Bachelor of Applied Science(Study Area A)/Bachelor of Information Technology (IX55)

Year offered: 2010
Admissions: Yes
CRICOS code: 020327M
Course duration (full-time): 4 years
Domestic fees (indicative): 2010: CSP $3,100 (indicative) per semester
International Fees (indicative): 2010: $11,500 (indicative) per semester
Domestic Entry: February
International Entry: February
QTAC code: 419302
Past rank cut-off: 77
Past OP cut-off: 12
OP Guarantee: Yes
Assumed knowledge: English (4,SA), Maths B (4,SA)
Preparatory studies: For information on acquiring assumed knowledge visit http://www.studentseervices.qut.edu.au/apply/ug/info/knowledge.jsp
Total credit points: 384
Course coordinator: Dr Perry Hartfield (Science), Mr Richard Thomas (Information Systems)
Discipline coordinator: Dr Perry Hartfield (Biochemistry Major); Dr Marion Bateson (Biotechnology Major); Dr Robert Johnson (Chemistry Major); Dr Ian Williamson (Ecology Major); Dr Robin Thwaites (Environmental Science Major); Dr Emad Kiriakous (Forensic Science Major); Dr Gary Huftile (Geoscience Major); Dr Christine Knox (Microbiology Major); Dr Greg Michael (Physics Major)
Campus: Gardens Point

Course Description
The science component of the course offers students a choice of one of nine majors: Biochemistry, Biotechnology, Chemistry, Ecology, Environmental Science, Forensic Science, Geoscience, Microbiology and Physics. See the Bachelor of Applied Science (SC01) course information for more details. So that students can complete the double degree in a shorter period of time, co-majors are to be taken from the information technology program.

This degree equips you to build and apply creative, innovative IT solutions across diverse industries. A hands-on, real world based curriculum gives you the opportunity to explore a wide range of areas within the two strands of this degree, and gain deep understanding within your chosen area speciality, such as networking, software engineering, data warehousing, business process modelling, enterprise systems, information management, web technologies, or digital societies. You will experience an innovative, hands-on approach to learning through projects where you develop IT systems. You will be able to gain entrepreneurial skills if you wish to learn how to develop an idea into a commercial opportunity. You learn to harness your creativity and people skills to maximise the impact of your technical know-how in the booming IT marketplace. It positions you for a challenging and rewarding career within the global economy. Full-time students are eligible for the Cooperative Education Program; paid industry work experience with credit towards your degree. Students are also offered many other work-integrated learning opportunities where you receive first-hand industry experience.

Study Areas
IX55 will not have nominated majors and minors and consequently there will not be a Study Area A shown on a graduate’s parchment. Instead, IX55 will have specialisations. The specialisation areas that will be available for students will include:

- Business Process Management
- Data Warehousing
- Digital Societies
- Enterprise Systems
- Information Management
- Network Systems
- Software Engineering
- Web Technologies

Recommended Study
At least one of the sciences. For the majors in biochemistry, biotechnology, forensic science and microbiology - Biological Science and Chemistry are recommended; for the major in physics - Maths C is recommended.

Career Outcomes
Recent rapid technological advances in scientific equipment have led to a high demand for graduates qualified in both a science discipline and information technology. This double degree qualifies you for this niche area of employment. Alternatively you may pursue a career as a science professional with the added dimension of advanced technological skills. Or you may choose to work in an information technology specialist area and find that your broad range of skills makes you particularly attractive to employers in industries at the forefront of scientific discoveries. IT is now an integral part of all commercial, industrial and government activities.

Professional Recognition
Graduates will satisfy the requirements for membership in the relevant professional body for their chosen science major. See the Bachelor of Applied Science course for
Entry Requirements

Year 12 or equivalent
Prerequisites: Nil
Primary Fields: B or C
Secondary Fields: B or C

International Students

English language requirements
In addition to the above academic entry requirements, international students must meet the University’s English language requirements of IELTS of 6.5 (with no lower than 6.0 for any one band).

Cooperative Education

The School of IT’s Cooperative Education Program gives you the opportunity of 10-12 months paid industry placement during your course where you can integrate real experience with what you’re learning in your degree. Companies that QUT’s Coop Ed students have worked with include Energex, Boeing, CITEC, CSC Mining, Environmental Protection Agency, Dialog, UNITAB, RACQ and many Queensland Government departments. The Coop Ed Program is available to Australian citizens and permanent residents only.

Find out more about the Cooperative Education Program.

Pathways to Further Studies

In 2001, an accelerated Honours program was introduced to increase the number of Bachelor of Information Technology students continuing their studies to complete the Honours year. The program allowed selected high achieving students the opportunity to undertake one postgraduate unit in the final semester of their BIT degree (or double degree) which would be counted both for completion of the degree and towards the Honours program. The program also provided students with the opportunity to commence their Honours studies over the Summer Semester.

An alternative to the Honours program is the Master of Information Technology (Research). Students who complete a BIT degree (or double degree) with a grade point average equal to, or greater than 5 (7 point scale) and who have decided against enrolling in an Honours program, could undertake this course. In addition, students may wish to enrol in the re-designed postgraduate coursework Masters which has ten specialisations allowing students to either extend their area of interest or specialise in other areas at the Masters level.

Further Information

For further information about this course, please contact the following:

Science Coordinator
Dr Perry Hartfield
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Information Technology Coordinator
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Email: i.williamson@qut.edu.au

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Email: r.thwaites@qut.edu.au

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Email: e.kiriakous@qut.edu.au

Geoscience
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Email: g.huftile@qut.edu.au

Microbiology
Dr Christine Knox
Phone: +61 7 3138 2301
### IX55 Bachelor of Applied Science/Bachelor of Information Technology Course structure

#### Year 1, Semester 1
- **INB101** Impact of IT
- **INB102** Emerging Technology

#### Year 1, Semester 2
- **INB103** Industry Insights
- **INB104** Building IT Systems

#### Year 2, Semester 1
- IT Breadth Unit Option
- IT Breadth Unit Option

#### Year 2, Semester 2
- IT Breadth Unit Option
- IT Breadth Unit Option

#### Year 3, Semester 1
- **INB201** Scalable Systems Development
  - IT Specialisation Unit Option
  - Science Major Unit

#### Year 3, Semester 2
- **INB300** Professional Practice in IT
  - IT Specialisation Unit Option
  - Science Major Unit

#### Year 4, Semester 1
- **INB301** The Business of IT
  - IT Specialisation Unit Option
  - Science Major Unit

#### IT Breadth Option Unit List

You must complete four (4) units from the following list. You should not commence these units until you have completed INB101, INB102, INB103 and INB104.

- **INB120** Corporate Systems
- **INB210** Databases
- **INB220** Business Analysis
- **INB250** Systems Architecture
- **INB251** Networks
- **INB255** Security
- **INB270** Programming
- **INB271** The Web
- **INB272** Interaction Design

#### IT Specialisation Option Unit List

You must complete four (4) units from the following list. Please ensure you have completed a minimum of 36 credit points (3 units) of IT Breadth Option Units before commencing these units. The units are grouped in areas to assist you in focusing your studies.

1. **BUSINESS PROCESS MANAGEMENT**:
   - **INB320** Business Process Modelling
   - **INB321** Business Process Management
   - **INB322** Information Systems Consulting
   - **INB123** Project Management Practice

2. **DATA WAREHOUSING**:
   - **INB340** Database Design
   - **INB341** Software Development With Oracle
   - **INB342** Enterprise Data Mining
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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>INB343</td>
<td>Advanced Data Mining and Data Warehousing</td>
<td>Please note: INB343 not offered in 2010</td>
</tr>
<tr>
<td>INB345</td>
<td>Mobile Devices</td>
<td></td>
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<tr>
<td>INB346</td>
<td>Enterprise 2.0</td>
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<tr>
<td>INB347</td>
<td>Web 2.0 Applications</td>
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<tr>
<td>INB335</td>
<td>Information Resources</td>
<td></td>
</tr>
<tr>
<td>INB343 &amp; INB323</td>
<td>are not offered in 2010</td>
<td></td>
</tr>
</tbody>
</table>

### Course structure - Major in Biochemistry

#### Year 1, Semester 1
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life

#### Year 1, Semester 2
- SCB120 Plant and Animal Physiology
- SCB121 Chemistry 2

#### Year 2, Semester 1
- SCB110 Science Concepts and Global Systems
  - Either
    - MAB101 Statistical Data Analysis 1
    - MAB105 Preparatory Mathematics
  - Or
    - MAB105 Preparatory Mathematics

#### Year 2, Semester 2
- SCB122 Cell and Molecular Biology
- SCB123 Physical Science Applications

#### Year 3, Semester 1
- LQB381 Biochemistry: Structure and Function
- LQB383 Molecular and Cellular Regulation

#### Year 3, Semester 2
- LQB481 Biochemical Pathways and Metabolism
- LQB483 Molecular Biology Techniques

#### Year 4, Semester 1
- LQB581 Functional Biochemistry
- LQB582 Biomedical Research Technologies

#### Year 4, Semester 2
- LQB681 Biochemical Research Skills
- LQB682 Protein Biochemistry and Bioengineering

### Course structure - Major in Biotechnology

#### Year 1, Semester 1
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life

#### Year 1, Semester 2
- SCB120 Plant and Animal Physiology
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<tr>
<th>Year, Semester</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>Year 1, Semester 1</td>
<td>SCB111</td>
<td>Chemistry 1</td>
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<td>Either</td>
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<td></td>
<td>MAB101</td>
<td>Statistical Data Analysis 1</td>
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<td>Or</td>
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<td></td>
<td>MAB105</td>
<td>Preparatory Mathematics</td>
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<tr>
<td>Year 2, Semester 1</td>
<td>SCB121</td>
<td>Chemistry 2</td>
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<tr>
<td>Year 2, Semester 2</td>
<td>SCB110</td>
<td>Science Concepts and Global Systems</td>
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<td>Either</td>
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<td></td>
<td>MAB101</td>
<td>Statistical Data Analysis 1</td>
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<td></td>
<td>MAB105</td>
<td>Preparatory Mathematics</td>
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<tr>
<td>Year 3, Semester 1</td>
<td>LQB381</td>
<td>Biochemistry: Structure and Function</td>
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<tr>
<td></td>
<td>LQB383</td>
<td>Molecular and Cellular Regulation</td>
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<tr>
<td>Year 3, Semester 2</td>
<td>LQB483</td>
<td>Molecular Biology Techniques</td>
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<tr>
<td></td>
<td>LQB484</td>
<td>Introduction to Genomics and Bioinformatics</td>
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<td>Year 4, Semester 1</td>
<td>Select TWO units from:</td>
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<td></td>
<td>LQB583</td>
<td>Genetic Research Technology</td>
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<td></td>
<td>LQB584</td>
<td>Medical Cell Biology</td>
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<td></td>
<td>LQB585</td>
<td>Plant Genetic Manipulation</td>
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<tr>
<td>Year 4, Semester 2</td>
<td>Select TWO units from:</td>
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<td></td>
<td>LQB682</td>
<td>Protein Biochemistry and Bioengineering</td>
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<td>LQB684</td>
<td>Medical Biotechnology</td>
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<td></td>
<td>LQB685</td>
<td>Plant Microbe Interactions</td>
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<td>Course structure - Major in Chemistry</td>
<td>Year 1, Semester 1</td>
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<tr>
<td></td>
<td>SCB111</td>
<td>Chemistry 1</td>
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<td>Either</td>
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<td></td>
<td>MAB101</td>
<td>Statistical Data Analysis 1</td>
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<td></td>
<td>MAB105</td>
<td>Preparatory Mathematics</td>
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<tr>
<td>Year 1, Semester 2</td>
<td>SCB112</td>
<td>Cellular Basis of Life</td>
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<td>SCB121</td>
<td>Chemistry 2</td>
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### Course structure - Major in Environmental Science

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<tr>
<th>Year 3, Semester 1</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NQB302</td>
<td>Earth Surface Systems</td>
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<tr>
<td>NQB321</td>
<td>Ecology</td>
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<tr>
<th>Year 3, Semester 2</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NQB421</td>
<td>Experimental Design</td>
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<tr>
<td>NQB422</td>
<td>Genetics and Evolution</td>
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<th>Year 4, Semester 1</th>
<th>Course Code</th>
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<tbody>
<tr>
<td>NQB521</td>
<td>Population Genetics and Molecular Ecology</td>
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<tr>
<td>NQB523</td>
<td>Population Management</td>
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<th>Year 4, Semester 2</th>
<th>Course Code</th>
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<tbody>
<tr>
<td>NQB622</td>
<td>Conservation Biology</td>
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<tr>
<td>NQB623</td>
<td>Ecological Systems</td>
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### Course structure - Major in Forensic Science

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<th>Course Code</th>
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<tbody>
<tr>
<td>SCB111</td>
<td>Chemistry 1</td>
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<tr>
<td>SCB112</td>
<td>Cellular Basis of Life</td>
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<tr>
<th>Year 1, Semester 2</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>SCB120</td>
<td>Plant and Animal Physiology</td>
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<td>SCB121</td>
<td>Chemistry 2</td>
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<th>Year 2, Semester 1</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>SCB110</td>
<td>Science Concepts and Global Systems</td>
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<td>Either</td>
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<tr>
<td>MAB101</td>
<td>Statistical Data Analysis 1</td>
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<td>Or</td>
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<tr>
<td>MAB105</td>
<td>Preparatory Mathematics</td>
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<th>Year 2, Semester 2</th>
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<tbody>
<tr>
<td>SCB123</td>
<td>Physical Science Applications</td>
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<tr>
<td>SCB131</td>
<td>Experimental Chemistry</td>
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<th>Year 3, Semester 1</th>
<th>Course Code</th>
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<tbody>
<tr>
<td>LQB383</td>
<td>Molecular and Cellular Regulation</td>
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<tr>
<td>SCB384</td>
<td>Forensic Sciences - From Crime Scene to Court</td>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>JSB979</td>
<td>Forensic Scientific Evidence</td>
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<tr>
<td>PQB312</td>
<td>Analytical Chemistry For Scientists and Technologists</td>
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<th>Year 4, Semester 1</th>
<th>Course Code</th>
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<tbody>
<tr>
<td>PQB513</td>
<td>Instrumental Analysis</td>
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<tr>
<td>PQB584</td>
<td>Forensic Physical Evidence</td>
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<tr>
<th>Year 4, Semester 2</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>LQB680</td>
<td>Forensic DNA Profiling</td>
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<tr>
<td>PQB684</td>
<td>Forensic Analysis</td>
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### Course structure - Major in Geoscience

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<thead>
<tr>
<th>Year 3, Semester 1</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NQB302</td>
<td>Earth Surface Systems</td>
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<tr>
<td>NQB321</td>
<td>Ecology</td>
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<tr>
<th>Year 3, Semester 2</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NQB403</td>
<td>Soils and the Environment</td>
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<tr>
<td>NQB421</td>
<td>Experimental Design</td>
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<tr>
<th>Year 4, Semester 1</th>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NQB501</td>
<td>Environmental Modelling</td>
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</tbody>
</table>
SCB111  Chemistry 1
SCB112  Cellular Basis of Life

Year 1, Semester 2
NQB201  Planet Earth
SCB123  Physical Science Applications

Year 2, Semester 1
SCB110  Science Concepts and Global Systems
Either
MAB101  Statistical Data Analysis 1
Or
MAB105  Preparatory Mathematics

Year 2, Semester 2
NQB202  History of Life on Earth
SCB222  Exploration of the Universe

Year 3, Semester 1
NQB311  Mineralogy
NQB314  Sedimentary Geology

Year 3, Semester 2
NQB411  Petrology of Igneous and Metamorphic Rocks
NQB412  Structural Geology and Field Methods

Year 4, Semester 1
NQB502  Field Methods in Natural Resource Sciences
NQB513  Geophysics

Year 4, Semester 2
NQB602  Environmental Chemistry
NQB614  Groundwater Systems

Course structure - Major in Microbiology

Year 1, Semester 1
SCB111  Chemistry 1
SCB112  Cellular Basis of Life

Year 1, Semester 2
SCB120  Plant and Animal Physiology
SCB121  Chemistry 2

Year 2, Semester 1
SCB110  Science Concepts and Global Systems
Either
MAB101  Statistical Data Analysis 1
Or
MAB105  Preparatory Mathematics

Year 2, Semester 2
SCB122  Cell and Molecular Biology
SCB123  Physical Science Applications

Year 3, Semester 1
LQB201  Biochemistry: Structure and Function
LQB306  Microbial Structure and Function

Year 3, Semester 2
LQB483  Molecular Biology Techniques
LQB486  Clinical Microbiology 1

Year 4, Semester 1
LQB581  Clinical Microbiology 2
LQB587  Applied Microbiology 1: Water, Air and Soil

Year 4, Semester 2
LQB686  Microbial Technology and Immunology
LQB687  Applied Microbiology 2: Food and Quality Assurance

Course structure - Major in Physics

Year 1, Semester 1
MAB121  Calculus and Differential Equations
SCB111  Chemistry 1

Year 1, Semester 2
MAB122  Algebra and Analytic Geometry
PQB250  Mechanics and Electromagnetism

Year 2, Semester 1
SCB110  Science Concepts and Global Systems
SCB112  Cellular Basis of Life

Year 2, Semester 2
MAB220  Computational Mathematics 1
PQB251  Waves and Optics

Year 3, Semester 1
MAB311  Advanced Calculus
PQB350  Thermodynamics of Solids and Gases

Year 3, Semester 2
PQB450  Energy, Fields and Radiation
PQB451  Electronics and Instrumentation

Year 4, Semester 1
PQB550  Quantum and Condensed Matter Physics
PQB551  Physical Analytical Techniques

Year 4, Semester 2
PQB650  Advanced Theoretical Physics
PQB651  Experimental Physics

Potential Careers:

UNIT SYNOPSES

INB101 IMPACT OF IT
You will gain an appreciation of the massive and positive impact that IT has had on a wide range of fields including business, science, engineering, education and health. You will learn about the benefits of increased productivity due to IT. You will consider ethical issues and possible negative impacts of IT. You will raise your awareness of the social implications of IT systems for society at the global, local and personal levels. You will develop an informed position on issues, and justify your reasoning with considered supportive arguments.

Antirequisites: ITB361, INN101  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

INB102 EMERGING TECHNOLOGY
The aim of this unit is to provide you with a conceptual framework so that you clearly identify Information Technologies and their purpose. This task will be fun as it covers a wide spectrum of ideas and allows us to examine some currently popular technologies. Information Technology has become so entwined with everyday life that identifying its scope is difficult, which also makes it difficult to identify opportunities where IT might further infiltrate into our daily lives for work and play. To achieve these aims, the unit introduces you to some of the theories and engineering practicalities that have already resulted in technological advances in the area of information technology. Concepts leading to existing technologies are introduced during lectures, which are followed by laboratory sessions where students will be encouraged to discuss social change, future information tools and explore the concepts required for constructing these technologies.

Antirequisites: ITB005  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

INB103 INDUSTRY INSIGHTS
This unit aims to develop your awareness of the career possibilities in the ICT industry and to equip you with some of the essential skills required of an ICT professional. The unit helps you to derive a roadmap for your career; to enable you to identify the qualities, skills and interests you need to possess, to plan your career path. The unit will also introduce you the inter-disciplinary nature of ICT careers.

Antirequisites: ITB002  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

INB104 BUILDING IT SYSTEMS
This team-based unit is an integrated introduction to information technology designed to engage, inspire and inform and will demonstrate the important role that technical system design and development plays in achieving robust operation of a large variety of technological solutions. This unit will give you substantial hands-on, practical learning experiences and will motivate you through engagement in the creative, explorative and meaningful development of technological artefacts that operate in real world contexts.

Antirequisites: ITB001  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

INB120 CORPORATE SYSTEMS
Corporate Systems Management is a growing area where people can make a difference to the way organisations and societies operate. In key business domains, such as Government, Health, Finance, Utilities and Primary Industries, Corporate Systems Managers play a vital role in directing the socio-technical systems that affect everyone's lives. This unit will help students to gain an overview of these major roles and key business domains in order to set the scene for their future studies and help them to match their emerging professional interests with potential career directions.

Antirequisites: ITB360  Credit points: 12  Contact
INB123 PROJECT MANAGEMENT PRACTICE
Successful businesses use Project Management (PM) processes to structure the implementation, upgrades and process improvement activities undertaken within organisations. This unit investigates project management processes and analyses, combines and applies the basic elements and tools of successful projects to ICT cases. With a focus on contemporary organisations, the unit covers activities such as communication and risk management, change management, recording keeping and project reporting. The unit covers practical, relevant and topical PM issues delivered as a complex project activity.

Prerequisites: ITB004 or ITB005 and (INB102 or ITB001)
Assumed knowledge: Completion of 36cp of Breadth units is assumed knowledge
Credit points: 12
Contact hours: 3 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1

INB201 SCALABLE SYSTEMS DEVELOPMENT
TBA

INB204 SPECIAL TOPIC 1
This unit gives you the opportunity to apply, under appropriate guidance, the knowledge and skills gained in your course to date and to execute a substantial development project. The ability to apply technical knowledge and skills to real-life situations is essential for information technology professionals. A substantial project, under academic supervision, will develop your initiative and ability to apply your knowledge and skills in a professional capacity. Completing the project will also enable you to appreciate the complementary nature of the course material in total, particularly the need for careful project management.

Prerequisites: INB371
Assumed knowledge: Knowledge of programming in Java, C# or C++. Knowledge of basic data structures (stacks, queues, trees, linked lists, hash tables), complexity analysis
Credit points: 12
Contact hours: 3 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1

INB220 BUSINESS ANALYSIS
This unit is designed to give you an introduction to the role, knowledge, and skills required of a business analyst. This unit focuses on both the trades—tools and methods used by a business analyst, as well as the soft skills—creativity and communication, both of which are critical to successful business and requirements analysis. Through lectures, cases studies and role playing activities, you will develop basic knowledge and skills required for introductory business analysis (BA).

Credit points: 12
Contact hours: 3 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1

INB221 TECHNOLOGY MANAGEMENT
This unit presents operational, tactical and strategic insights that support the activities central to the leadership and management of technology. These insights include project management, organisational leadership, outsourcing, planning, governance and millennium technologies. Such insights are used to inform decision-making - the core skill of any manager. Technology managers must understand the factors influencing any decision point. This unit equips
students for the challenges of management and to contribute to the decision-making faced by managers and the staff who advise on these issues.

Prerequisites: INB103 or ITB002 or INB120 or ITB360

Antirequisites: ITN241, ITN251 and ITN366

Equivalents: ITB366, ITB241

Credit points: 12

Contact hours: 3 per week

Campus: Gardens Point

Teaching period: 2010 SEM-1

INB250 SYSTEMS ARCHITECTURE

Contemporary computer-based systems are built from a wide range of technologies working at different levels of abstraction, from microprocessor hardware, to operating system and application software, to entire communications networks. At each abstraction level different techniques are needed to understand emergent properties of the system. This unit introduces some of the foundational principles commonly used to reason about the behaviour of computer-dependent systems at different levels of abstraction. Such techniques are especially important in the context of safety-, security- or mission-critical systems.

Assumed knowledge: Basic familiarity with set theory (Venn diagrams and set operators), elementary algebra (polynomial and summation expressions, exponents and logarithms, etc) and simple probability concepts (permutations and combinations).

Credit points: 12

Contact hours: 3 per week

Campus: Gardens Point

Teaching period: 2010 SEM-2

INB251 NETWORKS

Computer systems and communications networks are essential to the activities of modern organisations. When you graduate from a course in Information Technology, employers expect you to have a sound understanding of the terminology and concepts of computer systems, communications networks, and network services. This unit provides you with an introductory study of communications network technologies and network applications. The unit serves as an entry point to further specialised studies in the field of computer network systems.

Antirequisites: ITB006

Credit points: 12

Contact hours: 3 per week

Campus: Gardens Point

Teaching period: 2010 SEM-2

INB255 SECURITY

This unit aims to give you an understanding of the major issues in information security. You will be able to identify critical information security concepts and determine the information security implications of interactions between entities. You will have knowledge of a range of techniques for protecting information, and understand the limitations of these techniques. You will be aware of international information security management standards.

Antirequisites: ITB161, ITB523, ITB623 and ITN161

Equivalents: ITB730

Credit points: 12

Contact hours: 3 per week

Campus: Gardens Point

Teaching period: 2010 SEM-1

INB270 PROGRAMMING

This unit aims to give you a positive introduction to the skills required in solving computational problems and implementing solutions in a programming or scripting language. Although some theoretical aspects of computer programming are introduced briefly, the overall emphasis of the unit is programming practice. The unit emphasises generic programming concepts and related problem-solving strategies. The skills you learn in this unit will be applicable to a wide variety of commonly-used, industrially-significant programming and scripting languages.

Prerequisites: INB104 or ENB246

Antirequisites: ITB003, ITB112, ITB411, INN270

Credit points: 12

Contact hours: 3 per week

Campus: Gardens Point

Teaching period: 2010 SEM-2

INB271 THE WEB

The aims of the unit are to give you a thorough understanding of what the web is, how it works and what it has to offer. Additionally, the unit aims to give you a general understanding and basic skills in developing dynamic web applications, including an appreciation of the variety of implementation technologies available. Through an understanding of how web technologies have evolved to date, you will appreciate the necessity for lifelong learning and become an insightful predictor of future developments in this area. You will learn to critically analyse technological alternatives in order to adapt to and innovate with technologies that presently do not exist. You will appreciate the business or organizational context within which web applications exist and be skilled in communicating within that environment. You will appreciate the social and ethical issues relating to web based systems including accessibility, globalization, privacy, and piracy.

Prerequisites: INB104

Antirequisites: INB373 and INN370 and ITB007 and ITB227 and ITN007 and ITN227

Credit points: 12

Contact hours: 3 per week

Campus: Gardens Point

Teaching period: 2010 SEM-1

INB272 INTERACTION DESIGN

The aim of this unit is to provide you with an understanding of the theory, practices and challenges associated with the development of creative interactive design and human computer interaction.

Prerequisites: INB103 or INB181

Equivalents: ITB254
INB300 PROFESSIONAL PRACTICE IN IT

In this unit you will have the opportunity to experience real world work experiences and to reflect on how your studies have prepared you for the work environment. This will give you the opportunity to plan on how to best take advantage of your remaining studies to prepare for your planned career. To help you to understand your future career you will be working in a team and/or group environments, seeing firsthand the challenges and constraints that arise during professional practice in a real world industry environment. You will develop a richer appreciation of the graduate capabilities required of all information technology professionals, particularly skills such as communication, negotiation and problem-solving strategies.

Prerequisites: INB301 Assumed knowledge: Students are expected to have a solid IT background knowledge (e.g., completion of at least 192 credit points)
Equivalents: ITB010 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

INB301 THE BUSINESS OF IT

As an IT professional you are more and more evaluated in terms of the business value that you produce. This unit will prepare you for professional practice by making you “business savvy,” i.e. giving you the business knowledge and skills that will help you with your future career and job. In particular the unit will address three themes: (1) career planning and job applications, (2) entrepreneurship & innovation, and (3) business and IT strategy. You will be introduced to career development tools that enable you to self-manage your career and life. You will learn how to critically think about the requirements of a job and reflect upon your own experiences and learn how to communicate them. You will also learn about the entrepreneurial process of identifying a business opportunity and how to take advantage of that opportunity. In addition, you will gain an understanding of core strategic concepts and models, discuss typical strategy tools and then apply them to the ‘Business of IT’.

Prerequisites: ITB009 Assumed knowledge: Completion of 120 credit points within BIT is assumed
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1 and 2010 SEM-2

INB302 CAPSTONE PROJECT

Students are to work together in a team of 4-5 on a project that addresses one of the following three types of problems: real business problems, real market needs, real research problems. This unit extends students’ development of the professional, technical and teamwork skills required by IT professionals in practice. Students will extend their knowledge and skills in the areas of IT project management through completing professional project documentation and managing the team project. Students will also gain a greater understanding and skill level in analysis and design, and their significance in delivering successful business or research outcome. The unit also focuses on furthering students’ professional skills in report writing, oral communication, and visual communication.

Prerequisites: INB301 Assumed knowledge: Students are expected to have a solid IT background knowledge (e.g., completion of at least 192 credit points)
Equivalents: ITB010 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

INB304 SPECIAL TOPIC 3

Traditional Artificial Intelligence (AI) aims at satisfying the Turing test, that is, it aims at making computers indistinguishable from humans. Computer games AI aims at giving Non-Player Characters (NPC) behavioural artefacts that complement a game narrative. Computer game AI is a special area of study that deals with algorithmic approaches to entertainment affects in NPC. Students will develop in this unit an understanding of problems, solutions and algorithms that generally defines the current state of computer game AI. The aim of this unit is to provide students with an intermediate level course in computer game AI that involves a set of the most relevant algorithms and their applications in the interactive entertainment and game industries.

Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2010 SEM-2

INB305 SPECIAL TOPIC 4

INB305 Bgie Project Design Phase (P1) extends your work on the role, design, and plan of a computer game concept. The unit covers the conceptualisation and game design stages up to the game design pitch. If the project is given a green light by the assessment panel, it may be developed later in the P2 unit.

Prerequisites: INB371 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2010 SEM-2

INB306 PROJECT 1

This unit gives you the opportunity to apply, under appropriate guidance, the knowledge and skills gained in your course to date and to execute a substantial development project. The ability to apply technical knowledge and skills to real-life situations is essential for
information technology professionals. A substantial project, under academic supervision, will develop your initiative and ability to apply your knowledge and skills in a professional capacity. Completing the project will also enable you to appreciate the complementary nature of the course material in total, particularly the need for careful project management.

**Prerequisites:** INB101, INB102, INB103, INB104 and INB201

**Assumed knowledge:** As a minimum requirement you must have completed at least 132 credit points of IT units, including INB101, INB102, INB103, INB104, INB201, four breadth units, and at least two specialisation units.

**Equivalents:** ITB230

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

### INB307 PROJECT 2

This unit gives you the opportunity to apply, under appropriate guidance, the knowledge and skills gained in your course to date and to execute a substantial development project. The ability to apply technical knowledge and skills to real-life situations is essential for information technology professionals. A substantial project, under academic supervision, will develop your initiative and ability to apply your knowledge and skills in a professional capacity. Completing the project will also enable you to appreciate the complementary nature of the course material in total, particularly the need for careful project management.

**Assumed knowledge:** Assumed knowledge is completion of 192cp of which at least 144cp must be IT units

**Equivalents:** ITB791

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

### INB308 PROJECT 3

This unit gives you the opportunity to apply, under appropriate guidance, the knowledge and skills gained in your course to date and to execute a substantial development project. The ability to apply technical knowledge and skills to real-life situations is essential for information technology professionals. A substantial project, under academic supervision, will develop your initiative and ability to apply your knowledge and skills in a professional capacity. Completing the project will also enable you to appreciate the complementary nature of the course material in total, particularly the need for careful project management.

**Assumed knowledge:** Assumed knowledge is completion of 192 credit points of which at least 144 credit points must be for IT units

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

### INB311 ENTERPRISE SYSTEMS

The unit presents and discusses the Enterprise Systems Lifecycle model, orienting students to the requirements of addressing total cost of ownership, change management requirements and process modelling requirements in order to achieve business benefits. Concepts of Enterprise Systems success and associated enablers and barriers are also introduced. This unit introduces the technical architecture of complex 3-tiered client server environments. It seeks to show how an integrated complex database environment meets common business needs, and yet fails to meet the total Information Systems requirements.

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-2

### INB312 ENTERPRISE SYSTEMS APPLICATIONS

The aim of this unit is to introduce one of the more complex and comprehensive Enterprise Systems applications. This unit introduces the business perspective and application processes of modules (such as FI, CO, PP, MM and S&D) and investigates the support provided by these systems and the integration between modules by following some of the major processes in a business. The unit enables you to experience both the business analyst view and the user's view of the system across a number of business processes.

**Prerequisites:** INB233, INN312

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1

### INB313 ELECTRONIC COMMERCE SITE DEVELOPMENT

This unit will enable you to specify, design, implement and maintain effective e-commerce applications. You will obtain a broad understanding of the potential of e-commerce and how it can be employed to benefit an organisation. You will get direct experience of creating an e-commerce storefront following a business to business (B to B) or business to consumer (B to C) model. You will also have an understanding of the computer systems that underpin e-commerce including payment systems and secure transactions.

**Equivalents:** ITB260

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-2

### INB320 BUSINESS PROCESS MODELLING

The aim of this unit is to introduce you to modern methods and tools of business process management. These skills will be applied to the most complex, comprehensive and
relevant IT applications. This unit also seeks to develop logical thinking and the capability to understand and deal with complex systems, within a business management framework. The content will focus strongly on business process modelling, as a fundamental technique to manage the complexity associated with process management tasks within various contexts.

**Equivalents:** ITB298  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**INB321 BUSINESS PROCESS MANAGEMENT**

The aim of this unit is to introduce you to modern methodologies of Business Process Management. A main objective is to increase your awareness of the close link between business requirements and IT capabilities, and the related fundamental role of business processes. This unit also seeks to develop logical thinking, an appreciation for conceptual models, and the capability to understand and deal with complex systems.

**Antirequisites:** INN321  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**INB322 INFORMATION SYSTEMS CONSULTING**

The aim of the unit is to develop your skills in the consulting engagement process. This unit will give you an appreciation of the management of consulting practices and an understanding of the consulting sector generally. This unit presents the tactical and strategic issues involved in management consulting, and in particular: client engagement. In the unit there is an emphasis on Information Systems (IS) related work. IS constitutes a substantial portion of consulting activity and cuts across all areas of business expertise. The unit examines the dynamics of IS consulting within the context of large consulting firms and familiarises students with the consulting engagement lifecycle.

**Antirequisites:** ITB264, ITN264  **Assumed knowledge:** Completion of 96 credit points of an Undergraduate study is assumed knowledge  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**INB335 INFORMATION RESOURCES**

This unit will help you to understand the structure of the information environment, to reflect upon the information resources you discover, and to develop the ability to find appropriate information for future problem solving. You will develop your skills in identifying, accessing, evaluating and retrieving information resources to meet specific information needs. The unit will also help you develop skills in teamwork and oral and written communication.

**Equivalents:** ITB322  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**INB340 DATABASE DESIGN**

The aim of this unit is to help you develop your knowledge, understand a formal specification tool (ORM) for modelling information systems unambiguously and to apply this formal technique to conceptualise information systems found in many real world application domains.

**Prerequisites:** INB210 or ITB004  **Antirequisites:** ITB229  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**INB341 SOFTWARE DEVELOPMENT WITH ORACLE**

Oracle Corporation is the leading supplier of database software. This unit aims to develop a sound understanding of database creation, installation, administration, management, security, back up/recovery and application development. The unit aims to develop practical skills in each of these elements, using appropriate Oracle software.

It is expected that students undertaking this unit will have prior knowledge of relational database terminology and concepts, be thoroughly able to develop SQL for querying, updating and creating tables, and have a sound knowledge of database design.

**Prerequisites:** INB210 or ITB004 or INB122  **Equivalents:** ITB223  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**INB342 ENTERPRISE DATA MINING**

This unit will provide a comprehensive theoretical coverage of various topics in data and web mining. In addition there will be a significant practical component using hands on tools to solve real-world problems. Specifically, we will consider techniques from machine learning, data mining, text mining, and information retrieval to extract useful knowledge from data which are used for business intelligence, document databases, site management, personalization, and user profiling. This unit will first cover a detailed overview of the mining process and techniques, and then concentrate on applications of these techniques to web, e-commerce, document databases and data from advanced applications.

**Prerequisites:** INB122 or INB210 or INB340 or AYB114  **Antirequisites:** INN342  **Equivalents:** ITB239  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point
Gardens Point  Teaching period: 2010 SEM-2

INB343 ADVANCED DATA MINING AND DATA WAREHOUSING
Data warehousing and mining have been well recognized as the dominating techniques for using databases in the future. This unit discusses the concepts, structures and algorithms of data warehousing and mining, e.g., data architecture and quality, data warehouse and data mart, data cubes, OLAP, patterns, association rules and decision tables. Through this study, students will be able to demonstrate knowledge and skills of designing, developing and implementing data warehousing components in SQL environments. It also enables students to design systems and tools that provide services to data management and analysis, such as data warehouses, data mining tools, business intelligence based systems, smart information use systems, and data processing systems.

Prerequisites: INB210  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point

INB345 MOBILE DEVICES
This unit provides the opportunity for exploring new and emerging mobile devices and wireless technology including iPhone, Netbook, 3G, WiMax, and RFID. Students will critically review and understand how they can be used for current contexts such as government, business, education and social community, as well as emerging ‘wilderness’ environments with no power and wired communication. Students will appreciate the impacts of these devices and be inspired for the current and future opportunities in ICT usage trends.

Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

INB346 ENTERPRISE 2.0
This unit will help you to acquire the skills and knowledge required to critically explore and utilise applications within diverse contexts and organisations.

Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

INB347 WEB 2.0 APPLICATIONS
Web 2.0 applications enable the user to be control. The unit will provide the opportunity for students to explore web 2.0 applications including blogs, wikis, social networking, social tagging, podcasts, gaming, storytelling and virtual worlds such as second life. Students will critically consider the many and varied web applications and how they can be used in different contexts such as government, small and medium size businesses, non-profit organisations, educational institutions and community groups.

Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

INB350 INTERNET PROTOCOLS AND SERVICES
An understanding of the theoretical and practical concepts of network protocols and services is highly useful and relevant to network engineers and others working in the Information Processing industries. This unit introduces you to Internet protocols and the design, implementation and operation of network based applications. Theory and practical skills taught in this unit will be useful if you intend undertaking further networking units.

Prerequisites: INB251 or ITB006 or ITB510  Antirequisites: ITB264, ITB629, ITB720, ITN525, ITN667, ITN720  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

INB351 COMPUTER NETWORK ADMINISTRATION
The aim of this unit is to provide students with a working knowledge of the technical aspects and theory of network administration and management. The unit uses the Unix environment as the learning platform for attaining technical skills and for the development of problem solving skills necessary to be a successful networking professional.

Prerequisites: INB350  Equivalents: ITB721, ITB625, ITB535, ITB525  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

INB352 NETWORK PLANNING AND DEPLOYMENT
The unit draws together subject matter from a number of different networking-related areas. The aim of the unit is to assemble the previously acquired knowledge and techniques and apply it in a cohesive fashion to the task of network planning.

Prerequisites: INB350  Antirequisites: ITB551, ITB628, ITB722, INN352, ITN551, ITN722  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

INB353 WIRELESS AND MOBILE NETWORKS
This unit provides you with the skills to be able to design and understand the issues involved with different types of wireless communications systems. It develops your knowledge of Wide Area Networks (WANs), Local Area Networks (LANs) and Personal Area Networks (PANs) as well as skills in programming for mobile handsets. You will also develop knowledge of the different types of wireless communications technologies available and when each is most applicable in a particular situation.

Prerequisites: INB251 or ITB006  Antirequisites: ITN723
INB370 DATA STRUCTURES AND ALGORITHMS
The purpose of this unit is to ensure that you have a sound knowledge of modern programming techniques and their use in providing medium-scale software solutions. This unit will teach you to decompose a problem and produce a modular solution to a programming task. The principles to analyse algorithms for efficiency will also be introduced. In addition, you will acquire the necessary skills for you to use the tools available in common development environments, such as Microsoft Visual Studio.

Prerequisites: INB270 or ITB003  Antirequisites: ITB711, ITB702, INN371  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

INB372 AGILE SOFTWARE DEVELOPMENT
This unit introduces you to the software development process. You will look at each of the major activities involved in developing a software system. You will also learn how to manage and control the software development process for a large project when a number of team members are involved in the development. This unit develops the professional practice of working on large software systems.

Prerequisites: INB370  Antirequisites: INN372, ITB612, ITB712  Assumed knowledge: Good programming, debugging, testing and software development skills.  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

INB373 WEB APPLICATION DEVELOPMENT
This unit will provide you with an understanding of the issues, structure and technologies used for developing web-based systems. The unit will provide you with the theoretical and practical skills needed to develop enterprise critical applications designed with an n-tier architecture using state of the art technologies. A comparative technology approach is taken, including an analysis of how web technologies have evolved to date, in order to identify common themes and to better enable you to comprehend and critically evaluate future web technology offerings.

Prerequisites: INB271 or ITB007  Antirequisites: INN373  Equivalents: ITB716 and ITN716  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

INB374 ENTERPRISE SOFTWARE ARCHITECTURE
This unit aims to introduce you to the field of enterprise architecture. It attempts to give you a grounding in the basic knowledge and skills required by an enterprise architect. This includes a solid understanding of the IT challenges...
Currently facing medium to large size organizations, the theory and technologies currently used to address them and an appreciation of the business imperative for which they are utilized.

**Prerequisites:** INB270 or ITB003  **Equivalents:** ITB717  
**Credit points:** 12  **Contact hours:** 3 per week  
**Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**INB385 MULTIMEDIA SYSTEMS**

This unit will explore the concepts underpinning multimedia systems and the role played by these technologies in the overall knowledge of a computer professional. You will learn to: design and develop different kinds of interactive multimedia applications; understand the bank of knowledge in cultural developments surrounding the emergence of multimedia technologies; analyse design and processes that contribute to the production of a creative work, using contemporary hardware and software technologies; develop the creative potential of temporal media forms and their placement and use within new media works; understand principles and conventions associated with the interpretation and production of meaning through interactive visual representation.

**Prerequisites:** INB103 or ITB002  **Antirequisites:** ITB257  
**Credit points:** 12  **Contact hours:** 3 per week  
**Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**INB386 ADVANCED MULTIMEDIA SYSTEMS**

This advanced level unit will give you high level design and development skills in some of the current and emerging areas of the new media. Web delivered applications, stand-alone systems and installations will be included. It will endeavour to give you an in-depth understanding of interactive Multimedia Systems. You will be given the theoretical basis and practical skills to motivate you in the design and creation of a state-of-the-art system in this discipline. In the process it will encourage a professional team approach appropriate to the industry environment.

**Prerequisites:** INB385 (Special considerations may apply)  
**Equivalents:** ITB259, ITN259  **Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**INB860 COMPUTATIONAL INTELLIGENCE FOR CONTROL AND EMBEDDED SYSTEMS**

This is a specialisation unit in the area of Infomechatronics that introduces five methods from the field of computational intelligence and relates them to applications on real time control and embedded systems. The methods are: Knowledge Base Systems, Fuzzy Control, Neural Networks, Reinforcement Learning and Evolutionary Computation. The unit is also intended to teach the specific design and programming skills that will enable you to solve problems using computational intelligence methods in real-time embedded systems. It is assumed that you already have knowledge of programming.

**Antirequisites:** ITB847  **Credit points:** 12  **Contact hours:** 3 per week  
**Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**JSB979 FORENSIC SCIENTIFIC EVIDENCE**

The word ‘forensic’ once meant anything relating to a law court. However today the term ‘forensic science’ refers to a whole new subject: it means using science to solve legal issues. As science, and the many sub-disciplines of science, are appearing in court with ever-increasing rapidity, there is a clear need for scientists to understand the foundations to the law, the ways in which law reasons, the adversarial process, and the basics to the key area of evidence law. The aim of this unit is first to provide you with an understanding of evidence law, with a particular emphasis upon the foundations to reception of scientific evidence, and the ways in which expert scientific witnesses are received in our courts. The unit aims to clarify the links between science and law, as well as to articulate the differences between these two increasingly inter-twined disciplines.

**Equivalents:** JSB937, JSB444  **Credit points:** 12  
**Contact hours:** 3  
**Campus:** Gardens Point and External  **Teaching period:** 2010 SEM-2

**LQB381 BIOCHEMISTRY: STRUCTURE AND FUNCTION**

This unit extends basic organic chemistry theory to the level of the biological macromolecules. A clear understanding of the structure and function of these molecules is essential to the creative potential of temporal media forms and their placement and use within new media works; understand principles and conventions associated with the interpretation and production of meaning through interactive visual representation.

**Prerequisites:** (SCB121 and SCB122) or (SCB111 and SCB121) or SCB113  
**Antirequisites:** LSB275 and LSB325 and LSB308  **Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**LQB383 MOLECULAR AND CELLULAR REGULATION**

Molecular and Cellular Regulation is a second year unit and is a continuation and expansion of topics introduced in SCB112 Cellular Basis of Life and SCB122 Cell & Molecular Biology. Molecular and Cellular Regulation strengthens the focus on the molecular and genetic aspects of cellular processes and the consequences to the organism of failure of these basic processes. Topics taught relate to gene structure and regulation in prokaryotes and eukaryotes and the role of gene expression in the development of complex organisms. Related concepts such as cell signalling,
communication, proliferation and survival are further developed in this unit. 

**Prerequisites:** SCB122 or LSB238  **Antirequisites:** LSB468 and LSB338  
**Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

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**LQB386 MICROBIOLOGICAL STRUCTURE AND FUNCTION**

Aspects of microbiology impinge upon many facets of daily life, for example, human health, genetic engineering, the food industry and the built and natural environment. The unit introduces you to and provides you with a solid foundation in the basic microbiology required for progression to advanced studies in Microbiology. This unit provides knowledge about safe handling and study of micro-organisms that is also very important in many other disciplines, because micro-organisms are used as models and tools in a wide range of study areas. 

**Prerequisites:** SCB112 and (SCB121 or SCB113)  
**Antirequisites:** LSB328  
**Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

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**LQB481 BIOCHEMICAL PATHWAYS AND METABOLISM**

The study of biochemistry and cell biology, along with molecular biology, provides students with the knowledge required for the proper understanding of the structure and function of living organisms at the molecular level. As such, this unit extends the studies begun in the unit LQB381 Biochemistry into the metabolic processes occurring in living cells, and provides students with a basis for further studies in biochemistry as well as support for other units in the third year of the course.

**Prerequisites:** LQB381 or LSB308  
**Antirequisites:** LSB275, LSB325, LSB408  
**Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

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**LQB483 MOLECULAR BIOLOGY TECHNIQUES**

Molecular biology and recombinant DNA technologies have important roles in many areas within the life sciences, including medicine, agriculture, cell biology, environmental science and forensics. Through close alignment of theoretical concepts and practical skills, this lab-based unit expands on molecular themes introduced in earlier cell and molecular biology units to develop expertise in modern recombinant DNA techniques and an understanding of strategies used to identify and manipulate genes. The close relationship between theory and practice in this unit is designed to develop competence, independence and critical thinking that will provide students with a solid foundation for advanced molecular biology studies presented in several third level units.

**Prerequisites:** LSB238 or SCB122  
**Antirequisites:** LSB468, LSN468, LSN483  
**Assumed knowledge:** LQB383 is recommended prior study  
**Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

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**LQB484 INTRODUCTION TO GENOMICS AND BIOINFORMATICS**

The completion of the Human Genome project, along with similar projects on other organisms of a prokaryote and eukaryote nature, marked the beginning of a major revolution in fundamental biology that changed our understanding of the natural world. To understand how information on genome structure-function relationships (ie bioinformatics) is being used in areas such as gene discovery, disease diagnosis and drug development, students need to understand how the information content of DNA and proteins is extracted and analysed. This unit introduces students to the approaches to database mining and genome exploration.

**Prerequisites:** LQB383 or LSB338 or LSN101 and LSN102  
**Antirequisites:** LSB537, LSB619, LSB469  
**Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

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**LQB486 CLINICAL MICROBIOLOGY 1**

Micro-organisms are very important as pathogens of humans and animals, and their accurate clinical diagnosis is essential for appropriate treatment and management of infections. This unit builds upon the foundational topics in microbiology that you learned in LQB386 (Microbial Structure and Function) and starts preparing you for a career in a microbiology laboratory in clinical practice, industry or research. The unit will advance your knowledge and skills in classical methods of isolation and identification of bacteria in clinical specimens and introduce aspects of microbial pathogenesis and antibiotic sensitivity. The unit will provide you with an understanding of clinically important viruses, and will commence your training in diagnostic parasitology.

**Prerequisites:** LQB386 or LSB328  
**Antirequisites:** LSB435, LSB547  
**Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

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**LQB581 FUNCTIONAL BIOCHEMISTRY**

This unit will study advanced biochemical concepts with a focus on metabolism, signalling pathways, systems and networks that coordinate and regulate the functional behaviour of cells and tissues.

**Credit points:** 12  **Contact hours:** 5 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

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**LQB582 BIOMEDICAL RESEARCH TECHNOLOGIES**

This unit will study the technical principles and practical techniques that are essential for advancing research and development in biochemistry and biotechnology.
LQB583 GENETIC RESEARCH TECHNOLOGY
The tools available for the discovery and manipulation of new genes are increasing exponentially and, in turn, this is having a significant impact in many areas of the life sciences. The true potential for this ultimately relies on the ability to link genes and their function. There are many strategies, both targeted and global, which facilitate an understanding of gene and genome structure function relationships. These strategies rely on integrated technologies based on molecular genetics, molecular biology and genetic engineering. The identification of function leads then to unlimited potential for detection and manipulation of these genes in human, animal and plant systems.
Prerequisites: LQB483 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

LQB584 MEDICAL CELL BIOLOGY
This unit builds and extends the understanding of basic theoretical and practical aspects of molecular cell biology developed in previous cell and molecular biology units. Medical Cell Biology develops and extends the context of the cellular environment and its central role within the organism providing all of the biological functions required by the organism to survive, defend and protect itself from disease and trauma. An understanding of cell biology theory and molecular mechanisms of animal development and disease is essential for introduction to higher level units in medical biotechnology.
Prerequisites: LQB383 or LSB338 Antirequisites: LSB449, LSB503, LSN584 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

LQB585 PLANT GENETIC MANIPULATION
The potential of plant biotechnology can only be recognised as a result of the significant advances being made in technologies enabling the genetic manipulation of plants. Familiarity with the strategies, techniques and breadth of applications is essential as a basis for anyone planning a career in plant biotechnology. The unit is designed with a significant emphasis on achieving technical expertise in plant genetic manipulation and control of gene expression.
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

LQB586 CLINICAL MICROBIOLOGY 2
TBA
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

LQB587 APPLIED MICROBIOLOGY 1: WATER, AIR AND SOIL
Issues relating to microbial populations within the environment are of great interest and relevance to the community, and also to scientists. Building on the foundation of basic microbiology, in this advanced level unit you will gain a strong understanding of the nature of microbial populations in water, air and soil, and their importance to the human population. This unit is issues-based, encouraging a problem solving approach as you investigate/study microbial pollution, bioremediation, biogeochemical cycles and a healthy environment. You will gain knowledge and skills in analysis and interpretation of water, air and soil populations, which will permit you to investigate real-world problems.
Prerequisites: LQB386, LSB328, or LSB492 Equivalents: LSB528 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SEM-1

MAB101 STATISTICAL DATA ANALYSIS 1
Experiments, observational studies, sampling, and polls; data and variables; framework for describing and manipulating probability; independence; Binomial and Normal distributions; population parameters and sample statistics; concepts of estimation and inference; standard error; confidence intervals for means and proportions; tests of hypotheses on means and proportions (one sample and two independent samples); inference using tables of counts; modelling relationships using regression analysis; model diagnosis; use of statistical software. Antirequisites: BSB123, EFB101, MAB141, MAN101 Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge. Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2010 SUM-2, 2010 SEM-1 and 2010 SEM-2

MAB105 PREPARATORY MATHEMATICS
This unit is a substitute for Senior Mathematics B for those students who need the equivalent background for the successful study of units which assume it. It includes: basic number facts, natural numbers, integers, rational numbers, real numbers and their operations; basic algebra; functions and equations, graphs, linear functions, equations and applications; systems of linear equations; quadratic, exponential, logarithmic and trigonometric functions, properties and applications; introduction to calculus; rates of change, derivatives, rules of differentiation, second derivatives, maxima and minima and applications; integration and applications. This unit is incompatible with an exit assessment of High Achievement or better in Senior Mathematics B.
Assumed knowledge: Year 10 Level 6 Mathematics is assumed knowledge  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

MAB120 ALGEBRA AND CALCULUS
This unit introduces and reviews the elementary concepts of function, calculus, matrices and vectors with special reference to applications in science, technology and business where appropriate. Topics covered include the algebra of complex numbers, elementary functions (polynomial, trigonometric, exponential and logarithmic) and their properties, differentiation and integration methods and principles, geometric and algebraic applications of vectors and the solution of linear systems using matrices.  

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge  Equivalents: MAB100, MAB125, MAB180  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

MAB121 CALCULUS AND DIFFERENTIAL EQUATIONS
This unit extends the areas of function and calculus introduced in MAB120 by introducing series representations for functions and more advanced methods of differentiation and integration for functions of one variable. A strong connection to real world problems is made by introducing the use of differential equations in modelling, and exploring appropriate methods of solution. Practical calculations of volumes and surface areas of solids of revolution extend your interpretations of the definite integral. Taylor and Fourier series are introduced as a means of approximating functions by sums of polynomials and periodic functions. Some more advanced methods for indefinite integrals, such as partial fraction decomposition, are also introduced.  

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics C (or equivalent) or MAB125 or MAB180 or MAB120 is assumed knowledge  Equivalents: MAB111, MAB126  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

MAB122 ALGEBRA AND ANALYTIC GEOMETRY
This unit extends your knowledge in the areas of functions, calculus, matrices and vectors introduced in MAB120 by introducing functions of more than one variable, partial derivatives and multiple integrals, vector valued functions, and matrix methods for the solution of large systems of linear equations.  

Equivalents: MAB112, MAB127, MAB132  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

MAB220 COMPUTATIONAL MATHEMATICS 1
This unit includes: sources of error; computer arithmetic; solution of nonlinear equations in one variable; solution of systems of linear equations; interpolation; finite differences; numerical differentiation and integration; solution of first order linear differential equations; MATLAB programming. Students without an exit level of Sound Achievement in four semesters of Senior Mathematics C need to be concurrently enrolled in MAB100 if not completed earlier.  

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 and corequisite MAB120 or MAB125 or MAB100 or MAB180 if you don't have Senior Mathematics C is assumed knowledge  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

MAB311 ADVANCED CALCULUS
This unit includes the following: polar coordinates; parametric equations; conic sections; quadric surfaces; vector-valued functions; Fourier series; functions of several variables; graphs; partial derivatives; total derivatives; extrema; Lagrange multipliers; Taylor series for multivariable functions; double and triple integrals; Green's theorems; line and surface integrals; divergence theorem; Stoke's theorem; applications.  

Prerequisites: (MAB111 or MAB121) and (MAB112 or MAB122)  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

NQB201 PLANET EARTH
Earth Science impacts every aspect of modern life. Hence, the concepts of Earth Science are fundamental not only to the field of Geology, but also to Environmental Science, natural resource management, civil engineering and society at large. Planet Earth provides an introduction to Earth Science, including earth materials, geologic history, geological process at the Earth's surface, and the complex interplay between the lithosphere, atmosphere, hydrosphere and biosphere through geologic time. Thus, Planet Earth is a foundation unit for further studies in Geology and Environmental Science and also serves as a broad introduction to the world we live on.  

Equivalents: NRB230  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

NQB202 HISTORY OF LIFE ON EARTH
This unit provides an introduction to the history and development of life on Earth with an emphasis on fundamental biological and ecological principles as they have operated through geological time. The unit provides the student with an understanding of the processes of evolution, extinction and the changing environmental
conditions through Earth's history. The unit provides the student with practical experience in fossil identification, classification and morphological interpretation. It provides the student with a "deep-time" perspective of climate and other environmental changes affecting modern ecosystems. Hence, History of Life on Earth is a foundation unit for the Earth and Environmental Sciences as well as Ecology, Biological Sciences and Education.

**Equivalents:** NRB311 Credit points: 12 Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

**NQB302 EARTH SURFACE SYSTEMS**
Understanding long and short term climate and environmental change is now recognised as crucial to the interpretation of our biotic, geomorphic and cultural landscapes. To fully understand environment change it is important to recognise the interconnectedness between the atmosphere, hydrosphere, lithosphere, biosphere and humanity’s place within these spheres over various temporal and spatial scales. Developing knowledge of past and present climate change and landscaping processes helps to predict future process pathways for natural resource management, civil engineering, risk analysis, and impact assessment in the context of both natural and anthropogenic induced change.

**Assumed knowledge:** NQB201 is assumed knowledge.  
**Equivalents:** NRB301  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

**NQB311 MINERALOGY**
Minerals are the building blocks of rocks which comprise the solid Earth. The study of minerals is essential for understanding the structure and composition of the earth and the detailed processes of the rock cycle. Mineralogy forms the basis for petrology (the study of the genesis of rocks) and geochemistry, and is thus essential for Geoscience. The unit may also be of interest to chemists.

**Equivalents:** NRB333  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

**NQB314 SEDIMENTARY GEOLOGY**
This unit provides students with an introduction to sedimentology; both sediments and sedimentary rocks. The unit focuses on the link between the range of features preserved in sedimentary rocks and what those features tell us about sedimentary processes, depositional environments and the burial history of the rocks. The sedimentological processes and depositional environments observed in the modern world are discussed and used as a foundation for interpreting the evidence preserved in the ancient sedimentary rock record, in turn revealing much about earth processes in geologic history.

**Assumed knowledge:** NQB201 is assumed knowledge.  
**Equivalents:** NRB331  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

**NQB321 ECOLOGY**
Ecology is the study of the factors that influence the distribution and abundance of organisms. Ecology deals with basic properties of individuals and the emergent properties of collections of individuals that form populations and the dynamics of these populations and their interactions with populations of other species. An understanding of basic ecological principles is central to managing species and ecosystems. This unit provides a broad theoretical background in the major concepts of plant and animal ecology. It serves the dual role of providing a thorough grounding in ecology for students from all faculties; and laying the conceptual foundation for later subjects in the ecology and environmental science.

**Prerequisites:** SCB110 or SCB112  
**Equivalents:** NRB311  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

**NQB403 SOILS AND THE ENVIRONMENT**
Soils are the most dynamic component of Earth surface processes, being the interface of the lithosphere and the atmosphere and a key system within the biosphere and the hydrosphere. It is, therefore, one of the most critical resources to consider within the context of climate change. This unit will provide you with grounding in soil science by emphasising pedological principles, their application to environmental soil analysis and management, and knowledge of ecosystem function of soils in a changing environment. The unit would provide experience in describing and classifying soils and soil materials as well as field experience in the investigation of soil processes and the assessment of resource potential and environmental hazard.

**Prerequisites:** NQB302 or NRB301 or (ENB272 and ENB274)  
**Equivalents:** NRB302 or NRB301  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

**NQB411 PETROLOGY OF IGNEOUS AND METAMORPHIC ROCKS**
This unit includes an introduction to the description, classification and origin of igneous and metamorphic rocks and practical development of lithologic and petrographic abilities to identify mineral assemblages, classify rocks, and interpret textures. Field and theoretical constraints on the petrogenesis of rocks are discussed in lecture. Field study is an essential component of the unit. This unit builds upon the knowledge and skills acquired in the prerequisite unit (NQB311 Mineralogy).

**Prerequisites:** NQB311 or NRB333  
**Equivalents:** NRB436  Credit points: 12  Contact hours: 4 per week
**NQB412 STRUCTURAL GEOLOGY AND FIELD METHODS**
Structural geology, the deformation of earth materials, is one of the main elements in the core curriculum in geology. It is also essential to other subdisciplines of geology, such as foundation engineering and petroleum and mineral exploration. Geologists need to be able to describe and map structures, to understand the mechanical principles of rock deformation, and to be able to manipulate and calculate structural data.

**Prerequisites:** NQB314 or NRB331  
**Equivalents:** NRB434  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**NQB421 EXPERIMENTAL DESIGN**
An understanding of experimental design is essential for students and professionals in the ecological and environmental sciences as many biological systems are characterised by high levels of variability. This unit emphasises practical considerations of field and laboratory-based experimentation in ecology and environmental science, and provides experience in problem assessment, definition, formulation of testable hypotheses and experimental design.

**Prerequisites:** MAB101 or MAB104 or MAB105, and NQB321 or NRB311  
**Equivalents:** NRB412  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**NQB422 GENETICS AND EVOLUTION**
This unit provides a basic understanding of the mechanisms of inheritance using Mendelian Genetics as a foundation. These principles are extended to develop a clear understanding of the mechanisms and processes that drive evolution in natural populations. Topics include the physical basis of heredity, Mendelian and non-Mendelian inheritance patterns, genotype/environment interactions, quantitative traits, evolutionary theory, adaptation and natural selection, speciation and phylogeny, sexual selection and the evolution of life histories.

**Prerequisites:** SCB112  
**Equivalents:** NRB410  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**NQB501 ENVIRONMENTAL MODELLING**
The capacity for management of complex environmental problems such as climate change, now and in the future, will rely on the capacity of environmental managers to create, interpret and critically analyse models of environmental systems. Mathematical model building promotes the capacity to understand the interdependent relationships that characterise environmental systems and also provides a quantitative foundation for informed environmental management.

**Prerequisites:** NQB412 or NQB421  
**Assumed knowledge:** 48 credit points of second level science units is assumed knowledge.  
**Equivalents:** NRB500  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**NQB502 FIELD METHODS IN NATURAL RESOURCE SCIENCES**
Field experience is an essential part of the professional training of geologists, environmental scientists, ecologists, and natural resource specialists in general. The theory and practice of methods to interpret, measure, map, and monitor important natural resource features and characteristics are essential to the study of geological, ecological and environmental systems. Methods of survey, mapping and interpretation are necessary skills for resource assessment, geo-exploration, environmental impact assessment, land evaluation, baseline studies, and ecological investigations. There are varying emphases on these outcomes depending on the type of field survey you undertake in this unit.

**Prerequisites:** (NQB321 or NQB411) and (NQB302 or NQB412)  
**Assumed knowledge:** 36 credit points of second level science units in selected major is assumed knowledge. NQB302 and NQB403 for Env Sc, NQB321 for Ecol, NQB411 and NQB412 for Geosc  
**Equivalents:** NRB601  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**NQB513 GEOPHYSICS**
Geophysics is an integral branch of geology, providing many of the most useful methods of imaging the subsurface of the earth. These methodologies are useful in disciplines as diverse as plate tectonics, oil and mineral exploration, hydrogeology, environmental geology, engineering geology, and seismic hazards.

**Prerequisites:** (NQB201 or NRB230) and (NQB412 or NRB434)  
**Equivalents:** NRB534  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**NQB521 POPULATION GENETICS AND MOLECULAR ECOLOGY**
This unit is an extension of NQB422 Genetics and Evolution. Topics include the genetic structure of populations and processes of evolutionary change; natural selection, inbreeding and adaptation, species and speciation theory; ecological genetics; the genetics of behaviour.

**Prerequisites:** NQB422  
**Antirequisites:** NRB510  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**NQB523 POPULATION MANAGEMENT**
This unit develops the theoretical treatment of populations as a unit of study and integrates the content of previous eco-logic units into approaches for the management of biological populations. The unit focuses on those interactions that are most relevant to pest control, but the unit is also of fundamental importance to harvesting and conservation biology.

Prerequisites: NQB321, NQB421

Antirequisites: NRBS11

Credit points: 12

Contact hours: 4 per week

Campus: Gardens Point

Teaching period: 2010 SEM-1

PQB250 MECHANICS AND ELECTROMAGNETISM

The experimental means by which we have arrived at our modern understanding of the universe is central to the scientific philosophy. Students of physics and physics related areas need to possess skills in quantitative handling, processing, communication and evaluation of data. Higher level studies in specialised areas of Physics require a familiarity with a range of fundamental topics in Physics and an ability to apply critical thinking and advanced mathematical techniques to the analysis and solution of Physical problems. This first-level unit lays the foundation for these higher level studies by introducing the fundamental topic areas of mechanics and electromagnetism.

Assumed knowledge: Senior Maths B is assumed knowledge.

Credit points: 12

Contact hours: 4.5 hours per week

Campus: Gardens Point

Teaching period: 2010 SEM-2

PQB251 WAVES AND OPTICS

Wave phenomena are used to describe and explain many of the physical processes in the universe. Sound and light are the most commonly experienced of these and have far-reaching human applications, including their use as experimental tools for science. The study of wave phenomena has led to the development of quantum mechanics, a cornerstone of modern scientific thought. This first-level unit lays the foundation for discussion of wave phenomena in higher level studies, but will also be relevant to those not considering progressing to a Physics major but wishing to understand more of the physical world in which we live.

Assumed knowledge: Senior Maths B is assumed knowledge.

Credit points: 12

Contact hours: 4.5 hours per week

Campus: Gardens Point

Teaching period: 2010 SEM-2

PQB312 ANALYTICAL CHEMISTRY FOR SCIENTISTS AND TECHNOLOGISTS

Reliable chemical analysis and testing is fundamental to the functioning of our society. This generic unit is designed for future scientists and technologists in the fields of chemistry, forensic science and other similar sciences. It introduces students to concepts of quality assurance, good laboratory practice and the vital instrumental areas of analysis – chromatography and spectroscopy. Laboratory work is a key extensive activity in this unit.

Prerequisites: SCB131

Equivalents: PCB414

Credit points: 12

Contact hours: 4.5 per week

Campus: Gardens Point

Teaching period: 2010 SEM-1 and 2010 SEM-2

PQB331 STRUCTURE AND BONDING

This unit provides detailed coverage of the theories of bonding in organic, inorganic and coordination compounds including orbital hybridisation valence bond theory, coordination theory and crystal field theory. The cause and effect relationships between bonding and structure are developed leading to an understanding of structural variability, chirality, and other modes of isomerism for a broad range of chemical compounds. An introduction to molecular symmetry, which is central to the study of molecular geometry and shape, also provides the background for later studies in spectroscopy. Lectures are complemented by 7 laboratory experiments and 4 hands-on style workshops.

Prerequisites: SCB121 and SCB131

Antirequisites: PCB334, PCB354

Credit points: 12

Contact hours: 4.5 per week

Campus: Gardens Point

Teaching period: 2010 SEM-1

PQB350 THERMODYNAMICS OF SOLIDS AND GASES

This unit provides students with an overview of the basic thermodynamic principles that describe how heat and other forms of energy are transported through matter in its solid and gaseous states. Through integrated lecture and practical classes, it provides students with a foundation for more advanced studies later in areas such as condensed matter physics and quantum mechanics. The three areas of study in this unit; thermodynamics, solid state physics and statistical physics; are essential core topics if students are considering postgraduate study in the physical sciences or professional employment as a physicist.

Prerequisites: PQB250 or PCB250, and MAB111

Corequisites: MAB311

Assumed knowledge: Students should enrol in MAB311 in the same semester if not already completed

Equivalents: PCB562

Credit points: 12

Contact hours: 4 per week

Campus: Gardens Point

Teaching period: 2010 SEM-1

PQB401 REACTION KINETICS, THERMODYNAMICS AND MECHANISMS

This unit deals with the way in which the fundamental concepts of physical chemistry govern the extent and rates of chemical reactions and applies them to actual reaction types from the fields of organic and inorganic chemistry. Topics include: thermodynamics including enthalpy, heat capacity, entropy, Gibbs free energy, chemical equilibria and an introduction to electrochemistry: chemical kinetics including rate laws, mechanisms of chemical reactions,
collision theory of reaction rates and the steady state principle as well as acids and bases in both aqueous and non-aqueous environments.

**PQB442 CHEMICAL SPECTROSCOPY**

Spectroscopic techniques are now widespread in scientific laboratories. An appreciation of both the principles and practice of spectroscopy is essential for those contemplating a career in chemistry. The use of spectroscopic methods to elucidate molecular structure provides an excellent vehicle for training in the scientific method, particularly the logical application of experimental data to deduce the solution to a complex problem. Whilst the fundamental theoretical concepts will be dealt with in the early part of the unit, later emphasis will be on developing practical skills in problem solving, a skill of value to all fields of scientific and technological endeavour.

**Prerequisites:** PQB331  
**Equivalents:** PCB444  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**PQB450 ENERGY, FIELDS AND RADIATION**

The common theme of the topics covered in this unit is fields, the energy contained in these fields and the transfer of this energy. This theme is addressed in the specific topics of classical mechanics, electromagnetism and radiation physics. The classical mechanics and electromagnetism components build on material presented in introductory units and apply this to complex real-world problems. The unit is designed to prepare students for more advanced studies in these areas but the unit will also provide a useful background for students undertaking a major in Physics or preparing for a career in secondary education.

**Prerequisites:** PQB250 or PCB250, and MAB311  
**Equivalents:** PCB362  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**PQB451 ELECTRONICS AND INSTRUMENTATION**

Instrumentation plays an increasingly important role in the life of a scientist. This unit is designed to give the student a working knowledge in instrumentations and the principles of circuit theory and electronics that underlie instrumentation. It is offered at this stage of the program since it relies on work developed in the earlier advanced-level units and provides a basis for experimental work in later units.

**Prerequisites:** PQB250 or PCB250  
**Antirequisites:** PCB361, PCB460  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**PQB502 ADVANCED PHYSICAL CHEMISTRY**

A Chemistry graduate in today's highly technological world requires knowledge of the principles that govern the behaviour of solids, liquids, gases, and mixtures thereof. This leads to an appreciation of how fundamental physical chemical principles determine the bulk properties of materials and how the chemical nature of interfaces govern chemical reactions in many important applications. This unit is placed appropriately in fifth semester, following the second year units that provide the basic principles, language and tools of chemistry.

**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB513 INSTRUMENTATIONAL ANALYSIS**

TBA

**Prerequisites:** PQB312 or PCB414  
**Equivalents:** PCB514  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB531 ORGANIC MECHANISMS AND SYNTHESIS**

This unit deals with organic reaction mechanisms and their application in organic synthesis. Topics in mechanisms include: structural and electronic effects that govern reactivity of organic molecules; major classes of mechanisms including elimination reactions, nucleophilic additions to carbonyl compounds, nucleophilic acyl substitution, electrophilic addition to alkenes and electrophilic substitution of aromatics. Topics in synthesis include the principles of organic synthesis design using the retrosynthetic approach; carbon-carbon bond formation to build the major functional group classes; and the use of protecting and activating groups.

**Prerequisites:** PQB401, PQB442  
**Antirequisites:** PCB554  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB550 QUANTUM AND CONDENSED MATTER PHYSICS**

TBA

**Prerequisites:** PQB350 and (MAB135 or MAB311)  
**Equivalents:** PCB561  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB551 PHYSICAL ANALYTICAL TECHNIQUES**

Modern methods of physical analysis are an important tool for the physical scientist. This unit provides an introduction to the physical principles and applications in three fields of analysis: X-ray diffraction, analytical electron microscopy and physical spectroscopy. Each of these topics encompasses a variety of measurement techniques. The methodologies presented have wide application in a number of areas of science and technology including...
nanotechnology and materials research and development. Lectures are supplemented by laboratory practicals to enable students to gain familiarity and experience with the instrumentation.

**Prerequisites:** (PQB350 or PCB462) and (MAB112 or MAB122)  
**Equivalents:** PCB562  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB584 FORENSIC PHYSICAL EVIDENCE**
This unit provides a theoretical and practical framework to introduce you to the physical evidence processing techniques of questioned documents and computer forensics and the forensic examination techniques of optical and electron microscopy. The unit will also discuss the physical and chemical structure of some common types of physical evidence (fibres, fabrics & severance, soils and physical fits) and the analytical methods used for their analysis. It is placed appropriately in the fifth semester of the course to coincide with and complement the Instrumental Analysis unit PQB513 which the core knowledge for the instrumental techniques used within the forensic analysis of various types of physical evidence.

**Prerequisites:** PQB312, SCB384  
**Antirequisites:** PQB584  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**SCB110 SCIENCE CONCEPTS AND GLOBAL SYSTEMS**
You will undertake interdisciplinary study of the physical, geological and biological concepts relating to the origins of life; from the creation of matter and planets, to the emergence of life in all its complexity, culminating in the evolution of earth ecosystems. Human influences, overlaid upon earth's complex systems, will be examined as to their type, extent, and impact. In counterpoint, you will explore the breadth of philosophical developments underlying our search for knowledge; fundamental thoughts and ideas that span the last 2,500 years of human history. Ultimately, these concepts evolved through the development of a scientific method and we explore its workings in relation to the ongoing enterprise of human understanding.

**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**SCB111 CHEMISTRY 1**
This unit covers the fundamentals of general and physical chemistry. Topics include atomic and molecular structure, introduction to chemical bonding, reaction stoichiometry, thermochemistry, gas phase chemistry, reaction kinetics, equilibrium, acids, bases, buffers, oxidation, reduction and electrochemistry. The practical program involves experiments illustrating a range of chemical reaction types including precipitation reactions, acid-base chemistry and redox chemistry using analytical experimental methods. A comprehensive tutorial program (CHELP) complements the lectures and is designed to assist students to develop the problem solving skills required for further study in chemistry and related sciences.

**Antirequisites:** SCB113  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**SCB112 CELLULAR BASIS OF LIFE**
A study of life processes in all five groups of living organisms (bacteria, protists, fungi, plants and animals). Traditional topics in biology are integrated with recent research advances in molecular and cellular biology to provide a comprehensive foundation for later units in the medical, biotechnological and ecological sciences. The unit begins by constructing cells from the four quantitatively important groups of biological molecules (proteins, lipids, carbohydrates and nucleic acids). Molecular and evolutionary aspects of genetics are then introduced, with the great diversity of reproductive strategies found among organisms being emphasised. Finally, bioenergetics (photosynthesis and respiration) and its relevance to environmental issues is outlined.

**Antirequisites:** LSB118  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**SCB120 PLANT AND ANIMAL PHYSIOLOGY**
Regardless of which area of biology you decide to specialise in, you will need to understand the complex interactions between cells, tissues, organs and organ systems that comprise multi-cellular organisms. Although many living processes can be explained at the levels of biochemistry, biophysics and cell biology, a true understanding of complex, multicellular organisms requires integration of knowledge drawn from all of these areas, combined with the more complex physiological and structural levels you will learn about in this unit. The knowledge gained in this and other first level units provides you with the conceptual framework necessary to understand processes occurring from the cellular to the whole organism level and to higher levels of organisation.

**Prerequisites:** SCB112  
**Equivalents:** NRB270  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**SCB121 CHEMISTRY 2**
Chemistry is the central science. This is a unit of fundamental importance as it covers the background and general principles that underpin understanding in many Science and Health related disciplines, particularly in regards to the chemistry of life. In this unit students will be introduced to fundamental aspects of chemistry including the electronic structure of atoms, chemical bonding and molecular structure. From this basis students will develop
an understanding of the fundamentals of organic chemistry which will lead to important bio-inorganic molecules and coordination complexes. 

**Prerequisites:** (SCB111 or PCB142). SCB111 can be studied in the same teaching period. 

**Antirequisites:** SCB113  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**SCB122 CELL AND MOLECULAR BIOLOGY**  
SCB122 Cell and Molecular Biology 1 equips students with a comprehensive understanding of the molecular basis of the cell. This unit expands on the basic principles and concepts relating to cell structure, function, perpetuation and specialisation introduced in SCB112 and introduces students to fundamental molecular mechanisms central to the organisation of the cell. Students will be shown how macromolecular interactions are crucial to information flow and heredity. Students are taught the relationships between chromosomes, genes and cellular function and ultimately how these may determine an organism's phenotype. This unit underpins cell biology and molecular biology units that are offered in second year Life Science units. SCB122 is also ideal for interfaculty students (eg Education, Business, Arts) who will undertake no further life science studies. 

**Prerequisites:** SCB112 
**Antirequisites:** LSB238  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**SCB123 PHYSICAL SCIENCE APPLICATIONS**  
Physics principles underpin all of the sciences and 'new technologies'. This unit adopts an investigative team-based approach to provide students with an appreciation of fundamental concepts in physical science, together with experience in the application of these concepts to a range of 'real world' problems. The unit should be taken in the first year of study as the fundamental principles introduced here will be built upon in later units in the context of each science student's major discipline area. Employers in cutting-edge industries expect science graduates to have effective strategies for problem solving, skills for collaborative work and scientific communication and research skills. This unit aims to develop these skills by applying the fundamental concepts of physical science to problems in a team environment. 

**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**SCB131 EXPERIMENTAL CHEMISTRY**  
A study of chemistry and related disciplines such as medical science, biochemistry, molecular biology and pharmacy requires the development of practical laboratory skills used in synthesis and chemical analysis. This unit is a laboratory-based unit which is designed for students who intend to continue with experimental science units. The lectures complement the weekly practical sessions and teach the theory required to interpret experimental results. 

**Prerequisites:** SCB111 or SCB113  
**Antirequisites:** SCB121 unless SCB113 has been successfully completed  
**Credit points:** 12  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**SCB222 EXPLORATION OF THE UNIVERSE**  
This unit provides an introduction to optical observational astronomy; instrumentation; celestial sphere and astronomical coordinates; observations of constellations, stars, planets, clusters and other interesting celestial objects. The theory includes: optics of telescopes; properties of light; determination of physical properties of stars; nebulae; stellar spectra and classification; historical models of the solar system; Kepler's law, gravitation; physical geology of the planets and formation of the solar system; phenomena of astronomical origin; brief introduction to stars and galaxies. This course includes practical exercises and field trips. 

**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**SCB384 FORENSIC SCIENCES - FROM CRIME SCENE TO COURT**  
This unit provides an introduction to two fundamental areas in forensic science, crime scenes and justice. Mock crime scenes involving real life scenarios are used to provide hands-on training on crime scene management and examination protocols. The principles for forensic examination of crime scenes involving fire, explosion, murder, etc, are introduced through lectures, workshops and practical exercises. Also an overview of the techniques used in forensic photography, fingerprinting as well as Legal procedures at court is presented. This unit is provided by professional forensic practitioners with practical real life experience being transferred to new generations. This head start provides a unique advantage for a strong career in forensics. 

**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1