Bachelor of Information Technology/Bachelor of Mathematics (IX57)

Year offered: 2011
Admissions: Yes
CRICOS code: 059226F
Course duration (full-time): 4 Years
Domestic Fees (indicative): 2011: CSP $3,028 (indicative) per semester
International Fees (indicative): 2011: $11,375 (indicative) per semester
Domestic Entry: February
International Entry: February
QTAC code: 418552
Past rank cut-off: 81
Past OP cut-off: 10
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: Mr Mike Roggenkamp (Information Technology Major), Dr Tim Moroney (Mathematical Sciences Major)
Campus: Gardens Point

Professional Recognition
Graduates will be eligible for membership of the Mathematical Society of Australia, the Statistical Society of Australia and, depending on unit selection, the Australian Society for Operations Research. This course is accredited by the Australian Computer Society (ACS). ACS accreditation is internationally recognised by the Seoul Accord.

Financial Support
You should consider applying for an industry-sponsored mathematics bursary or an information technology scholarship to help you financially throughout your studies. For further information visit Scholarships.

Study Areas
IX57 will not have nominated majors and minors and consequently there will not be a Study Area A shown on a graduate’s parchment. Instead, IX57 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

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 a 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.

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 Energec, 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.

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

Information Technology Coordinator
Mr Richard Thomas
Phone: +61 7 3138 2782
Email: enquiry.scitech@qut.edu.au
## Mathematical Sciences Coordinator
Dr Tim Moroney  
Phone: +61 7 3138 2262  
Email: t.moroney@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.

### Course Structure for Students with Four Semesters of Senior Mathematics B and Senior Mathematics C

#### Year 1, Semester 1
- **INB101** Impact of IT  
- **INB102** Emerging Technology  
- **MAB121** Calculus and Differential Equations  
- **MAB122** Algebra and Analytic Geometry

#### Year 1, Semester 2
- **INB103** Industry Insights  
- **INB104** Building IT Systems  
- **MAB210** Statistical Modelling 1  
- **MAB220** Computational Mathematics 1

#### Year 2, Semester 1
- **IT Breadth Unit Option**  
- **IT Breadth Unit Option**  
- **MAB101** Statistical Data Analysis 1  
- **MAB312** Linear Algebra

#### Year 2, Semester 2
- **IT Breadth Unit Option**  
- **IT Breadth Unit Option**  
- **Level 2 or 3 Maths Unit**  
- **Level 2 or 3 Maths Unit**

#### Year 3, Semester 1
- **INB201** Scalable Systems Development  
- **MAB311** Advanced Calculus  
- **Level 2 or 3 Maths Unit**

#### Year 3, Semester 2
- **INB300** Professional Practice in IT  
- **IT Specialisation Unit Option**  
- **Level 2 or 3 Maths Unit**  
- **Level 2 or 3 Maths Unit**

### Year 4, Semester 1
- **INB301** The Business of IT  
- **IT Specialisation Unit Option**  
- **Level 2 or 3 Maths Unit**  
- **Level 2 or 3 Maths Unit**

### Year 4, Semester 2
- **INB302** IT Capstone Project  
- **IT Specialisation Unit Option**  
- **Level 2 or 3 Maths Unit**  
- **Level 2 or 3 Maths Unit**

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### Course Structure for Students with Four Semesters of Senior Mathematics B Only

#### Year 1, Semester 1
- **INB101** Impact of IT  
- **INB102** Emerging Technology  
- **MAB101** Statistical Data Analysis 1  
- **MAB120** Algebra and Calculus

#### Year 1, Semester 2
- **INB103** Industry Insights  
- **INB104** Building IT Systems  
- **MAB121** Calculus and Differential Equations  
- **MAB122** Algebra and Analytic Geometry

#### Year 2, Semester 1
- **IT Breadth Unit Option**  
- **IT Breadth Unit Option**  
- **MAB220** Computational Mathematics 1  
- **MAB312** Linear Algebra

#### Year 2, Semester 2
- **MAB210** Statistical Modelling 1  
- **Level 2 or 3 Maths Unit**  
- **Level 2 or 3 Maths Unit**

#### Year 3, Semester 1
- **INB201** Scalable Systems Development  
- **IT Specialisation Unit Option**  
- **Level 2 or 3 Maths Unit**

#### Year 3, Semester 2
- **INB300** Professional Practice in IT  
- **IT Specialisation Unit Option**  
- **Level 2 or 3 Maths Unit**  
- **Level 2 or 3 Maths Unit**
<table>
<thead>
<tr>
<th>IT Specialist Unit Option</th>
<th>MAB333</th>
<th>Statistical Techniques</th>
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</thead>
<tbody>
<tr>
<td>MAB334</td>
<td>Time Series Analysis</td>
<td></td>
</tr>
<tr>
<td>MAB613</td>
<td>Partial Differential Equations</td>
<td></td>
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<tr>
<td>MAB623</td>
<td>Financial Mathematics</td>
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<td>MAB624</td>
<td>Applied Statistics 3</td>
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<td>MAB625</td>
<td>Operations Research 3B</td>
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<td>MAB640</td>
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<tr>
<td>MAB672</td>
<td>Advanced Mathematical Modelling</td>
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Note: MAB523 Introduction to Quality Management and MAB621 Discrete Mathematics do not contribute to the mandatory 48 credit points minimum from Level 3 Mathematics units.

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**IT Breadth Option Unit List**

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

- INB120 Corporate Systems
- INB210 Databases
- INB220 Business Analysis
- INB250 Foundations of Computer Science
- INB251 Networks
- INB255 Security
- INB270 Programming
- INB271 The Web
- INB272 Interaction Design

**IT Specialisation Option Unit List**

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

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

2. **DATA WAREHOUSING:**
   - INB340 Database Design
   - INB341 Data Warehousing
   - INB342 Data Management
   - INB343 Data Analysis

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**Mathematics Units**

**Level 2 Units**

- MAB311 Advanced Calculus
- MAB312 Linear Algebra
- MAB313 Mathematics of Finance
- MAB314 Statistical Modelling 2
- MAB315 Operations Research 2
- MAB413 Differential Equations
- MAB414 Applied Statistics 2
- MAB420 Computational Mathematics 2
- MAB422 Mathematical Modelling
- MAB461 Discrete Mathematics
- MAB480 Introduction to Scientific Computation

Note: MAB311 Advanced Calculus and MAB312 Linear Algebra are mandatory units.

**Level 3 Units - at least 4 units must be selected**

- MAB521 Applied Mathematics 3
- MAB522 Computational Mathematics 3
- MAB524 Statistical Inference
- MAB525 Operations Research 3A

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**Year 3, Semester 2**

- INB300 Professional Practice in IT
  - IT Specialist Unit Option
  - Level 2 or 3 Maths Unit
  - Level 2 or 3 Maths Unit

**Year 4, Semester 1**

- INB301 The Business of IT
  - IT Specialist Unit Option
  - Level 2 or 3 Maths Unit
  - Level 2 or 3 Maths Unit

**Year 4, Semester 2**

- INB302 IT Capstone Project
  - IT Specialist Unit Option
  - Level 2 or 3 Maths Unit
  - Level 2 or 3 Maths Unit
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

Potential Careers:
Actuary, Computer Game Programmer, Data Communications Specialist, Database Manager, Market Research Manager, Mathematician, Network Administrator, Network Manager, Programmer, Quantitative Analyst, Software Engineer, Statistician, Systems Analyst.

UNIT SYNOPSISES

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 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 employing a project management method. The aim of this course is to familiarise you with the PRINCE2® method so that you could successfully work within and lead project teams. At the conclusion of this unit you will may be eligible to sit the externally provided PRINCE2® Foundation and Practitioner accreditation examinations.

**Antirequisites:** INN500  **Assumed knowledge:** Completion of 48 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 and 2011 SEM-2

### 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: INN210  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 understanding of the major concepts, knowledge, and skills required for introductory business analysis. 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.
Prerequisites: INB103 or ITB002 or INB120 or ITB360  Antirequisites: ITN241, ITN251 and ITN366  Equivalents: ITB366, ITB241  Credit points: 12

Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

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-2

INB251 NETWORKS
Computer systems and communications networks are essential to the activities of modern organisations. When you graduate from a course in Information Technology, employers expect you to have a sound understanding of the terminology and concepts of computer systems, communications networks, and network services. This unit provides you with an introductory study of communications network technologies and network applications. The unit serves as an entry point to further specialised studies in the field of computer network systems.
Antirequisites: 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
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: INB373 and INN373 and ITB007 and ITB227 and ITN007 and ITN227  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) behavioural artefacts that complement a game narrative. Computer game AI is a special area of study that deals with algorithmic approaches to entertainment affects in NPC. Students will develop in this unit an understanding of problems, solutions and algorithms that generally defines the current state of computer game AI. The aim of this unit is to provide students with an intermediate level course in computer game AI that involves a set of the most relevant algorithms and their applications in the interactive entertainment and game industries.

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

**Prerequisites:** INB371  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1 and 2011 SEM-2

**INB306 PROJECT 1**  
This unit gives you the opportunity to apply, under academic supervision, will develop your initiative and ability to apply your knowledge and skills in a professional capacity. Completing the project will also enable you to appreciate the complementary nature of the course material in total, particularly the need for careful project management.

**Prerequisites:** INB101, INB102, INB103, INB104 and INB201  
**Assumed knowledge:** As a minimum requirement you must have completed at least 132 credit points of IT units, including INB101, INB102, INB103, INB104, INB201, four breadth units, and at least two specialisation units.  
**Equivalents:** ITB230  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2011 SEM-1, 2011 SEM-2 and 2011 SUM

**INB307 PROJECT 2**  
This unit gives you the opportunity to apply, under appropriate guidance, the knowledge and skills gained in your course to date and to execute a substantial development project. The ability to apply technical knowledge and skills to real-life situations is essential for information technology professionals. A substantial project, under academic supervision, will develop your initiative and ability to apply your knowledge and skills in a professional capacity. Completing the project will also enable you to appreciate the complementary nature of the course material in total, particularly the need for careful project management.

**Assumed knowledge:** Assumed knowledge is completion of 192cp of which at least 144cp must be IT units  
**Equivalents:** ITB791  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 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

INB311 ENTERPRISE SYSTEMS
The unit presents and discusses the Enterprise Systems Lifecycle model, orienting students to the requirements of addressing total cost of ownership, change management requirements and process modelling requirements in order to achieve business benefits. Concepts of Enterprise Systems success and associated enablers and barriers are also introduced. This unit introduces the technical architecture of complex 3-tiered client server environments. It seeks to show how an integrated complex database environment meets common business needs, and yet fails to meet the total Information Systems requirements.

Antirequisites: INN311    Credit points: 12    Contact hours: 3 per week    Campus: Gardens Point    Teaching period: 2011 SEM-2

INB312 ENTERPRISE SYSTEMS APPLICATIONS
The aim of this unit is to introduce one of the more complex and comprehensive Enterprise Systems applications. This unit introduces the business perspective and application processes of modules (such as FI, CO, PP, MM and SD) and investigates the support provided by these systems and the integration between modules by following some of the major processes in a business. The unit enables you to experience both the business analyst view and the user's view of the system across a number of business processes.

Antirequisites: ITB233, INN312    Credit points: 12    Contact hours: 3 per week    Campus: Gardens Point    Teaching period: 2011 SEM-1

INB313 ELECTRONIC COMMERCE SITE DEVELOPMENT
This unit will enable you to specify, design, implement and maintain effective e-commerce applications. You will obtain a broad understanding of the potential of e-commerce and how it can be employed to benefit an organisation. You will get direct experience of creating an e-commerce storefront following a business to business (B to B) or business to consumer (B to C) model. You will also have an understanding of the computer systems that underpin e-commerce including payment systems and secure transactions.

Antirequisites: ITB260    Credit points: 12    Contact hours: 3 per week    Campus: Gardens Point    Teaching period: 2011 SEM-2

INB320 BUSINESS PROCESS MODELLING
The aim of this unit is to introduce you to modern methodologies of business process modelling. A main 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.

Antirequisites: INN335    Equivalents: ITB322    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 conceptual models, and the capability to understand and deal with complex systems.

Antirequisites: INN321    Credit points: 12    Contact hours: 3 per work    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.

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

Antirequisites: 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 conceptually design systems found in many real-world application domains.

Prerequisites: INB210 or ITB004  Antirequisites: ITB229
Credit points: 12  Contact hours: 3 per week
Campus: Gardens Point  Teaching period: 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.

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.

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

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: INB250 or ITB005 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, ITN352, 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: ITB771
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  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  Antirequisites: 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  Antirequisites: 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 Equivalent: 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) Equivalent: ITB259, ITN259 Credit points: 12 Contact hours: 3 per week Campus: Gardens Point Teaching period: 2011 SEM-2

INB860 COMPUTATIONAL INTELLIGENCE FOR CONTROL AND EMBEDDED SYSTEMS
This is a specialisation unit in the area of Infomechatronics that introduces five methods from the field of computational intelligence and relates them to applications on real time control and embedded systems. The methods are: Knowledge Base Systems, Fuzzy Control, Neural Networks, Reinforcement Learning and Evolutionary Computation. The unit is also intended to teach the specific design and programming skills that will enable you to solve problems using computational intelligence methods in real-time embedded systems. It is assumed that you already have knowledge of programming.

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

MAB101 STATISTICAL DATA ANALYSIS 1
Experiments, observational studies, sampling, and polls; data and variables; framework for describing and manipulating probability; independence; Binomial and Normal distributions; population parameters and sample statistics; concepts of estimation and inference; standard error; confidence intervals for means and proportions; tests of hypotheses on means and proportions (one sample and two independent samples); inference using tables of counts; modelling relationships using regression analysis; model diagnosis; use of statistical software.
Antirequisites: BSB123, EFB101, MAB141, MAN101, MAB233 Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge. Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SUM-2, 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 Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge.
Equivalents: MAB100, MAB125, MAB180 Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-1, 2011 SEM-2 and 2011 SUM

MAB121 CALCULUS AND DIFFERENTIAL EQUATIONS
Building upon the foundations established in MAB120 or Senior Maths C, this unit addresses the significant role of mathematical modelling using differential equations for the description and resolution of simple and complex problems relevant to real world situations. 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 ordinary differential equations used to model real world problems. You will also gain a deeper understanding of the concepts of the derivative and the integral, and how these may be used in applied contexts.

MAB20 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.

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics C (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 and 2011 SEM-2

MAB22 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: MAB112, MAB127, MAB132
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2011 SEM-1, 2011 SEM-2 and 2011 SUM

MAB210 STATISTICAL MODELLING 1
This unit is intended for all mathematics degree students, all double degree students with mathematics, secondary education students with mathematics as a teaching area, and quantitatively-oriented students in other courses, particularly in Science, Information Technology, Engineering and areas of Business. The unit will provide you with fundamental skills and operational knowledge for all further study in statistics, and highly relevant foundations for other areas of mathematics such as mathematical modelling and operations research. The unit will also help you develop fundamental problem-solving skills in statistics and mathematics.

Prerequisites: MAB121 or MAB122
Antirequisites: MAN210
Assumed knowledge: Grade of Sound Achievement in Senior Mathematics C (or equivalent) or MAB20 is assumed knowledge. Students are advised to enrol in either MAB121 or MAB122 in the same semester if not previously completed.
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2011 SEM-1 and 2011 SEM-2
MAB314 STATISTICAL MODELLING 2
This unit includes: models for stochastic processes and statistical methods, which have applications in engineering, information technology, finance, and physical and life sciences. Markov chains; random walks; branching processes; queueing processes; long-term behaviour of processes; use of generating functions; bivariate and conditional distributions; transformations of random variables; beta and gamma distributions; mixture distributions; order statistics, minimum and maximum. **Prerequisites:** MAB112 and MAB210 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2011 SEM-1

MAB315 OPERATIONS RESEARCH 2
This unit introduces the essential features of operations research methods. It develops a number of basic mathematical techniques to solve generic problems and the theoretical foundations of these techniques. Students should develop the ability to apply various operations research methods, algorithms and techniques in the solution of practical problems. Students will also look at the applications of operations research techniques to real-world problems. **Prerequisites:** MAB210 and (MAB112 or MAB122) **Antirequisites:** MAN315 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2011 SEM-1

MAB413 DIFFERENTIAL EQUATIONS
Differential Equations are among the most important aspects of the theoretical developments of any branch of science. It is often the case that the formulation of mathematical models of real world problems leads to an equation in which a function and its derivatives play a major role. Such equations are examples of differential equations. This unit builds on studies of differential equations in first year and provides a framework for studying partial differential equations and other aspects of applied mathematics in later semesters. **Prerequisites:** MAB311 or MAB312 **Antirequisites:** MAN413 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2011 SEM-2

MAB414 APPLIED STATISTICS 2
This unit includes: Simple linear regression (revision), multiple linear regression, making inferences from regressions, choosing a model, checking model assumptions, general linear models - analysis of covariance, ANOVA revisited, designing experiments, issues in designing experiments, analysing experimental results, further experimental designs, assumptions, and how to cope if they aren't met, simulations. **Prerequisites:** MAB101 **Assumed knowledge:** MAB112 is recommended prior study **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2011 SEM-2

MAB420 COMPUTATIONAL MATHEMATICS 2
This unit provides you with the opportunity to employ a number of the skills that you have developed in the disciplines of computational mathematics and linear algebra, combining them in a coherent manner for resolving topical and relevant real world problems. You will become familiar with the methodologies for developing numerical algorithms that can be employed for either the direct solution or the iterative solution of large, sparse linear systems. **Prerequisites:** MAB220 and MAB312 **Antirequisites:** MAN420 **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2011 SEM-2

MAB422 MATHEMATICAL MODELLING
In this unit you will develop skills in the formulation and interpretation of mathematical models of 'real-world' problems drawn from the literature, the media and the lecturer's own research areas. You will also develop and extend your skills in the use of mathematical software to investigate solutions of some of these models. By emphasising the need to write clear mathematical arguments and to explain in logical and clear English the conclusions drawn from the mathematical models developed in the unit, you will also develop your written communication skills. **Prerequisites:** MAB121 **Antirequisites:** MAN422 **Assumed knowledge:** MAB112 is recommended for prior/concurrent study for exposure to MATLAB **Credit points:** 12 **Contact hours:** 4 per week **Campus:** Gardens Point **Teaching period:** 2011 SEM-2

MAB461 DISCRETE MATHEMATICS
Discrete mathematics is playing an ever increasingly important role in society. We live in an electronic age where information security is of paramount importance, and it is discrete mathematics in the main that provides this security. In addition, many real world systems are discrete in nature and therefore lend themselves to a discrete analysis. These methods are therefore vital to the professional mathematician and useful to those with an interest in mathematics. This second level unit will provide you with an introduction to discrete and combinatorial mathematics, and give you a mathematical perspective that is different from the traditional coverage in other mathematics units. It will also provide you with valuable methods to apply in other areas of science and computer science.
This unit develops problem-solving skills and sharpens analytical skills. This unit introduces the technical issues involved in applying operations research principles, methods and algorithms in the solution of real-world problems.

Prerequisites: MAB315 Antirequisites: MAN525
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-1

MAB533 STATISTICAL TECHNIQUES
This unit builds on your knowledge and skills of statistical techniques and aims to provide you with an understanding and a working knowledge of some more specialised statistical techniques and their applications. Topics covered include quality management concepts and tools for statistical process control, modelling and analysis of reliability (for inanimate objects) and survival (for living entities), and multivariate techniques such as principal components analysis, discriminant analysis and cluster analysis.

Prerequisites: MAB210 and MAB414 Antirequisites: MAB523
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-1

MAB536 TIME SERIES ANALYSIS
Data in business, economics, engineering and the natural sciences often occur in the form of time series. Time Series Analysis provides models and methods for the analysis of such series of correlated observations. The ability to forecast optimally, to understand causal relationships between variables, and to analyse dynamic systems is of great practical importance. For example, optimal sales forecasts are needed for business planning, transfer function models are needed for improving the design and control of a process plant, and vector time series models are used to represent the relationships and interactions of macroeconomic variables in an economy. This unit is concerned with the building of time series models and the use of such models for practical applications such as optimal forecasting, simulation, causality analysis, and analysis of dynamic systems.

Prerequisites: MAB314 and MAB414 Antirequisites: MAN536, MAB526
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point Teaching period: 2011 SEM-2

MAB613 PARTIAL DIFFERENTIAL EQUATIONS
Partial differential equations are the classical foundation of mathematical models used to unambiguously describe processes exhibiting spatial and temporal variation. There exist numerous modern important examples of such so-called continuum models and so it is essential that any practising mathematician be conversant with both the background, formulation and solution of such equations. This unit aims to develop your understanding of the construction, analysis, solution and interpretation of partial
differential equation models of real-world processes.

**Prerequisites:** MAB311 and MAB413    **Antirequisites:**

MAN613    **Credit points:** 12    **Contact hours:** 4 per week    **Campus:** Gardens Point    **Teaching period:** 2011 SEM-2

**MAB623 FINANCIAL MATHEMATICS**

This unit includes the following: quantitative techniques in business, economics and finance; theory and structure of interest rates; general accumulation and discounting functions; force of interest; discounting including Modern Portfolio theory and extension; varying interest; general annuities; varying annuities; continuous varying annuities; mathematical analysis of financial transactions in money and capital markets; life annuities and life assurances; the life table; basic life table functions; life annuities and assurances; policy values; paid up policy values; changes to policies; use of life table; superannuation.

**Prerequisites:** MAB313 and MAB311    **Credit points:** 12    **Contact hours:** 4 per week    **Campus:** Gardens Point    **Teaching period:** 2011 SEM-2

**MAB624 APPLIED STATISTICS 3**

Applied statistics provides methods for investigating relationships between variables that arise in data from a variety of areas including science, technology and commerce. The planning of the collection of the data, using ideas of experimental design, and the analysis of the resulting data, using methods based on statistical inference, are fundamental aspects of the statistical process. In addition, communication of results with clear reporting of the conclusions of the analysis is very important. These activities are an important part of decision making processes whatever the context of the application. This unit aims to build on the introductory experimental design and statistical analysis methods presented to you in Applied Statistics 2 in order to introduce modern statistical methods. Additionally, the use of statistical software to carry out analyses and the reporting of conclusions are emphasised.

**Prerequisites:** MAB414    **Antirequisites:** MAN624

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

**MAB625 OPERATIONS RESEARCH 3B**

Operations research techniques are used in most industries that are concerned with the application of scientific methods in decision making, especially the allocation of resources. There is thus a need for graduate students who can make decisions on the most appropriate technology to solve a particular problem and implement it. This unit will build on the foundation of previous Operations Research units to develop knowledge and skills in using advanced techniques, tools and methods.

**Prerequisites:** MAB315    **Equivalents:** MAN625

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

**MAB640 INDUSTRY PROJECT**

In a holistic and systematic approach to problem solving, it is important that you learn to apply analytical methods and quantitative techniques encountered in a classroom environment to real world issues in industry. The aim of this unit is to allow you to utilise your knowledge of problem solving procedures and develop your communication and interactive skills by completing a specified project in industry under controlled supervision, providing a summary of your findings in a seminar and presenting a formally written detailed report.

**Other requisites:** Unit coordinator approval is required to enrol

**Credit points:** 24    **Campus:** Gardens Point    **Teaching period:** 2011 SEM-1 and 2011 SEM-2

**MAB672 ADVANCED MATHEMATICAL MODELLING**

Models are developed beginning with the description of ‘real world’ problems. Emphasis is on the mathematical modelling and not on the development of new mathematical techniques. The unit includes: mathematical modelling; model formulation; dimensional analysis and re-scaling; curves of pursuit; bungy jumping; modelling with systems of ordinary differential equations; phase plane methods for analysing systems of ODEs; bacterial growth in a chemostat; predator-prey models with harvesting; limit cycles; oscillations and excitible media; modelling with partial differential equations; motion of a continuum; continuity; traffic flow; aggregation of slime mould amoebae; momentum; ideal gas dynamics; quasi-linear PDEs.

**Prerequisites:** MAB422    **Antirequisites:** MAN672

**Assumed knowledge:** MAB311. Also recommend: MAB413

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