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

Year offered: 2011
Admissions: Yes
CRICOS code: 020327M
Course duration (full-time): 4 years
Domestic Fees (indicative): 2011: CSP $3,300 (indicative) per semester
International Fees (indicative): 2011: $11,875 (indicative) per semester
Domestic Entry: February
International Entry: February
QTAC code: 418322
Past rank cut-off: 76
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.qut.edu.au/assumed-knowledge
Total credit points: 384
Course coordinator: Dr Perry Hartfield (Science), Mr Mike Roggenkamp (Information Technology)
Discipline coordinator: Dr Perry Hartfield (Biochemistry Major); Dr Marion Bateson (Biotechnology Major); Dr John McMurtrie (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 Overview
This double degree prepares you for an increasing range of careers that involve the application of information technology to science. It gives you the ability to use creative as well as analytical methods to solve scientific problems. Studying this double degree allows you to develop the technical skills required for your relevant field of study in applied science.

The science component of the course offers you the choice of majoring in biochemistry, biotechnology, chemistry, ecology, environmental science, forensic science, geosciences, microbiology or physics. Theoretical aspects are balanced by strong practical components in this science and information technology double degree.

Recommended Study
At least one of the sciences. For biochemistry, biotechnology, forensic science, and microbiology majors - Biological Science and Chemistry; for physic major - Maths

Professional Recognition
This course is accredited by the Australian Computer Society (ACS). ACS accreditation is internationally recognised by the Seoul Accord. Please refer to the Science pages at Studyfinder for more information on the relevant professional body for your chosen science major.

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

Cooperative Education
The Faculty'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.

**Limits on grades of 3**
A new policy concerning grades of 3 came into effect from 1 January 2009 (QUT MOPP C/5.2). With effect from this date grades of 3 are no longer considered a conceded or low pass but are classified as a fail grade. Any grades of 3 awarded prior to 1 January 2009 retain the conceded pass status and will be counted for graduation purposes up to the maximum number of grades of 3 permitted for your course. Grades of 3 incurred in units that commence after 1 January 2009 will not count towards your degree. Further information is available on the Student Services website.

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

**Science Coordinator**
Dr Perry Hartfield  
Phone: +61 7 3138 2984  
Email: p.hartfield@qut.edu.au

**Information Technology Coordinator**
Mr Richard Thomas  
Phone +61 7 3138 2782  
Email: enquiry.scitech@qut.edu.au

**Discipline Coordinators**

**Biochemistry**
Dr Perry Hartfield  
Phone: +61 7 3138 2984  
Email: p.hartfield@qut.edu.au

**Biotechnology**
Dr Marion Bateson  
Phone: +61 7 3138 1269  
Email: m.bateson@qut.edu.au

**Chemistry**
Dr John McMurtrie  
Phone: +61 7 3138 1220  
Email: j.mcmurtrie@qut.edu.au

**Ecology**
Dr Ian Williamson  
Phone: +61 7 3138 2779  
Email: i.williamson@qut.edu.au

**Environmental Science**
Dr Robin Thwaites  
Phone: +61 7 3138 2400  
Email: r.thwaites@qut.edu.au

**Forensic Science**
Dr Emad Kiriakous  
Phone: +61 7 3138 2501  
Email: e.kiriakous@qut.edu.au

**Geoscience**
Dr Gary Huftile  
Phone: +61 7 3138 4470  
Email: g.huftile@qut.edu.au

**Microbiology**
Dr Christine Knox  
Phone: +61 7 3138 2301  
Email: c.knox@qut.edu.au

**Physics**
Dr Greg Michael  
Phone: +61 7 3138 1584  
Email: g.michael@qut.edu.au

**Deferment**
Domestic students can defer their offer in this course for one year. In exceptional circumstances up to 12 months of additional deferment may be granted.

Find out more on deferment.

**IX55 Bachelor of Applied Science/Bachelor of Information Technology Course structure**

<table>
<thead>
<tr>
<th>Year 1, Semester 1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>INB101 Impact of IT</td>
<td></td>
</tr>
<tr>
<td>INB102 Emerging Technology Science Core Unit</td>
<td></td>
</tr>
<tr>
<td>INB103 Industry Insights</td>
<td></td>
</tr>
<tr>
<td>INB104 Building IT Systems Science Core Unit</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year 1, Semester 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>INB101 Impact of IT</td>
<td></td>
</tr>
<tr>
<td>INB102 Emerging Technology Science Core Unit</td>
<td></td>
</tr>
<tr>
<td>INB103 Industry Insights</td>
<td></td>
</tr>
<tr>
<td>INB104 Building IT Systems Science Core Unit</td>
<td></td>
</tr>
</tbody>
</table>
Year 2, Semester 1

IT Breadth Unit Option
IT Breadth Unit Option
Science Core Unit
Science Core Unit

Year 2, Semester 2

IT Breadth Unit Option
IT Breadth Unit Option
Science Core Unit
Science Core Unit

Year 3, Semester 1

INB201 Scalable Systems Development
IT Specialisation Unit Option
Science Major Unit
Science Major Unit

Year 3, Semester 2

INB300 Professional Practice in IT
IT Specialisation Unit Option
Science Major Unit
Science Major Unit

Year 4, Semester 1

INB301 The Business of IT
IT Specialisation Unit Option
Science Major Unit
Science Major Unit

Year 4, Semester 2

INB302 IT Capstone Project
IT Specialisation Unit Option
Science Major Unit
Science Major Unit

IT Breadth Option Unit List

IT Breadth Option Units
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 Foundations of Computer Science
INB251 Networks
INB255 Security
INB270 Programming
INB271 The Web
INB272 Interaction Design

IT Specialisation Option Unit List

IT Specialist Option Units
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 and Data Analysis
   INB343 Advanced Data Mining and Data Warehousing
   INB344 Search Engine Technology

3. DIGITAL ENVIRONMENTS:
   INB345 Mobile Devices
   INB346 Enterprise 2.0
   INB347 Web 2.0 Applications
   INB335 Information Resources

4. ENTERPRISE SYSTEMS:
   INB123 Project Management Practice
   INB221 Technology Management
   INB311 Enterprise Systems
   INB312 Enterprise Systems Applications

5. NETWORK SYSTEMS:
   INB350 Internet Protocols and Services
   INB351 Unix Network Administration
   INB352 Network Planning
   INB353 Wireless and Mobile Networks

6. SOFTWARE ENGINEERING:
INB370  Software Development
INB371  Data Structures and Algorithms
INB372  Agile Software Development
INB374  Enterprise Software Architecture
7. WEB TECHNOLOGIES:
INB313  Electronic Commerce Site Development
INB373  Web Application Development
INB374  Enterprise Software Architecture
INB385  Multimedia Systems
INB386  Advanced Multimedia Systems
8. UNGROUPED:
INB204  Special Topic 1
INB205  Special Topic 2
INB304  Special Topic 3
INB305  Special Topic 4
INB306  Project 1
INB307  Project 2
INB308  Project 3
INB355  Cryptology and Protocols
INB365  Systems Programming
INB381  Modelling and Animation Techniques
INB382  Real Time Rendering Techniques
INB860  Computational Intelligence for Control and Embedded Systems

Course structure - Major in Biochemistry

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

Year 1, Semester 2 (Life Sciences Pre-Major Strand)
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

Course structure - Major in Biotechnology

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

Year 1, Semester 2 (Life Sciences Pre-Major Strand)
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
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
Year 4, Semester 1
Select TWO units from:
LQB583 Genetic Research Technology
LQB584 Medical Cell Biology
LQB585 Plant Genetic Manipulation

Year 4, Semester 2
Select TWO units from:
LQB682 Protein Biochemistry and Bioengineering
LQB684 Medical Biotechnology
LQB685 Plant Microbe Interactions

Course structure - Major in Chemistry

Year 1, Semester 1
SCB111 Chemistry 1
SCB112 Cellular Basis of Life
MAB101 Statistical Data Analysis 1
MAB105 Preparatory Mathematics

Year 1, Semester 2 (Chemistry Pre-Major Strand)
SCB112 Cellular Basis of Life
SCB121 Chemistry 2

Year 2, Semester 1
MAB120 Algebra and Calculus
SCB110 Science Concepts and Global Systems

Year 2, Semester 2
SCB123 Physical Science Applications
SCB131 Experimental Chemistry

Year 3, Semester 1
PQB312 Analytical Chemistry For Scientists and Technologists
PQB331 Structure and Bonding

Year 3, Semester 2
PQB401 Reaction Kinetics, Thermodynamics and Mechanisms
PQB442 Chemical Spectroscopy

Year 4, Semester 1
PQB502 Advanced Physical Chemistry
PQB531 Organic Mechanisms and Synthesis

Year 4, Semester 2
PQB631 Advanced Inorganic Chemistry
PQB642 Chemical Research

Course structure - Major in Ecology

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

Year 1, Semester 2 (Ecology and Environmental Science Pre-Major Strand)
SCB120 Plant and Animal Physiology
SCB122 Cell and Molecular Biology

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

Year 2, Semester 2
NQB201 Planet Earth
NQB202 History of Life on Earth

Year 3, Semester 1
NQB302 Earth Surface Systems
NQB321 Ecology

Year 3, Semester 2
NQB421 Experimental Design
NQB422 Genetics and Evolution

Year 4, Semester 1
NQB521 Population Genetics and Molecular Ecology
NQB523 Population Management

Year 4, Semester 2
NQB622 Conservation Biology
NQB623 Ecological Systems

Course structure - Major in Environmental Science

Year 1, Semester 1
SCB111 Chemistry 1
SCB112 Cellular Basis of Life
## Year 1, Semester 2 (Ecology and Environmental Science Pre-Major Strand)
- 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
- NQB202 History of Life on Earth
- SCB123 Physical Science Applications

## Year 3, Semester 1
- NQB302 Earth Surface Systems
- NQB321 Ecology

## Year 3, Semester 2
- NQB403 Soils and the Environment
- NQB421 Experimental Design

## Year 4, Semester 1
- NQB501 Environmental Modelling
- NQB502 Field Methods in Natural Resource Sciences

## Year 4, Semester 2
- NQB601 Sustainable Environmental Management
- NQB602 Environmental Chemistry

## Course structure - Major in Forensic Science
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life

## Year 1, Semester 1
- SCB121 Chemistry 2
- SCB122 Cell and Molecular Biology

## Year 1, Semester 2 (Forensic Science Pre-Major Strand)
- SCB110 Science Concepts and Global Systems
- Either MAB101 Statistical Data Analysis 1
- Or MAB105 Preparatory Mathematics

## Course structure - Major in Geoscience
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life

## Year 1, Semester 2 (Geoscience Pre-Major Strand)
- 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
NQB613 Plate Tectonics
NQB615 Geochemistry

Course structure - Major in Microbiology

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

Year 1, Semester 2 (Life Sciences Pre-Major Strand)
SCB120 Plant and Animal Physiology
SCB121 Chemistry 2

Year 2, Semester 1
SCB110 Science Concepts and Global Systems
SCB122 Cell and Molecular Biology
SCB123 Physical Science Applications

Year 2, Semester 2
SCB111 Chemistry 1
SCB112 Cellular Basis of Life

Year 3, Semester 1
LQB381 Biochemistry: Structure and Function
LQB386 Microbial Structure and Function

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

Year 4, Semester 1
LQB586 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
Or
MAB120 Algebra and Calculus
SCB111 Chemistry 1

Students who have completed only Maths B are required to take MAB120. Students who have completed both Maths B and Maths C should take MAB121.

Year 1, Semester 2 (Physics Pre-Major Strand)
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
Or
MAB121 Calculus and Differential Equations
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 SYNOPSIS

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: INN101 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1 and 2011 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.

Equivalents: ITB005 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1 and 2011 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 to the inter-disciplinary nature of ICT careers.

Equivalents: ITB002 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1 and 2011 SEM-2

INB104 BUILDING IT SYSTEMS
Today's modern integrated technology is built on IT systems which run in a range of contexts (e.g. mobile computing, robotics, and web-based systems) using a range of technological solutions such as programming and scripting, databases, web development and network programming. This 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.

Equivalents: ITB001 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1 and 2011 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 hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1

INB123 PROJECT MANAGEMENT PRACTICE
In your information technology career it is very likely that you will work on and lead project teams to achieve business outcomes. You will achieve more effective outcomes by
INB201 SCALABLE SYSTEMS DEVELOPMENT
Information technology is a key enabling tool in a rapidly evolving global economy. IT systems underpin innovation across a range of application areas including business, economics, science, engineering, education and the arts. In order to educate graduates in this climate, Scalable Systems Development adopts an integrated approach to provide broad hands-on experiences designed to orient students to the range of possibilities within the IT discipline.

This team-based unit is an extension of project work introduced in Building IT Systems. Within a concrete, project-based context students will encounter the practical challenges of designing and implementing a substantial IT system. The unit aims to increase students' awareness of the potential of IT in enabling innovation through providing active, constructive and challenging problem-based learning experiences.

**Prerequisites:** (INB102 or ITB005) and (INB104 or ITB001)
**Assumed knowledge:** Completion of 36cp of Breadth units is assumed knowledge

**Equivalents:** ITB007

**Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1

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: 2011 SEM-1 and 2011 SEM-2

INB205 SPECIAL TOPIC 2
This unit introduces computational techniques involving numerical simulations and visualization. These skills will be applied to solve problems in a range of application areas. The programming language MATLAB will be used, along with the simulation environment NetLogo.

**Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1 and 2011 SEM-2

INB210 DATABASES
Databases and database systems are essential items that support many aspects of everyday life in modern society. All graduates from a course in Information Technology will be expected by employers to understand the concepts and terminology of databases. The aim of this unit is to introduce you to the structure and role of databases in modern organisations.

**Antirequisites:** INN500  **Equivalents:** ITB004

**Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-2

INB220 BUSINESS ANALYSIS
This unit is aims 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).

**Antirequisites:** INN220  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 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.

**Antirequisites:** INB103 or ITB002 or INB120 or ITB360

CRICOS No. 00213J ABN 83 791 724 622
INB250 FOUNDATIONS OF COMPUTER SCIENCE

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. Most of the techniques are derived from the field of Discrete Mathematics and are the foundation of the discipline called Computer Science.

**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:** 2011 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:** INN270

**Equivalents:** ITB003

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2011 SEM-1 and 2011 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:** INB270

**Equivalents:** ITB003

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2011 SEM-1

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:** INN251

**Equivalents:** ITB006

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2011 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, ITN161 and INN255

**Equivalents:** ITB730

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2011 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

**Credit points:** 12

**Contact hours:** 3 per week

**Campus:** Gardens Point

**Teaching period:** 2011 SEM-2

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: INB201 Antirequisites: ITS020, INS010, INS011, INS012, INS020 Assumed knowledge: To be taken in your final year of the BIT. You must have completed at least 132 CPs of IT units, including at least two specialisation units. Normally you should have completed at least 192 CPs in a single degree or 288 CPs in a double degree Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1, 2011 SEM-2 and 2011 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”.

Antirequisites: 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: 2011 SEM-1 and 2011 SEM-2

INB302 IT 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: 2011 SEM-2 and 2011 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) behaviourable 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.

Prerequisites: INB210 or ITB004 or INB122 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1 and 2011 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 further as 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.

Prerequisites: INB371 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-1 and 2011 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
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: 2011 SEM-1, 2011 SEM-2 and 2011 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: 2011 SEM-1, 2011 SEM-2 and 2011 SUM
objective is to increase your awareness of the conceptual
foundation of modelling and for the capabilities of BPMN
and available tools. You will learn how to use grammars and
tools to build, maintain and communicate practically relevant
process models.

**Equivalents:** ITB298  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 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
contceptual models, and the capability to understand and
deal with complex systems.

**Prerequisites:** INN321  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 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.

**Prerequisites:** 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:** 2011 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.

**Prerequisites:** INN335  **Equivalents:** ITB322  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 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:** ITB299
**Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-1

**INB341 SOFTWARE DEVELOPMENT WITH ORACLE**
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:** 2011 SEM-2

**INB342 ENTERPRISE DATA MINING AND DATA ANALYSIS**
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  **Teaching period:** 2011 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  
Antirequisites: INN343  
Credit points: 12  
Contact hours: 3 per week  
Campus: Gardens Point  
Teaching period: 2011 SEM-1

INB344 SEARCH ENGINE TECHNOLOGY
Prerequisites: INB371  
Assumed knowledge: Intermediate programming experience with intermediate-level knowledge of data structures and algorithms  
Credit points: 12  
Teaching period: 2011 SEM-1

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: 2011 SEM-1

INB346 ENTERPRISE 2.0
Web technologies and applications are reshaping contemporary organisations. By 2009 it has been predicted that more than 80% of organisations will have blogs and more than 50% of organisations will have wikis as part of their business solutions and strategies. Furthermore, with the advent of Cloud Computing, many companies are outsourcing key business functions to external web applications. The successful contemporary organisation requires expertise in not just business and management practice but in the critical design, use and consequences of new and emerging technologies. This unit will explore the ways in which IT has impacted on how organisations design and deliver activities and services internally and externally.

The aim of this unit is to provide you with an understanding of how web 2.0 is changing the way contemporary organisations function.
Credit points: 12  
Contact hours: 3 per week  
Campus: Gardens Point  
Teaching period: 2011 SEM-1

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: 2011 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: ITB624, ITB629, ITB720, ITN525, ITN667, ITN720  
Credit points: 12  
Contact hours: 3 per week  
Campus: Gardens Point  
Teaching period: 2011 SEM-1

INB351 UNIX 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: 2011 SEM-2

INB352 NETWORK PLANNING
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, ENN523  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2011 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  Assumed knowledge: Networks or equivalent networking knowledge is assumed knowledge  Equivalents: ITB723  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

INB355 CRYPTOLOGY AND PROTOCOLS
Cryptographic techniques are widely used to implement computer and network security. As an IT security professional you may be required either to evaluate or implement information systems using cryptographic algorithms and protocols. This elective unit covers the main cryptographic technical concepts including encryption, digital signatures and cryptographic protocols.

Antirequisites: ITB646, ITB548, ITB566  Assumed knowledge: Maths B or equivalent is assumed knowledge  Equivalents: ITB732  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

INB365 SYSTEMS PROGRAMMING
Systems programming is an essential part of any computer-science education. This unit uses operating system concepts to teach the foundations of systems programming and advanced concepts for producing softwares that provide services to computer hardware. Through this study, you will be able to demonstrate knowledge of the principles and techniques of process management, memory and file management, protection & security, and distributed systems.

Prerequisites: INB270 or ITB003 or INB371  Antirequisites: ITB745, ITB706, INN365  Assumed knowledge: Fundamentals of computer architecture; high level programming languages (such as C, C++, Java Python) is assumed knowledge.  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point

Teaching period: 2011 SEM-2

INB370 SOFTWARE DEVELOPMENT
Understanding software development is an integral part of the IT industry for software engineers. Software development relies on object technologies, programming techniques and numerous code libraries provided by language developers and third party vendors. Integrated Development Environments, unit testing frameworks, automated and continuous build tools and versioning systems are all becoming part of the tool set modern software developers must be familiar with. This unit is designed to introduce these technologies and techniques to show how software can be rapidly developed.

Prerequisites: INB270 or ITB003  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

INB371 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: 2011 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: 2011 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: INN271, INN373   Equivalents: ITB716 and ITN716  
Credit points: 12   Contact hours: 3 per week   Campus: Gardens Point   Teaching period: 2011 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: 2011 SEM-2

INB381 MODELLING AND ANIMATION TECHNIQUES
The development of computer graphics tools is a significant application within the IT, Games and related industries, relying heavily on software engineering methodologies. These tools, such as CAD systems, 3D modelling systems and games engines, are used in such industries as advertising, engineering, manufacturing, simulation for education and training, computer games, film special effects, etc. Modelling techniques are intrinsic to a 3D graphics system, especially one used for real time animation. With increased CPU and GPU power, the ability to animate in real time is allowing more sophisticated interaction and the merger of games/simulation and film. The unit will provide you with the knowledge and skills to use an industry standard graphics API to implement graphics applications and to develop a basic real time animation system using an industry standard language.

Prerequisites: INB371 and MAB281   Equivalents: ITB746  
Credit points: 12   Contact hours: 3 per week   Campus: Gardens Point   Teaching period: 2011 SEM-2

INB382 REAL TIME RENDERING TECHNIQUES
This unit will provide you with knowledge and skills in basic to advanced techniques in real-time rendering using shading languages. You will be able to implement a high quality real-time rendering system in an industry standard API.

Prerequisites: INB371, INB381 and MAB281   Antirequisites: ITB648 and ITB649   Equivalents: ITB747
Credit points: 12   Contact hours: 3 per week   Campus: Gardens Point   Teaching period: 2011 SEM-1

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: 2011 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: 2011 SEM-2

INB880 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.
Assumed knowledge: Knowledge of a programming language like Python, Java or C is assumed.

Equivalents: ITB847  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LSB468 and LSB338  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LQB481 BIOCHEMICAL PATHWAYS AND METABOLISM

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 a student's understanding of the metabolism of living cells. Hence this biomolecular unit is a fundamental prerequisite for all advanced units in the various disciplines in the field of life sciences.

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: 2011 SEM-1

LQB388 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: 2011 SEM-1

LQB386 MICROBIAL 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: 2011 SEM-1

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 a student's understanding of the metabolism of living cells. Hence this biomolecular unit is a fundamental prerequisite for all advanced units in the various disciplines in the field of life sciences.

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: 2011 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: 2011 SEM-1
LQB383 is recommended prior study  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**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 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:** 2011 SEM-2

**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:** 2011 SEM-2

**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.

**Prerequisites:** (LQB381 or LSB308) and (LQB383 or LSB338)  
**Antirequisites:** LSB508  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**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.

**Prerequisites:** LQB381 or LSB308  
**Antirequisites:** LSB527  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

**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 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:** 2011 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:** 2011 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:** 2011 SEM-1
LQB586 CLINICAL MICROBIOLOGY 2
Clinical microbiology laboratories throughout the world are recognising the need to maximise their diagnostic capabilities for accurate and early detection and management of medically-important parasitic, fungal and bacterial diseases of humans. This unit emphasises a strong commitment to professional practice by: (i) providing you with a comprehensive, in-depth knowledge and understanding of infectious disease states and their etiology, (ii) developing high level generic and specific laboratory-based skills in diagnostic microbiology and (iii) developing and refining critical thinking skills so that experimental results may be observed and recorded intelligently and reported with a high degree of confidence in their validity and rigor.

Prerequisites: LQB486    Antirequisites: LSB547 and LSB647    Credit points: 12    Contact hours: 4 per week
Campus: Gardens Point    Teaching period: 2011 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    Antirequisites: LSB528    Credit points: 12    Contact hours: 4 per week
Campus: Gardens Point    Teaching period: 2011 SEM-1

MAB105 PREPARATORY MATHEMATICS
This unit is intended to cater for the needs of students whose background in mathematics is either weak or does not reach the equivalent of Senior Mathematics B. It is intended to provide the concepts and skills needed for successful study of those units within the university which assume a background equivalent to Senior Mathematics B. This unit is incompatible with a grade of High Achievement in Senior Mathematics B. The aim of this unit is to develop your mathematical skills in and understanding of algebra, functions and graphing, differential and integral calculus of one variable and to interpret and solve simple, real world problems using these skills.

Assumed knowledge: Year 10 Level 6 Mathematics is assumed knowledge    Credit points: 12    Contact hours: 4 per week
Campus: Gardens Point    Teaching period: 2011 SEM-1 and 2011 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.

Antirequisites: MAN120    Assumed knowledge: Grade of at least Least Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge
Credit points: MAB100, MAB125, MAB180    Contact hours: 4 per week
MAB122 ALGEBRA AND ANALYTIC GEOMETRY
Building upon the foundations established in MAB120 or Senior Maths C, this unit addresses the significant role of mathematical modelling using vectors, matrices and multivariable calculus for the description and resolution of simple and complex problems relevant in the real world. The formulation and solution of such problems is supported by appropriate advanced mathematical concepts used for function approximation, differentiation and integration. Undertaking this unit will allow you to develop your problem solving skills, especially in the context of advanced mathematical techniques applied to vectors, matrices and multivariable functions used to model real world problems.

**Assumed knowledge:** Grade of at least Sound Achievement in Senior Mathematics C (or equivalent) or MAB120 or MAB100 or MAB125

**Equivalents:** MAB111, MAB126, MAB131, MAB182

**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1, 2011 SEM-2 and 2011 SUM

MAB220 COMPUTATIONAL MATHEMATICS 1
Many real world problems are not solvable analytically, meaning that it is necessary to develop computational methods that can be used to solve these problems. Additionally, to be able to apply these methods to large problems, they must be implemented as algorithms in a computer language such as MATLAB. This unit addresses both the theoretical development of computational methods and their implementation in MATLAB. The aim of this unit is to provide you with the introductory concepts, computational techniques and programming skills that will allow you to solve many real world problems. It is also designed to prepare you for study in the advanced units in computational mathematics.

**Antirequisites:** MAN220  
**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:** 2011 SEM-1, 2011 SEM-2 and 2011 SUM

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:** 2011 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:** 2011 SEM-2

NQB202 HISTORY OF LIFE ON EARTH
This unit aims to provide you with an understanding of the processes of evolution and the changing environmental conditions through time that influenced the patterns of the evolution of life on this planet. The unit will provide you with practical experience in fossil plant and animal identification, classification and morphological interpretation. It will also enable you to apply palaeontological information to interpret the evolutionary history of higher taxa and the changing ancient depositional environments through time.

**Equivalents:** NRB240  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

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:** 2011 SEM-2
period: 2011 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: 2011 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: 2011 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: 2011 SEM-1

NQB403 SOILS AND THE ENVIRONMENT
This unit will provide you with grounding in soil science (pedology) by emphasising pedological principles, their application to environmental soil analysis and management, and knowledge of ecosystem function of soil in a changing environment. This one of the most critical resources to consider within the context of climate change and is an essential component of environmental scientific studies. It also compliments and provides a basis for further biogeo scientific studies in the SC01 degree. Your knowledge of past and present soil processes will help you to predict process pathways and outcomes for the purposes of environmental planning and management, risk analysis, and impact assessment involving soils. It also contributes to your understanding of field survey and interpretation of soil phenomena in ecological, geological and environmental contexts.

Prerequisites: NQB302 or NRB301 or (ENB272 and ENB274)  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-2

NQB411 PETROLOGY OF IGNEOUS AND METAMORPHIC ROCKS
Igneous and metamorphic rocks compose the bulk of the Earth. Understanding what these rocks are and how they form is an essential part of the study of geology and is fundamental to a wide range of higher level units. This unit builds upon the knowledge and skills acquired in the prerequisite unit (NQB311 Mineralogy) by focusing on the description, classification and origins of igneous and metamorphic rocks. This unit aims to allow you to develop the theoretical and practical skills necessary to describe, classify and interpret igneous and metamorphic rocks.

Prerequisites: NQB311 or NRB333  Equivalents: NRB436  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-2

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. This unit fosters the skill of critical three- and four-dimensional analysis that usually sets geoscientists apart from other scientists and technologists.

Prerequisites: NQB314 or NRB331  Equivalents: NRB434  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-2

NQB421 EXPERIMENTAL DESIGN
This unit deals with the theory and practice of experimental design and the quantitative approaches used for the investigation of ecological and environmental questions discussed in the prerequisite unit Ecology and developed in subsequent units in the ecology and environmental science majors.
The aims of this unit are to provide an introduction to the logic of experimentation and experimental design; build a practical extension on the theoretical basis of statistics obtained in other units using experimental situations commonly met in ecology and environmental science; and apply methods used to quantify the ecological attributes of populations and communities in experimental field situations.

**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:** 2011 SEM-2

---

**NQB422 GENETICS AND EVOLUTION**

A detailed understanding of the principles of genetics is required to fully comprehend modern developments in ecology and evolutionary theory. These principles will be taken forward to develop a clear understanding of the mechanisms and processes that drive evolution in natural populations. The unit provides the foundation for further studies in population and conservation biology. The aim of the unit is to provide a detailed understanding of the principles of genetics and their application to studies of evolution and ecology.

**Prerequisites:** SCB112

**Equivalents:** NRB410

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2011 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:** 2011 SEM-1

---

**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:** 2011 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. The aim of the unit is to provide you with the core knowledge and skills of geophysical measurements, processing of data, and geological interpretation of geophysical data.

**Prerequisites:** (NQB201 or NRB230) and (NQB412 or NQB434)

**Equivalents:** NRB534

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2011 SEM-2

---

**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:** 2011 SEM-1

---

**NQB523 POPULATION MANAGEMENT**

This unit develops the theoretical treatment of populations as a unit of study and integrates the content of previous ecology 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:** NRB511

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2011 SEM-1

---

**NQB613 PLATE TECTONICS**

This unit considers geological observations in the context of a unifying theory. It examines lithospheric plates, plate geometries, Earth morphology, relative and absolute plate movements, stresses of plate interactions, types of plate
boundaries, and orogenesis. It also examines the development of the most important geologic theory of the 20th century.

**Prerequisites:** (NQB412 or NRB434) and (NQB314 or NRB331) and (NQB411 or NRB436) and (NQB513 or NRB534). NQB513 can be studied in the same teaching period as NQB613  

**Equivalents:** NRB635  

**Credit points:** 12  

**Contact hours:** 4 per week  

**Campus:** Gardens Point  

**Teaching period:** 2011 SEM-2

### NQB615 GEOCHEMISTRY

Through lecture, discussion and problem solving exercises, this unit introduces the application of geochemistry, phase equilibria, and thermodynamics to demonstrate the origin and evolution of igneous and metamorphic rocks. Problem-solving exercises synthesise field, petrographic and geochemical data to develop quantitative petrogenetic models and enhance critical thinking and written communication skills. Field study is an important component of this unit.

**Equivalents:** NRB536  

**Credit points:** 12  

**Contact hours:** 4 per week  

**Campus:** Gardens Point  

**Teaching period:** 2011 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:** 2011 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:** 2011 SEM-2

### PQB312 ANALYTICAL CHEMISTRY FOR SCIENTISTS AND TECHNOLOGISTS

This unit addresses three vital theoretical and practical elements of analytical chemistry: quality assurance in a chemical laboratory; principles of chemical sampling; common instrumental techniques. It is a generic unit designed to address the needs and skills of students enrolled in the Chemistry major as well as other majors such as Forensic Science and double degrees in with the Chemistry major. The unit builds on the analytical chemistry concepts introduced in SCB131 Experimental Chemistry. The aim of this unit is to provide students with principles of analytical chemistry, including some common instrumental techniques, which are firmly linked to the theory and practice of the discipline in a modern, working laboratory.

**Prerequisites:** SCB131  

**Equivalents:** PCB414  

**Credit points:** 12  

**Contact hours:** 4.5 per week  

**Campus:** Gardens Point  

**Teaching period:** 2011 SEM-1 and 2011 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:** 2011 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 or MAB120 or MAB121)  
**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:** 2011 SEM-1

**PQB401 REACTION KINETICS, THERMODYNAMICS AND MECHANISMS**
Physical Chemistry is a discipline of chemistry in which the influences of physical factors on chemical reactions are described and quantified. The fundamental factors that govern the extents (equilibria) and rates (kinetics) of chemical reactions are usually the realm of Physical Chemistry. This unit illustrates this basic science with applications of these principles to actual reaction types that are expounded as case studies of the principles underlying the Chemistry. In addition, all students of chemistry need an understanding of the concepts of acids and bases in their widest sense. This unit provides the tools that chemists use to understand how and why molecules react. The aim of this unit is to demonstrate how reactions and their equilibria and rates can be described and quantified, and to understand by studying key examples, the fundamental factors that govern the outcomes of chemical reactions.  
**Prerequisites:** PQB331  
**Antirequisites:** PCB354, PCB405  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-2

**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:** 2011 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 comajor 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:** 2011 SEM-2
build the major functional group classes; and the use of protecting and activating groups.

**Prerequisites:** PQB401, PQB442  
**Antirequisites:**  
**PQB554**  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1

### PQB550 QUANTUM AND CONDENSED MATTER PHYSICS

TBA  
**Prerequisites:** PQB350 and (MAB134 or MAB311)  
**Equivalents:** PCB561  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 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:** 2011 SEM-1

### PCB584 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 PCB513 which core knowledge for the instrumental techniques used within the forensic analysis of various types of physical evidence.

**Prerequisites:** PQB312, SCB384  
**Antirequisites:** PCB584  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 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 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:** 2011 SEM-1 and 2011 SEM-2

### SCB111 CHEMISTRY 1

Chemistry is the central science. It affects society as well as the individual. It is the language and principal tool of the physical sciences, the biological sciences, the health sciences and the agricultural and earth sciences. A basic knowledge of chemistry is essential to all students in these areas. Knowledge of chemistry allows a better understanding of the human body and of the environment in which we live. The aim of this unit is to introduce you to the basic concepts of general, inorganic, analytical and physical chemistry.

**Antirequisites:** SCB113  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1 and 2011 SEM-2

### SCB112 CELLULAR BASIS OF LIFE

Scientists from all disciplines need an appreciation and a broad overview of the characteristics and functioning of the five groups of living organisms (bacteria, protists, fungi, plants and animals), and their interactions with the inanimate world. SCB112 Cellular Basis of Life is a first semester unit that is essential for many students undertaking courses requiring biological knowledge. Through integrated lecture and laboratory classes, this unit provides you with a foundation for later more advanced studies in your course or major (eg such as medical science, biomedical science, pharmacy, optometry, biochemistry, biotechnology, microbiology, geosciences, ecology, business and education among others). The aim of this unit is to introduce you to the wide diversity of living organisms while emphasising the unity of life processes at the cellular, biochemical and biophysical levels.

**Antirequisites:** LQB182, LSB118  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1 and 2011 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 biology, the cellular, biochemical and biophysical levels.
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: 2011 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. In this unit you will be introduced to fundamental aspects of chemistry including the nature of matter, atoms, molecules and ions. From this basis you will develop an understanding of the electronic structure of atoms, chemical bonding and molecular structure as well as the fundamentals of organic chemistry (often described as the chemistry of life). The aims of this unit are to generate an understanding of the importance of chemical bonding and molecular structure and how these factors effect the properties of organic and bioinorganic molecules; and to allow recognition of, and provide an understanding of, the nature of organic functional groups and their respective reactivity.

Prerequisites: (SCB111 or PCB142) . SCB111 can be studied in the same teaching period  Antirequisites: QB105 and SCB113  Credit points: 12  Contact hours: 4.5 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1 and 2011 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. SCB112 can be studied in the same teaching period.  Antirequisites: LSB238  Credit points: 12  Contact hours: 4.5 per week  Campus:

Gardens Point  Teaching period: 2011 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: 2011 SEM-2

SCB131 EXPERIMENTAL CHEMISTRY
Chemistry is the central science. A detailed study of chemistry and related disciplines requires the development of practical laboratory skills for synthesis and chemical analysis. This unit is designed specifically to develop these aspects of chemistry. 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. The aim of this unit is to develop a broad knowledge of, and the practical skills required for, scientific experiments in chemistry. The skills acquired in this unit are transferable to other practical sciences including medical science, biochemistry, molecular biology and pharmacy.

Prerequisites: SCB113 or PB105 or (SCB111 and SCB121). SCB121 can be concurrently enrolled with SCB131  Credit points: 12  Campus: Gardens Point

Teaching period: 2011 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:
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: 2011 SEM-1