming  6cp</td>
</tr>
<tr>
<td>70211 Law of Contract  8cp</td>
</tr>
<tr>
<td>70217 Criminal Law  6cp</td>
</tr>
<tr>
<td>Year 2</td>
</tr>
<tr>
<td>Stage 3</td>
</tr>
<tr>
<td>31414 Information Systems  6cp</td>
</tr>
<tr>
<td>31416 Computer Systems Architecture  6cp</td>
</tr>
<tr>
<td>70311 Law of Tort  8cp</td>
</tr>
<tr>
<td>70616 Federal Constitutional Law  8cp</td>
</tr>
<tr>
<td>Stage 4</td>
</tr>
<tr>
<td>31424 Systems Modelling  6cp</td>
</tr>
<tr>
<td>31428 Quantitative Modelling  6cp</td>
</tr>
<tr>
<td>70317 Real Property  8cp</td>
</tr>
<tr>
<td>70318 Personal Property  4cp</td>
</tr>
<tr>
<td>Year 3</td>
</tr>
<tr>
<td>Stage 5</td>
</tr>
<tr>
<td>31434 Database Design  6cp</td>
</tr>
<tr>
<td>31436 Systems Software and Networks  8cp</td>
</tr>
<tr>
<td>70617 Administrative Law  8cp</td>
</tr>
<tr>
<td>70417 Corporate Law  8cp</td>
</tr>
<tr>
<td>Stage 6</td>
</tr>
<tr>
<td>31444 Systems Design and Development  10cp</td>
</tr>
<tr>
<td>70516 Equity and Trusts  8cp</td>
</tr>
<tr>
<td>76xxx Elective subject 1  6cp</td>
</tr>
<tr>
<td>Year 4</td>
</tr>
<tr>
<td>Stage 7</td>
</tr>
<tr>
<td>31455 Software Development Case Study  5cp</td>
</tr>
<tr>
<td>71005 Practice and Procedure  4cp</td>
</tr>
<tr>
<td>71216 Law of Evidence  6cp</td>
</tr>
<tr>
<td>76xxx Elective subject 2  6cp</td>
</tr>
<tr>
<td>76xxx Elective subject 3  6cp</td>
</tr>
<tr>
<td>Stage 8</td>
</tr>
<tr>
<td>31464 Information Technology Planning and Design  6cp</td>
</tr>
<tr>
<td>31455 Software Development Case Study (cont.)  5cp</td>
</tr>
<tr>
<td>71116 Remedies  6cp</td>
</tr>
<tr>
<td>76xxx Elective subject 4  6cp</td>
</tr>
</tbody>
</table>
Year 5

Stage 9

31454  Project Management and the
Professional
Industrial experience  8cp

Stage 10

Legal practice major (PLT) or four
law electives  24cp

1 These subjects may be replaced by Computing Science electives with the approval of the Head of School of Computing Sciences.

Double degree in Business and Computing Science

Students initially enrol in the Bachelor of Business degree and take the 'Programming and Design' sub-major offered by the School of Computing Sciences. On satisfactory completion of the Business degree and the 'Programming and Design' sub-major, students may then apply for admission to the Bachelor of Science in Computing Science degree. If admitted, students will receive exemptions for the computing core subjects they completed in the Programming and Design sub-major. They will also receive 24cp of exemptions for electives, the equivalent of a Business sub-major in the Computing Science degree.

Full details of the Bachelor of Business degree are contained in the Faculty of Business Handbook.
General inquiries should be directed to either the University Graduate School, telephone 9514 1523, or the Faculty's Graduate Studies Officer, telephone 9514 1806. Applicants for research degrees should discuss their proposed research with either the Director, Postgraduate Studies, or their chosen supervisor before submitting applications. The Faculty's Graduate Studies Officer can assist applicants in contacting members of staff, and in completing the application form.

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
- information processing strategy, systems management
- local networks and network interface technology
- neural networks
- 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 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 (contacts: 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 databases with expert systems, modelling of constraints and development of design tools. Integration of groupware with databases (contacts: 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, and 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 (contacts: 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: Associate Professor Jenny Edwards).

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**Doctor of Philosophy**

**Course code: MC54**

The Doctor of Philosophy (PhD) is intended for students who wish to pursue research at the highest level; such research is expected to demonstrate significant originality and make a substantial contribution to computing knowledge. For specific areas of interest 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 their PhD 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 that 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) Honours degree with a major computing component, or a Master’s degree in an appropriate area, or 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.

All Doctor of Philosophy students at UTS are 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 will 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 DEETYA guidelines. Details will be available in early 1997.

Progress reports
All Doctor of Philosophy 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
All candidates for the degree of Doctor of Philosophy should give the 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 Degrees are available from the University Graduate School.

Recent theses
Ma, X W 1994, A design and analysis aid environment for parallel computations.
Stewart, B 1996, Learning of probabilistic models from data.

Master of Science

Course code: MSC1
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 both a full-time and a part-time basis. The normal duration of enrolment for this degree is two years for full-time attendance or three years for 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 that 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) Honours degree with a major computing component, or 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.
Every Master of Science 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. Of the two supervisors, one will 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 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 DEETYA guidelines. Details will be available in early 1997.

**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 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.
- Wilson, D N 1993, Project management for a prototyping environment.
- Linn, C N 1994, A performance model for loosely coupled heterogeneous distributed information systems.
- Fuller, A L 1996, Class based domain modelling.
- Hallewell Haslwanter, J D 1996, Systems development methodologies in the context of HCI.
- Charif, A 1996, Genetic logic programming for natural language understanding.

**POSTGRADUATE COURSEWORK PROGRAMS**

**Master of Science in Computing**

**Course code: MCS3**

The Master of Science in Computing is a professional course. Graduates select a program of study that 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 systems, or which equips the student for a position in corporate management.

**Attendance pattern**

The course is offered on a part-time basis only, over six semesters (three years), because it is considered important that students remain in professional employment while undertaking this course. Attendance is normally required at lectures for at least two evenings per week. As the course is only available part time, all timetabled sessions are held in the evenings. These 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 Course 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 the Course Guide and to study it carefully. From August each year an 'Admission package' containing a copy of the Course 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. For students commencing in 1997, tuition fees will be set at $1,440 per semester for a normal attendance pattern. Course fees are revised from year to year in accordance with University and government policy. Details of the current fee structure may be obtained from the University Graduate School.

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 that 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, 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 a 24-credit-point project must have the strong support of their Project Supervisor as a part of these 'special circumstances'.

Each student's program of study will be subject to approval by the Director, Postgraduate Studies. The subjects chosen by a student must form a coherent plan of study and must be consistent with the student's professional career goals. When approving a student's program of study, the Director, Postgraduate Studies, will not permit a student to enrol in a subject in the 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;

- by including and 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:

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>CP</th>
<th>Semester offered</th>
</tr>
</thead>
<tbody>
<tr>
<td>32901</td>
<td>Recent Advances in Computer Science</td>
<td>6</td>
<td>A98, A97</td>
</tr>
<tr>
<td>32106</td>
<td>Object-oriented Software Development</td>
<td>6</td>
<td>A97</td>
</tr>
<tr>
<td>32107</td>
<td>Formal Reasoning for Software Development</td>
<td>6</td>
<td>S97</td>
</tr>
<tr>
<td>32108</td>
<td>Specialist Topics in Artificial Intelligence</td>
<td>6</td>
<td>S97</td>
</tr>
<tr>
<td>32306</td>
<td>Capacity Management</td>
<td>6</td>
<td>A98</td>
</tr>
<tr>
<td>32307</td>
<td>Operating Systems</td>
<td>6</td>
<td>S98</td>
</tr>
<tr>
<td>32308</td>
<td>Computer Architecture</td>
<td>6</td>
<td>S97</td>
</tr>
<tr>
<td>32902</td>
<td>Recent Advances in Information Systems</td>
<td>6</td>
<td>A97, A98</td>
</tr>
<tr>
<td>32204</td>
<td>Advanced Data Management</td>
<td>6</td>
<td>A98</td>
</tr>
<tr>
<td>32205</td>
<td>Computer Communication Systems</td>
<td>6</td>
<td>S98</td>
</tr>
<tr>
<td>32206</td>
<td>Advanced Information Systems Modelling</td>
<td>6</td>
<td>S97</td>
</tr>
<tr>
<td>32207</td>
<td>Information Management</td>
<td>6</td>
<td>A97</td>
</tr>
<tr>
<td>32208</td>
<td>Information Processing Strategy</td>
<td>6</td>
<td>S97</td>
</tr>
<tr>
<td>32402</td>
<td>Information Technology Environment</td>
<td>6</td>
<td>S98</td>
</tr>
<tr>
<td>32912</td>
<td>Project</td>
<td>12</td>
<td>All</td>
</tr>
<tr>
<td>32924</td>
<td>Project</td>
<td>24</td>
<td>All</td>
</tr>
</tbody>
</table>

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

**Elective subjects**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>21702</td>
<td>Industrial Relations</td>
<td>6cp</td>
</tr>
<tr>
<td>21718</td>
<td>Organisation Analysis and Design</td>
<td>6cp</td>
</tr>
<tr>
<td>21719</td>
<td>Organisational Behaviour</td>
<td>6cp</td>
</tr>
<tr>
<td>21720</td>
<td>Employment Relations</td>
<td>6cp</td>
</tr>
<tr>
<td>21722</td>
<td>Leadership and Management Action</td>
<td>6cp</td>
</tr>
<tr>
<td>21724</td>
<td>Human Resource Management</td>
<td>6cp</td>
</tr>
<tr>
<td>21741</td>
<td>Operations Management</td>
<td>6cp</td>
</tr>
<tr>
<td>22747</td>
<td>Accounting for Managerial Decisions</td>
<td>6cp</td>
</tr>
<tr>
<td>22751</td>
<td>Corporate Accounting Issues</td>
<td>6cp</td>
</tr>
<tr>
<td>24734</td>
<td>Managerial Marketing</td>
<td>6cp</td>
</tr>
<tr>
<td>24737</td>
<td>Marketing Information Management</td>
<td>6cp</td>
</tr>
<tr>
<td>25706</td>
<td>Economics for Management</td>
<td>6cp</td>
</tr>
<tr>
<td>25707</td>
<td>Government Business Relations</td>
<td>6cp</td>
</tr>
<tr>
<td>25741</td>
<td>Capital Markets</td>
<td>6cp</td>
</tr>
<tr>
<td>25742</td>
<td>Financial Management</td>
<td>6cp</td>
</tr>
</tbody>
</table>

**Subjects from other schools or faculties**

The following subjects from other schools or faculties are available to students in the MSc in Computing as electives. Students should contact the relevant school or faculty for prerequisites.

**School of Mathematical Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>35443</td>
<td>Mathematical Programming 3</td>
<td>4cp</td>
</tr>
<tr>
<td>35448</td>
<td>Dynamic Optimisation</td>
<td>4cp</td>
</tr>
<tr>
<td>35457</td>
<td>Multivariate Statistics</td>
<td>4cp</td>
</tr>
<tr>
<td>35459</td>
<td>Linear Models and Experimental Design</td>
<td>4cp</td>
</tr>
<tr>
<td>35466</td>
<td>Advanced Stochastic Processes</td>
<td>4cp</td>
</tr>
<tr>
<td>35467</td>
<td>Time Series Analysis</td>
<td>4cp</td>
</tr>
<tr>
<td>35485</td>
<td>Advanced Financial Modelling</td>
<td>4cp</td>
</tr>
</tbody>
</table>

**Faculty of Business**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>21702</td>
<td>Industrial Relations</td>
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<td>21718</td>
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<td>Corporate Accounting Issues</td>
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<tr>
<td>25706</td>
<td>Economics for Management</td>
</tr>
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<td>25707</td>
<td>Government Business Relations</td>
</tr>
<tr>
<td>25741</td>
<td>Capital Markets</td>
</tr>
<tr>
<td>25742</td>
<td>Financial Management</td>
</tr>
</tbody>
</table>

**Faculty of Humanities and Social Sciences**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>55901</td>
<td>Research and Data Analysis</td>
</tr>
<tr>
<td>55902</td>
<td>Information Behaviour</td>
</tr>
<tr>
<td>55903</td>
<td>Information Production and Presentation</td>
</tr>
<tr>
<td>55907</td>
<td>Information Retrieval</td>
</tr>
<tr>
<td>55908</td>
<td>Information Project Development</td>
</tr>
<tr>
<td>55910</td>
<td>User Documentation 1</td>
</tr>
<tr>
<td>55911</td>
<td>User Documentation 2</td>
</tr>
</tbody>
</table>

**Faculty of Law**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Subject Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>72100</td>
<td>Legal Process</td>
</tr>
<tr>
<td>77816</td>
<td>Design Law</td>
</tr>
<tr>
<td>77819</td>
<td>Copyright Law</td>
</tr>
<tr>
<td>79708</td>
<td>Contemporary Business Law</td>
</tr>
<tr>
<td>79741</td>
<td>Marketing Legislation in Australia</td>
</tr>
<tr>
<td>79749</td>
<td>Law for Managers</td>
</tr>
</tbody>
</table>

**School of Mathematical Sciences**

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<tr>
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<td>35466</td>
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<td>4cp</td>
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<td>35467</td>
<td>Time Series Analysis</td>
<td>4cp</td>
</tr>
<tr>
<td>35485</td>
<td>Advanced Financial Modelling</td>
<td>4cp</td>
</tr>
</tbody>
</table>
Choosing a program in 1997

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 for the School of Computing Sciences). 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.

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>A 97</td>
<td>Object-oriented</td>
<td>Recent Advances</td>
<td>Recent Advances in Information</td>
<td>Information Management</td>
</tr>
<tr>
<td></td>
<td>Software</td>
<td>in Computer Science</td>
<td>Systems</td>
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<tr>
<td></td>
<td>Development</td>
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<tr>
<td>S 97</td>
<td>Formal Reasoning</td>
<td>Computer</td>
<td>Advanced</td>
<td>Information Processing Strategy</td>
</tr>
<tr>
<td></td>
<td>for Software</td>
<td>Architecture</td>
<td>Information Systems Modelling</td>
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<td>Development</td>
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<tr>
<td>A 98</td>
<td>Recent Advances</td>
<td>Capacity</td>
<td>Advanced Data Management</td>
<td>Recent Advances in Information Systems</td>
</tr>
<tr>
<td></td>
<td>in Computer Science</td>
<td>Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S 98</td>
<td>Specialist Topics</td>
<td>Operating Systems</td>
<td>Computer Communication Systems</td>
<td>Information Technology</td>
</tr>
<tr>
<td></td>
<td>in Artificial Intelligence</td>
<td></td>
<td></td>
<td>Environment</td>
</tr>
<tr>
<td>A 99</td>
<td>Object-oriented</td>
<td>Recent Advances</td>
<td>Recent Advances in Information</td>
<td>Information Management</td>
</tr>
<tr>
<td></td>
<td>Software</td>
<td>in Computer Science</td>
<td>Systems</td>
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<tr>
<td>S 99</td>
<td>Formal Reasoning</td>
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<td>Advanced</td>
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<td></td>
<td>for Software</td>
<td>Architecture</td>
<td>Information Systems Modelling</td>
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<td></td>
<td>Development</td>
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</tbody>
</table>

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 that is 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 that is closely related to their current employment. Alternatively, students may wish to choose a topic that would be of value to their future career. The project should be a vehicle for importing the knowledge learnt from the coursework into 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. Before beginning the project work a student must:

- 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.
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 hope to submit their completed project. Students should note the requirement, stated below, for the project to be submitted before the end of the tenth week of the semester in which they wish to have their project examined. The examination of the project must be completed before the School's Examination Review Committee meeting for that semester. This meeting takes place towards the end of each semester. If a student is 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 the enrolment in the Project subject for that semester will be cancelled.

Students usually enrol in a 12-credit-point project. If, in the opinion of the project supervisor, the topic chosen merits a more substantial investigation then the supervisor should make a case to the Director, Postgraduate Studies, for the credit points of the project to be extended to 24. Students should not enrol in the 24-credit-point project unless they have written permission to do so from the Director, Postgraduate Studies.

The project will result in:

- the preparation of an extensive written report, three copies of which 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. All three copies will be retained by the School; one of these 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 report bound before submitting it for examination although, 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;

- the presentation of a research seminar of 40 minutes followed by a 20-minute discussion with the examiners. A day will be set for the research seminars each semester. The research seminar day will usually be early in the semester; that is, the seminars will be presented by students who submitted their written report in the previous semester. This is to avoid overloading staff and students at the end of semester. Students will be given a mark for their project when they submit their written report; however all students are required to present their research seminar at a satisfactory standard before they will be permitted to graduate. The research seminar should consist of a discussion of the more highly controversial or technical issues found within the written report. When delivering the research seminar, students should assume that their audience is familiar with the contents of their written report. Note that students do not need to enrol in the Project subject to present their research seminar.

The project will be examined on the content and standard of presentation of the written report and the research presentation. The mark for the Project subject will be determined on the basis of the written report alone.

**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 have his or her registration from the course discontinued. 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 (Rule 3.3.5.2).

- 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 University Graduate School Board (Rule 3.3.7.1).

Master of Business in Information Technology Management

Course code: MC85

Graduate Diploma in Information Technology Management

Course code: MC75

Graduate Certificate in Information Technology Management

Course code: MC63

Offered for the first time in 1994, these courses form a joint program between the School of Computing Sciences and the School of Management in 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 Seyens, Program Manager, on 9514 1925 or David Wilson, Director, Management Development Program, on 9514 1832.

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 (such students will therefore be exempt from Semesters 1, 2, 3 and 4);
  
  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 such as Business or Computing, plus a minimum of two years' experience in the IT industry;
  
  or

- the prior successful completion of the Graduate Certificate in Information Technology Management (such students will therefore be exempt from Semesters 1 and 2), 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 such as Business or Computing, 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 that can establish the applicant’s aptitude, knowledge and practical experience, which 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, Management Development Program, 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, then they should seek advice from that school or faculty on the feasibility of a remedial program. The Director, Management Development Program, 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).

Course structure

All subjects will be assessed to the Master’s standard, regardless of the course in which a student is enrolled. Therefore, 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, Management Development Program. 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, Management Development Program, 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. 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. Therefore, 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)

A student must complete the following three core subjects:

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

Plus one elective subject selected from

- 24704 Managing Client Relations 6cp
- 32602 Impact of Information Technology 6cp
- 32603 Software Quality Management 6cp
- 32604 Systems Integration 6cp
- 32605 Managerial Analysis and Evaluation of Information Systems 6cp
- 32701 Advances in Information Technology 6cp
- 32702 Contemporary Telecommunications 6cp
- 32703 Information Technology Strategy 6cp

or

an elective approved by the Director, Management Development Program.

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

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, Management Development Program.

Level 4 – Master of Business in Information Technology Management (66cp)

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
- 32806 Project A 6cp
- 32812 Project B 6cp

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.

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

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Subject</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>21788</td>
<td>Effective People Management</td>
<td>6cp</td>
</tr>
<tr>
<td>21789</td>
<td>Contemporary Management Practices</td>
<td>6cp</td>
</tr>
<tr>
<td>32601</td>
<td>Advanced Project Management</td>
<td>6cp</td>
</tr>
</tbody>
</table>

An elective approved by the Director, Management Development Program.
Year 2

21806 Managing Organisational Change 6cp
21807 Total Quality and Productivity Management 6cp
21808 Strategic Business Management Elective 6cp

Year 3

21751 Management Research Methods 6cp
32806 Project A 6cp
32812 Project B 6cp

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, Management Development Program, 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 and passed by all Master's students.

A student may wish to select a topic that is closely related to his or her current employment. Alternatively, a student may wish to choose a topic that should be of value to his or her future career. The project should be a vehicle for importing the knowledge learnt from the coursework into 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

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 9514 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 in for an interview.

For further information, applicants should contact Bruce Irvine, the Faculty's Graduate Studies Officer, on 9514 1806, or Peter Bebbington, Director, Graduate Education, on 9514 1828.
Fees
In 1997 the fee for the course will be set at $5,760 for 48 credit points (that is, $120 per credit point) for Australian citizens and permanent residents. For overseas students, the fee will be set at $14,500 per annum. All fees are subject to annual review.

Attendance pattern
The course is normally taken on a part-time basis over two years, and will usually entail attending three 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 below.

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 (Rule 3.2.6.1).

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) (Rule 3.2.6.2).

Course structure
To gain the Graduate Diploma, students must complete a minimum of 48 credit points.

In the first academic year, students must take the following core subjects.

**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.

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 Technology 4cp
- 31240 Topics in Computer Graphics 4cp
- 31425 Principles of Software Development B 6cp
- 31428 Quantitative Modeling 6cp
- 31436 Systems Software and Networks 8cp
- 31443 Distributed Databases and Client Server Computing 4cp
- 31444 Systems Design and Development 10cp
- 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 of subjects’ section for the School of Computing Sciences 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 fees, will be additional to
Graduate Diploma in Information Technology
prerequisite chart

- Development Methodologies
- Distributed Databases and Client/Server Computing
- Objectbases
- Introduction to Database Design
- Object-oriented Methodologies
- Systems Design and Development
- Project Management and the Professional
- Introduction to Information Systems
- Systems Software and Networks
- Network Management
- Introduction to Procedural Programming
- Object-oriented Programming and C++
- Principles of Software Development A
- Principles of Software Development B
- Quantitative Modelling
- Introduction to Systems Modelling
- Computer Systems Architecture
- Systems Software and Networks
the standard course program and credit will not be given.

**Recommended part-time program**

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Spring semester</th>
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<tbody>
<tr>
<td>31940</td>
<td>Introduction to Systems Modelling 4cp</td>
</tr>
<tr>
<td>31942</td>
<td>Introduction to Computer Systems Architecture 4cp</td>
</tr>
<tr>
<td>31943</td>
<td>Introduction to Information Systems 4cp</td>
</tr>
</tbody>
</table>

**Autumn semester**

| 31934  | Introduction to Database Design 4cp |
| 31941  | Introduction to Procedural Programming 4cp |

<table>
<thead>
<tr>
<th>Year 2</th>
<th>Spring semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>31436</td>
<td>Systems Software and Networks 8cp</td>
</tr>
<tr>
<td></td>
<td>Elective 4cp</td>
</tr>
</tbody>
</table>

**Autumn semester**

| Two or three electives 12cp |

**GRADUATE CERTIFICATES**

**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 and/or the Graduate Certificate in Computer Science, or their equivalents. The course enables students to develop advanced skills in more specialised areas of information technology.

**Length and attendance pattern**

This is a one-year part-time course. Depending on demand, the course, or individual subjects, may be offered in flexible attendance modes.

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 Director, Graduate Education (see the Graduate Diploma in Information Technology’s ‘Course structure’ section). The total requirement for the Graduate Certificate is 16 credit points.

Students should note that this structure is currently under review. Information on the revised course structure will be available early in 1997.

For further information, contact Peter Bebbington, Director, Graduate Education, on 9514 1828.

**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 (Rule 3.2.6.1).

**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/94/80) (Rule 3.2.6.2).

**Fees**

Full tuition fees will be charged. In 1997, the fee for this course has been set at $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 and attendance pattern

The course is one year part time, i.e. four semester hours per week per six-credit-point subject, and 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 a Bachelor’s degree (or equivalent) from a recognised university, 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 are equivalent to that which is implied by these requirements.

Course structure

The total requirement for the Graduate Certificate is 18 credit points. The course consists of the following subjects:

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

This structure is currently under review. Information on any revision to the course structure will be available early in 1997.

For further information, contact Peter Bebbington, Director, Graduate Education, on 9514 1828.

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 (Rule 3.2.6.1).

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/94/80) (Rule 3.2.6.2).

Fees

Full tuition fees will be charged. In 1997, the fee for this course has been set at $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 and attendance pattern

This is a part-time course. Depending on demand, the course, or individual subjects, may be offered in flexible attendance modes. 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 are
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 subjects taken from the Graduate Diploma in Information Technology and approved by the Director, Graduate Education (see the Graduate Diploma in Information Technology’s ‘Course structure’ section). The total requirement for the Graduate Certificate is 16 credit points.

For further information, contact Peter Bebbington, Director, Graduate Education, on 9514 1828.

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 (Rule 3.2.6.1).

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/94/80) (Rule 3.2.6.2).

Fees
Full tuition fees will be charged. In 1997, the fee for this course has been set at $3,200. This fee is subject to annual review.

Graduate Certificate in Human–Computer Interaction

(Not offered in 1997)

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 and attendance pattern
The is a one-year part-time course that has a total of 18 credit points made up of three subjects, each worth six credit points.

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 Peter Bebbington, Director, Graduate Education, on 9514 1828.

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 (Rule 3.2.6.1).

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/94/80) (Rule 3.2.6.2).

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 and attendance pattern
This is a one-year part-time course. Depending on demand, the course, or individual subjects, may be offered in flexible attendance modes.

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 requirements, provided that a case can be made to establish that their aptitude, knowledge and practical experience are 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 subjects taken from the Graduate Diploma in Information Technology and approved by the Director, Graduate Education (see the Graduate Diploma in Information Technology’s ‘Course structure’ section). The total requirement for the Graduate Certificate is 16 credit points.

For further information, contact Peter Bebbington, Director, Graduate Education, on 9514 1828.

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 (Rule 3.2.6.1).

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/94/80) (Rule 3.2.6.2).

Fees
Full tuition fees will be charged. In 1997, the fee for this course has been set at $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 and attendance pattern

This is a one-year part-time course (i.e. six semester hours per week per six-credit-point subject).

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 a Bachelor’s degree (or equivalent) from a recognised university, 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 are equivalent to the above.

Course structure

The course consists of a coherent set of three subjects taken from the Graduate Diploma in Information Technology and approved by the Director, Graduate Education (see the Graduate Diploma in Information Technology’s ‘Course structure’ section). The total requirement for the Graduate Certificate is 12 credit points.

This structure is currently under review. Information on the revised course structure will be available early in 1997.

For further information, contact Peter Bebbington, Director, Graduate Education, on 9514 1828.

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 (Rule 3.2.6.1).

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/94/80) (Rule 3.2.6.2).

Fees

Full tuition fees will be charged. In 1997, the fee for this course has been set at $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 and attendance pattern

This is a one-year part-time course.

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 that 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 background does not fit these requirements, provided that a case can be made to establish that their computing knowledge and practical experience are 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 and consists of three semester hours per week. Thus the total course requirement is 12 credit points.

For further information, contact Peter Bebbington, Director, Graduate Education, on 9514 1828.

**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 (Rule 3.2.6.1).

**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/94/80) (Rule 3.2.6.2).

**Fees**

Full tuition fees will be charged. In 1997, the fee for this course has been set at $2,100. This fee is subject to annual review.
**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 per 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 that 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 and those offered by the Institute for International Studies as part of the Bachelor of Science in Computing Science/Bachelor of Arts in International Studies can be found in the School of Mathematical Sciences' 'Subject descriptions' section in this handbook.

**31140**

**Introduction to Computer Graphics**

4cp; 3hpw; prerequisite: 31425 Principles of Software Development B; 31429 Procedural Programming or 31624 Data Structures and Algorithms; 31625 Software Engineering 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 and algorithms; graphics standards; human–computer interaction and graphical design; application areas of computer graphics.

**31163**

**Knowledge Technology**

4cp; 3hpw; prerequisite: 31425 Principles of Software Development B; 31429 Procedural Programming or 31624 Data Structures and Algorithms; 31625 Software Engineering or graduate subject 31941; coordinator: Professor J Debenham


**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, anti-aliasing, half-toning and ordered dither, hidden line and surface removal algorithms, computer animation and radiosity.

**31350**

**Project (2 semesters)**

8cp; 6hpw; prerequisite: 31444 Systems Design and Development or 31641 Systems Design; coordinator: to be advised

**31351**

**Project (1 semester)**

8cp; 6hpw; prerequisite: 31444 Systems Design and Development or 31641 Systems Design; coordinator: to be advised

**31352**

**Project**

4cp; 3hpw; prerequisite: 31444 Systems Design and Development or 31641 Systems Design; coordinator: to be advised

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 C S Johnson
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; 7hpw; 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 and 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 CW Johnson
This subject provides a sound basis for understanding how computer hardware and data communications support higher level software constructions. All software undergoes a process of translation or interpretation which reduces it to primitive operations capable of being performed by the 'hardware'. In this subject, these primitive operations, and the organisation and design of computer systems that execute these operations, are examined. The SPARC architecture, together with its assembly language, is studied as an example of a contemporary (and real) computer architecture. This subject also presents some fundamental concepts in data communications, as a basis for later subjects which treat the topic in greater depth.

31417
Computing Practice
6cp; 4hpw; coordinator: Mr J Colville

31424
Systems Modelling
6cp; 3hpw; coordinator: Mr J EI-Den
This subject introduces information system concepts including their static and dynamic components. It describes how these concepts can be used to model information systems to correctly capture their 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.
The subject 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; 6hpw; 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; Shpw; coordinator: Dr T Osborn
Reasoning with data, descriptive statistics, probability theory, distributions, estimation, hypothesis testing, spreadsheet exercises, report writing, principles of modelling, queuing models, utility models, adaptive methods, and 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: Dr B Howarth
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 is 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: Mr U Szewcow
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 databases 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
This is a project-based subject which guides students through an information systems development process. The requirements for the information system are specified in a series of Use Cases. The development involves designing the user interface and data system and then designing and implementing the system. The emphasis throughout the development is on meeting the user’s requirements, implementing a distributed solution and integrating the new systems with the existing information systems infrastructure. Attention to quality of the system outcomes is maintained throughout the development process. Students will work in managed teams of 10. There are no formal lectures and no exams in this subject; staff/student contact takes place at regular structured project meetings and discussion meetings. Students are expected to have at least four hours of contact with their team each week and, given that this is a 10-credit-point subject, to do significant work outside of this contact time.

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 infor-
formation 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: one devoted to projects, and the other 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 specifications; detailed coding; and 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.

31505
Business Information Systems Management
6cp; 3hpw; coordinator: Mr J EI-Den
This subject introduces information system concepts including their static and dynamic components. It describes how these concepts can be used to model information systems correctly capture their 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.

The subject 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.

31506
Business Information Systems Implementation
6cp; 4hpw; coordinator: Mr L Smith

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
This subject is concerned with the systems development life cycle, the tools and techniques used in the analysis of systems' requirements, and the determination of alternate implementation strategies.

31541
Commercial Programming
6cp; 4hpw; prerequisites: 31521 Foundations of Computing and Programming; 31531 Systems Analysis and Design; coordinator: Mr L Smith

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; 4hpw; prerequisites: 31521 Foundations of Computing and Programming; 31531 Systems Analysis and Design; coordinator: Mr S Jha

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

31696
Industrial Training (F/T)
0cp; 6hpw; prerequisites: 31414 Information Systems; 31417 Computing Practice; 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 four 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 I**  
*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; prerequisite: 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 J Underwood*  
This subject introduces theories of organisations such as businesses, government departments and voluntary organisations. We deal with the behaviour of people in organisations, the structure of organisations, and the relation between the two. Emphasis is given to applications of organisation theory to the management of the IT function in organisation.

**31737**  
**Business Process Transformation**  
*4cp; 3hpw; coordinator: Mr J Underwood*  
This subject covers the restructuring of organisational processes through the innovative use of information systems and information technology. Current proposals for organisation restructuring are introduced and evaluated through comparison with previous theories of restructuring.

**31743**  
**Machine Learning**  
*4cp; 3hpw; prerequisite: 31428 Quantitative Modelling; coordinator: Dr T Osborn*  
This subject is concerned primarily with Machine Learning: automatic construction of computable models from data. Symbolic and non-symbolic methods are studied. Topics include statistical learning, clustering and correlations; neural networks methods; genetic algorithms; genetic programming; Shannon information; rule induction; and first-order learning.

**31744**  
**Case-based Reasoning**  
*4cp; 3hpw; prerequisite: 31163 Knowledge Technology; coordinator: Dr R Rist*  

**31745**  
**Knowledge-based Systems**  
*4cp; 3hpw; prerequisite: 31743 Machine Learning or 31744 Case-based Reasoning; coordinator: Dr S Prabhakar*  
This subject addresses the important issues relating to the design of flexible Knowledge-Based Systems (KBS). These include understanding analytical techniques for KBS, bases for deep level representation of the world, knowledge acquisition techniques, design principles and case studies of how these principles are implemented in the current KBS.
31746
Artificial Intelligence Applications
4cp; 3hpw; prerequisite: 31743 Machine Learning or 31744 Case-based Reasoning; coordinator: Dr S Prabhakar

31748
Programming on the Internet
4cp; 3hpw; prerequisite: 31436 Systems Software and Networks; coordinator: Dr G Feuerlicht
This subject covers programming in Java, Website Administration, HTML authoring, CGI programming and network security.

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.

31769
Contemporary Information Technology 2
4cp; 3hpw; prerequisite: 31718 Contemporary Information Technology 1; coordinator: Mr D Wilson
This subject covers topical issues in the development and implementation of information systems and the professional ethics of software developers.

31770
Industry Project 1
5cp; 14hpw; 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. 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 the role and scope of HCI, HCI methods such as requirements analysis, task analysis and usability testing, usability evaluation, and user-centred design support.

31778
Resources 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 include resource acquisition, developing software, workplace environments, hardware and software security, operations management, and EDP accounting.

31779
Applications of Information Technology I
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, databases, 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.

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, databases, 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 I; 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 leading 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 B Wong
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. 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; and 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 Poufis

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: 22615 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: Mr J El-Den

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 R Raban

This subject deals with the ways system development becomes part of the operation of the modern day enterprise. It outlines how system development processes fall into and support everyday operations in an enterprise and how they are managed within the enterprise. There is particular emphasis on re-engineering existing systems into client needs using existing systems whenever possible, and minimising development costs through reuse of existing modules and the use of productivity tools that minimise development time while improving system quality.

31919

Distributed Software Programming
4cp; 4hpw; prerequisites: 31426 Systems Software and Networks; 31920 Network Management; coordinator: Mr U Szewcow

This subject builds on material learnt in Systems Software and Networks and the Network Management elective. It furthers an 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 Calville

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 databases. The theoretical discussion of the topic will be supported with practical exercises using a commercially available OODBMS.

31922

Object-oriented Methodologies
4cp; 3hpw; prerequisite: 31424 Systems Modelling or graduate subject 31940; coordinator: Mr R Raban

This subject introduces the object-oriented methods of analysing the problem domain and creating an implementation independent formal representation of the system requirements. As elements of the object-oriented analysis (OOA) process, OOA representation and OOA complexity management are introduced and compared with the related concepts of structured analysis methodologies. The differences between the two approaches, and the advantages and disadvantages of each of them, are discussed. Various object-oriented modelling methodologies are compared and their applicability to different application domains is assessed. The transition from implementation independent results of the OOA to the object-oriented design (OOD) for different implementation platforms is also covered.

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 supporting cooperation between distributed workers. It describes how people work together and the changes to work practices resulting from distribution of such work using information technology. The subject covers the ways of using collaboration technology such as LOTUS Notes or the Internet to support distributed work and the design processes followed to construct computer-based cooperative systems.

31924

Performance Modelling
4cp; 4hpw; prerequisites: 31432 Systems Software and Networks; 31428 Quantitative Modelling; 31696-7 or 31698-9 Industrial Training; 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: Dr R Rist
This subject provides an introduction to the Smalltalk programming language and environment. Topics include the syntax and semantics of Smalltalk, the Smalltalk programming tools, the Smalltalk class library, Smalltalk programming style and design, and adding graphical interfaces to Smalltalk programs.

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; and psychological, philosophical, computational and scientific issues in modelling intelligence.

31927
Applications Development with Visual Basic
4cp; 3hpw; prerequisite: 31414 Information Systems and one of 31415 Principles of Software Development A or 31429 Procedural Programming or 31729 Information Systems Practice; corequisite: 31424 Systems Modelling or 31434 Database Design; coordinator: Mr J Underwood
This subject aims to give students exposure to various business uses of microcomputers. Students will be required to apply software tools and packages which have different strengths and weaknesses to create an application. The technical environment for this subject is Microsoft Excel and Visual Basic.

31928
Applications Development with Delphi
4cp; 3hpw; prerequisite: 31414 Information Systems and one of 31415 Principles of Software Development A or 31429 Procedural Programming or 31729 Information Systems Practice; corequisite: 31424 Systems Modelling or 31434 Database Design; coordinator: Mr P Bebbington
This subject aims to give students exposure to the development of user-orientated databases using visual programming languages. Students will be required to apply software tools and packages which have different strengths and weaknesses to create an application. The technical environment for this subject is Borland Delphi and a database package.

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 testing, implementing quality assurance, and software engineering methods and tools.

31934
Introduction to Database Design
4cp; 4hpw; prerequisite: 31940 Introduction to Systems Modelling; 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 and object-oriented 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 their 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.

**31941**

**Introduction to Procedural Programming**

*4cp; 3hpw; coordinator: Dr B Howarth*

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 CW Johnson*

This subject provides a sound basis for understanding how computer hardware and data communications support higher level software constructions. All software undergoes a process of translation or interpretation which reduces it to primitive operations capable of being performed by the ‘hardware’. In this subject, the organisation and design of computer systems that execute these operations are examined. This subject also presents some fundamental concepts and technology in data communications, which alone is a good grounding in the area or which can serve as a basis for later subjects that treat communications and networks in greater depth.

**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: Mr R Raban*

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 students to 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
This subject covers a range of advanced database topics, including: relational, object-oriented database systems and distributed databases. The subject area is treated mainly from a technological viewpoint, but also includes discussions of management issues.

32205
Computer Communication Systems
6cp; 3hpw; coordinator: Associate Professor M Fry

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: 32207 Information Management; coordinator: Mr D Wilson
This subject is designed to provide students with an awareness of the problems in developing corporate strategies for information processing and to develop skills in the selection and use of appropriate techniques. Topics include the following: 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 and 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 concept 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, and secure systems.

32308  
Computer Architecture  
6cp; 3hpw; coordinator: Associate Professor T Hintz  
Current directions in machine architecture, 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; and IT as a leading part of the economy.

32501  
Computer Graphics  
6cp; 3hpw; coordinator: Dr K Suffern  
Demonstrates why computer graphics are 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  
This subject covers a range of topics in distributed databases and client/server computing. The main topics include discussion of distributed database design, distributed transactions and queries, and data replication strategies. Modern client/server and database server techniques are introduced.

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.

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 concepts 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: Dr R Rist
The Smalltalk language and programming environment are covered in the first half of the subject. The second half uses the Smalltalk class library to build an interactive system with a graphical user interface (GUI).

32512
Advanced Knowledge Technology
6cp; 3hpw; coordinator: Professor J Debenham

32513
Advanced Machine Learning
6cp; 3hpw; prerequisite: 32512 Advanced Knowledge Technology; coordinator: Dr T Osborn
This subject is concerned primarily with machine learning: automatic construction of computable models from data. Symbolic and non-symbolic methods are studied. Topics include statistical learning, clustering and correlations; neural networks methods; genetic algorithms; genetic programming; Shannon information; rule induction; and first-order learning.

32514
Advanced Case-based Reasoning
6cp; 3hpw; prerequisite: 32512 Advanced Knowledge Technology; coordinator: Dr T Osborn

32516
Internet Programming
6cp; 3hpw; coordinator: Dr G Feuerlicht
Internet Programming covers programming in Java, Website Administration, HTML authoring, CGI programming and network security. Students implement a system, preferably in their work environment, that interfaces a database to the World Wide Web using Java.

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 workplaces, 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 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 the difficulties associated with its prevention and 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

Systems 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. This subject examines the project from the set of user requirements right through to the final output solution, delivered on time, within budget and having achieved the expected performance criteria.

32605
Managerial Analysis and Evaluation of Information Systems
6cp; 3hpw; coordinator: Mr B Wong

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.

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


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 students' skills in the selection and use of appropriate techniques.

32806
Project A
6cp; prerequisite: Graduate Diploma in Information Technology Management; corequisite: 21751 Management Research Methods; coordinator: Professor J Debenham

See 32812 Project B below.

32812
Project B
6cp; prerequisites: 32806 Project A; 21751 Management Research Methods; coordinator: Professor J Debenham

All students in the MBus in IT Management are required to enrol in and pass the project subjects. 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 systems, capacity planning, communications, distributed systems, and 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 database design, automated development methodologies, alternative system modelling techniques, system usability, quality in information systems, organisation-wide network design, participative system design, managing the IT function in the next decade, security in information systems, evaluating the economics of information systems, and career paths in IT.

32912
Project
12cp; coordinator: Professor J Debenham
See 32924 Project below.

32924
Project
24cp; coordinator: Professor J Debenham

SUBJECTS OFFERED BY OTHER FACULTIES

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

015110
Aboriginal Cultures and Philosophies
8cp; 3hpw
This subject will introduce participants to Aboriginal culture and social organisation as expressions of Aboriginal cosmology. Contemporary Aboriginal culture will be presented as an evolving response to colonialism and as a reassertion of cultural empowerment.

21751
Management Research Methods
6cp; 3hpw; prerequisite: Graduate Certificate in Information Technology Management; coordinator: Associate Professor B Ticehurst
This subject 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 B Ticehurst

This subject addresses a range of management practices appropriate to contemporary organisations. The unit provides students with an understanding of key aspects of current management practices, including: managerial relationships; intercultural management; leadership, status and power; negotiation; interviewing; team building; managerial audits; and managerial ethics.

Students explore a range of strategies for handling management issues e.g. competencies relevant to people, organisational structures and issues, and working in international environments.

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; and strategic control and monitoring.

22321
Cost Management Systems
6cp; 3hpw; coordinator: to be advised

Introduces students to the basic concepts underlying management accounting with a particular emphasis on current developments. Introduces appropriate cost management concepts, techniques and skills such as cost planning, cost behaviour, cost estimation, and cost accumulation and allocation systems (job, process and activity-based costing). Emphasises using accounting information to understand and make decisions about the management of cost structures of organisations.

22615
Accounting Information Systems
4cp; 3hpw; coordinator: to be advised

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.

24105
Marketing Principles
5cp; 3hpw; coordinator: Mr G Taberner

Aims to develop an awareness and understanding of marketing concepts and how these concepts apply to profit and non-profit organisations. To provide the foundations from which a more advanced study of marketing may be pursued. To show the relevance of the need for a marketing orientation in a dynamic and changing business environment. To allow students to test and apply marketing concepts in a dynamic simulated business environment. To develop the skills necessary to formulate a basic marketing plan. The projects also highlight the need for group decision making for effective management.

24704
Managing Client Relations
6cp; 3hpw; 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 focusing 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.

54230
Aboriginal Social and Political History
8cp; 3hpw
Examines and analyses the impact of colonialism on indigenous peoples, with particular reference to the Aboriginal inhabitants of this region. The emergence of Aboriginal social and political movements will be presented as the basis for repossession of their traditional heritage in land and culture.

54231
Aboriginal People and the Media
8cp; 3hpw; prerequisites: 015110 Aboriginal Cultures and Philosophies; 54230 Aboriginal Social and Political History
Familiarises students with the field of debate in relation to the representation of Aboriginals in the media, and with the productions of Aboriginal media organisations. Where possible, some written, video or film production could become part of the course assessment.

54330
The Politics of Aboriginal History
8cp; 3hpw; prerequisites: Aboriginal Studies subjects at 100 and 200 levels
Introduces students to the wide range of historical work by Aboriginal and non-Aboriginal people over the last three decades, and encourages students to develop skills in the critical evaluation of this work in its political and social contexts. Students will enhance their knowledge of primary research materials for the field of Aboriginal history, and will develop their skills in the analysis and use of these sources.

54331
Aboriginal Forms of Discourse
8cp; 3hpw; prerequisites: 015110 Aboriginal Cultures and Philosophies; one Aboriginal Studies subject at the 200 level
Familiarises students with a broad range of Aboriginal forms of discourse – novels, plays, films, oral narratives – and introduces them to methods of analysis, of both text and content, deriving from the disciplines of cultural studies and textual studies.

International Studies subjects
Descriptions for subjects comprising the International Studies component of the combined Bachelor of Science in Computing Science/Bachelor of Arts in International Studies degree can be found in the School of Mathematical Sciences’ ‘Subject descriptions’ section in this handbook.
Numerical list of subjects

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 the 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’ section 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.

Bachelor of Science in Computing Science – core subjects

<table>
<thead>
<tr>
<th>Subject number</th>
<th>Subject name</th>
<th>Semester offered</th>
<th>CP</th>
<th>HPW</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
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1 Indicates at least four other core subjects from the BSc.
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**Aboriginal Studies subjects**

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**Note:** These subjects comprise the Aboriginal Studies sub-major; they may also be taken as electives.

**International Studies subjects**

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Note: x indicates one of four levels of study. Details of all International Studies subjects can be found in the School of Mathematical Sciences' 'Subject descriptions' section in this handbook.

### Graduate Diploma in Information Technology

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

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### Alphabetic list of subjects

#### Undergraduate subjects

**Explanatory notes**

1. Subjects taught by other faculties
2. BlnfTech only
3. GradDiplmTech and Graduate Certificates only
4. Elective subject
5. Not offered in 1997
6. Graduate Certificates only
7. BSc only
8. Subjects taught to students of other faculties only
9. BSc BA subject

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