Bachelor of Engineering (Software Engineering) (EN40)

Year offered: 2010
Admissions: Yes
CRICOS code: 056529D
Course duration (full-time): 4 years
Domestic fees (indicative): 2010: CSP $3,800 (indicative) per semester
International Fees (indicative): 2010: $12,000 (indicative) per semester
Domestic Entry: February and July
International Entry: February and July
QTAC code: 412502
Past rank cut-off: 79
Past OP cut-off: 11
OP Guarantee: Yes
Assumed knowledge: English (4, SA) and Maths B (4, SA)
Preparatory studies: For information on acquiring assumed knowledge visit http://www.studentservices.qut.edu.au/apply/ug/info/knowledge.jsp
Total credit points: 384
Standard credit points per full-time semester: 48
Course coordinator: Dr R. Mahalinga-Iyer
Discipline coordinator: Dr Jasmine Banks
Campus: Gardens Point

Course Overview
The course is a collaborative program between the Faculties of Built Environment & Engineering and Information Technology which provides students with the electrical engineering and software development skills to seek employment as software engineers. The engineering component consists of studies in electronic systems engineering while the information technology component concentrates on software engineering. These studies integrate into a cohesive course which gives a wide and advanced study of modern electronic and computing systems. This degree produces computer and electronic engineers especially suited for the development and application of electronic systems and computer systems in all areas of industry.

Recommended Study
Chemistry, Maths C and Physics

Career Outcomes
Software Engineers create, maintain and modify computer and software programs such as operating systems or communications software. They may also evaluate and deploy new programming tools and techniques and analyse current software products. You may work in a range of occupational environments. Software engineers can work in Engineering/IT-specific industries, as well as in other organisations requiring software engineering expertise.

Professional Recognition
Full professional accreditation from Engineers Australia and the Australian Computer Society has been given for this course.

Minors
For professional recognition you will undertake an Applications minor which consists of a Work Place Integrated Learning unit, a project unit and two specialised engineering units.

Special course requirements
Students are required to complete 60 days approved industrial experience as part of the Work Integrated Learning unit.

International Student Entry
International students must maintain an enrolment program that will allow them to complete their course within the specified timeframe of their eCoE (electronic Confirmation of Enrolment).

Deferment
All domestic applicants offered admission to undergraduate award courses may apply to defer commencement of their study. A deferment application will not normally be considered for courses where specific admission requirements apply, for example submission of folios or undertaking auditions. Applicants are not entitled to hold a deferred place and hold a place in another QUT course for the same period.

Find out more on deferment.

Unit Incompatibility/Translation Information
Details on the translation and incompatibility of old and new units is located here:
Undergraduate Translation Table
If you have completed the unit(s) listed under the “Translation Unit Codes” column you are not permitted to enrol in the listed new code.

Further Information
Faculty of Built Environment and Engineering: tel: +61 7 3138 1993, fax: +61 7 3138 1516, email: bee.enquiries@qut.edu.au
Faculty of Science and Technology: tel: +61 7 3138 2782, fax +61 7 3138 2703, email: enquiry.scitech@qut.edu.au

Full-time Course structure – Students commencing
February 2010 onwards (Years 2 – 4)

Please Note:

For 1st year enrolment program please refer to EN40 Bachelor of Engineering course entry.

Year 2 - Semester 1 (to be introduced in 2011)

ENB240 Introduction To Electronics
ENB246 Engineering Problem Solving
ENB250 Electrical Circuits
MAB127 Mathematics for Engineering 2
OR
MAB233 Engineering Mathematics 3

Year 2 - Semester 2 (to be introduced in 2011)

ENB243 Linear Circuits and Systems
INB210 Databases
INB251 Networks
INB270 Programming

Year 3 - Semester 1 (to be introduced in 2012)

ENB354 Introduction To Systems Design
INB301 The Business of IT
INB370 Software Development
INB371 Data Structures and Algorithms

Year 3 - Semester 2 (to be introduced in 2012)

ENB244 Microprocessors and Digital Systems
ENB355 Advanced Systems Design
INB365 Systems Programming
MAB233 Engineering Mathematics 3
OR
Selective

Year 4 - Semester 1 (to be introduced in 2013)

BE801 Project 1
OR
INB309-1 Major Project
ENB350 Real-time Computer-based Systems
INB255 Security
Selective

Year 4 - Semester 2 (to be introduced in 2013)

BE701 Work Integrated Learning 1
BE802 Project 2

OR

INB309-2 Major Project
INB272 Interaction Design
INB372 Agile Software Development

Software Engineering Selectives

ENB242 Introduction To Telecommunications
ENB344 Industrial Electronics
ENB352 Communication Environments For Embedded Systems
INB340 Database Design
INB355 Cryptology and Protocols
INB373 Web Application Development
INB374 Enterprise Software Architecture
INB381 Modelling and Animation Techniques
INB382 Real Time Rendering Techniques
Any other unit approved by coordinator.

Full-time Course structure – Students commencing Mid-Year 2010 onwards (Years 2 – 5)

Please Note:

For 1st year enrolment program please refer to EN40 Bachelor of Engineering course entry.

Year 2 - Semester 1 (to be introduced in 2011)

ENB240 Introduction To Electronics
ENB246 Engineering Problem Solving
ENB250 Electrical Circuits
MAB127 Mathematics for Engineering 2
OR
MAB233 Engineering Mathematics 3

Year 2 - Semester 2 (to be introduced in 2011)

ENB150 Introducing Engineering Design
ENB200 Introducing Sustainability
ENB243 Linear Circuits and Systems
INB270 Programming

Year 3 - Semester 1 (to be introduced in 2012)

INB255 Security
INB370 Software Development
INB371 Data Structures and Algorithms

Year 3 - Semester 2 (to be introduced in 2012)

ENB244 Microprocessors and Digital Systems

Selective

INB309-2 Major Project
INB272 Interaction Design
INB372 Agile Software Development

Software Engineering Selectives

ENB242 Introduction To Telecommunications
ENB344 Industrial Electronics
ENB352 Communication Environments For Embedded Systems
INB340 Database Design
INB355 Cryptology and Protocols
INB373 Web Application Development
INB374 Enterprise Software Architecture
INB381 Modelling and Animation Techniques
INB382 Real Time Rendering Techniques
Any other unit approved by coordinator.
## INB210 Databases

## INB251 Networks

## INB365 Systems Programming

### Year 4 - Semester 1 (to be introduced in 2013)

<table>
<thead>
<tr>
<th>Unit Code</th>
<th>Course Title</th>
<th>Campus</th>
<th>Teaching Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>INB301</td>
<td>The Business of IT</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>MAB233</td>
<td>Engineering Mathematics 3</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
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OR

### Year 4 - Semester 2 (to be introduced in 2013)

<table>
<thead>
<tr>
<th>Unit Code</th>
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<tbody>
<tr>
<td>ENB355</td>
<td>Advanced Systems Design</td>
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<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>BEB801</td>
<td>Project 1</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
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<tr>
<td>INB309-1</td>
<td>Major Project</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB272</td>
<td>Interaction Design</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB372</td>
<td>Agile Software Development</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
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OR

### Year 5 - Semester 1 (to be introduced in 2014)

<table>
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<th>Course Title</th>
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<th>Teaching Period</th>
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<tbody>
<tr>
<td>BEB701</td>
<td>Work Integrated Learning 1</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>BEB802</td>
<td>Project 2</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB309-2</td>
<td>Major Project</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
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## Software Engineering Selectives

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<tr>
<td>ENB242</td>
<td>Introduction To Telecommunications</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>ENB344</td>
<td>Industrial Electronics</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>ENB352</td>
<td>Communication Environments For Embedded Systems</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB340</td>
<td>Database Design</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB355</td>
<td>Cryptology and Protocols</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB373</td>
<td>Web Application Development</td>
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<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB374</td>
<td>Enterprise Software Architecture</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB381</td>
<td>Modelling and Animation Techniques</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
</tr>
<tr>
<td>INB382</td>
<td>Real Time Rendering Techniques</td>
<td>Gardens Point</td>
<td>2010 SEM-1, 2010 SEM-2 and 2010 SUM</td>
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## UNIT SYNOPSES

### BEB701 WORK INTEGRATED LEARNING 1

This unit aims to provide you with the opportunity to learn in a workplace environment. It will involve attendance, participation, observation, critical reflection, and report writing on workplace activities. The emphasis of your critical reflection and report writing will be on identifying and describing aspects of professional relevance incorporating: collaboration and teamwork; work place, health and safety; professional conduct; ethical responsibility, and other aspects of your workplace experience.

This unit may form part of your (compulsory) course core (as required by professional accrediting bodies e.g. Engineers Australia, Australian Institute of Building, Royal Institution of Chartered Surveyors), or it may be one of several work integrated learning (WIL) units (selected as part of a Minor).

**Prerequisites:** 192cp of completed studies  
**Credit points:** 12  
**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

### BEB801 PROJECT 1

This unit is usually taken in the final year of study. Students complete an individual project involving the application of skills and knowledge attained during the earlier years of their degree program. For some students, this unit will be taken one of two ‘project’ units related to the same student project; in such cases this unit may be a pre-requisite or co-requisite to the second unit (or a follow-on from the first unit). The final ‘deliverable’ for this unit may vary for each discipline and details will be provided in lectures/tutorials and on the Blackboard website.

**Equivalents:** CEB411, CEB420, CNB434, EEB781-1, EEB889-1  
**Credit points:** 12  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

### BEB802 PROJECT 2

This unit is usually taken in the final year of study, and is only taken by students completing a two unit project. Students complete an individual project involving the application of skills and knowledge attained during the earlier years of their degree program. This unit will be taken as the second of two ‘project’ units related to the same student project.

**Equivalents:** CEB415, EEB782-2, EEB889-2  
**Credit points:** 12  
**Teaching hours:** 2 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

### ENB150 INTRODUCING ENGINEERING DESIGN

**Assumed knowledge:** ENB110 is assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

### ENB200 INTRODUCING SUSTAINABILITY

This unit will enable you as a graduating Built Environment and Engineering professional to take active and positive steps to transform professional practice in ways that promote the sustainability of our planet, our economy and
This unit introduces you to electrical circuit analysis. It will give you a basic understanding of linear and switching circuits, and how to solve them using the principles of circuit theory. Students will also study practical applications of these circuits. Practical exercises and laboratory work are introduced as a way of reinforcing theoretical concepts. These circuits include basic transistors and operational amplifiers, as well as more advanced circuits such as those found in microprocessors and digital systems.

ENB241 ELECTRICITY AND ELECTRONICS

This unit introduces the fundamentals of electricity and electronics. It covers the basic principles of electricity, including Ohm's law, Kirchhoff's laws, and the behavior of electrical circuits. Students will learn about the properties of different types of electronic devices, such as resistors, capacitors, inductors, diodes, and transistors. The unit also covers the basics of circuit analysis and the use of computer-aided design tools for circuit design.

ENB251 ELECTRICAL CIRCUITS

This unit covers the analysis of electrical circuits using Kirchhoff's laws and Ohm's law. Students will learn how to use these laws to solve circuit problems and to design circuits that meet specific requirements. The unit also covers the principles of circuit design and the selection of components for specific applications.

ENB262 NETWORKS AND ELECTRICAL SYSTEMS

This unit covers the analysis of electrical networks and the design of electrical systems. Students will learn about the behavior of networks, including how to use network functions, and how to design and analyze electrical systems using the principles of network analysis.

ENB263 INTRODUCTION TO TELECOMMUNICATIONS

This unit introduces you to the field of telecommunications. It covers the basics of signal transmission and the principles underlying digital and analog communication systems. Students will learn about the fundamentals of signal transmission, including modulation and demodulation, as well as the use of signal processing techniques in telecommunications.

ENB264 INTRODUCTION TO ELECTRONICS

This unit introduces you to the world of electronics. It covers the basics of electronic devices, including transistors, diodes, and integrated circuits. Students will learn about the behavior of these devices, as well as how to design and analyze electronic circuits using the principles of circuit theory.

ENB265 ELECTRONICS PROJECTS

This unit focuses on the application of electronics in real-world projects. Students will work on a project that involves the design and implementation of an electronic circuit or system. The project will be based on a specific problem or application, and will give students the opportunity to apply their knowledge of electronics in a practical setting.

ENB266 COMPUTER-AIDED DESIGN OF ELECTRONIC CIRCUITS

This unit covers the use of computer-aided design (CAD) tools for the design and analysis of electronic circuits. Students will learn how to use CAD tools to design and simulate electronic circuits, as well as how to use these tools to solve circuit problems and to design circuits that meet specific requirements.

ENB267 DIGITAL ELECTRONICS

This unit covers the fundamentals of digital electronics, including the behavior of digital circuits, logic gates, and computer systems. Students will learn about the principles of digital circuit design and the selection of components for specific applications. The unit also covers the basics of computer architecture and the design of computer systems.

ENB268 ELECTRICAL ENGINEERING PROBLEMS AND PROJECTS

This unit focuses on the application of electrical engineering concepts in real-world projects. Students will work on a project that involves the design and implementation of an electrical circuit or system. The project will be based on a specific problem or application, and will give students the opportunity to apply their knowledge of electrical engineering in a practical setting.

ENB269 COMPUTER-AIDED DESIGN OF ELECTRICAL CIRCUITS

This unit covers the use of computer-aided design (CAD) tools for the design and analysis of electrical circuits. Students will learn how to use CAD tools to design and simulate electrical circuits, as well as how to use these tools to solve circuit problems and to design circuits that meet specific requirements.

ENB270 REAL-TIME COMPUTER-BASED SYSTEMS

This unit covers the design and implementation of real-time computer systems. Students will learn about the principles of real-time systems, including the behavior of real-time algorithms, the selection of real-time operating systems, and the design of real-time software. The unit also covers the basics of real-time simulation and the use of simulation tools for the design and testing of real-time systems.

ENB271 ELECTRICAL ENGINEERING PROBLEMS AND PROJECTS

This unit focuses on the application of electrical engineering concepts in real-world projects. Students will work on a project that involves the design and implementation of an electrical circuit or system. The project will be based on a specific problem or application, and will give students the opportunity to apply their knowledge of electrical engineering in a practical setting.

ENB272 COMPUTER-AIDED DESIGN OF ELECTRICAL CIRCUITS

This unit covers the use of computer-aided design (CAD) tools for the design and analysis of electrical circuits. Students will learn how to use CAD tools to design and simulate electrical circuits, as well as how to use these tools to solve circuit problems and to design circuits that meet specific requirements.

ENB273 REAL-TIME COMPUTER-BASED SYSTEMS

This unit covers the design and implementation of real-time computer systems. Students will learn about the principles of real-time systems, including the behavior of real-time algorithms, the selection of real-time operating systems, and the design of real-time software. The unit also covers the basics of real-time simulation and the use of simulation tools for the design and testing of real-time systems.

ENB274 ELECTRICAL ENGINEERING PROBLEMS AND PROJECTS

This unit focuses on the application of electrical engineering concepts in real-world projects. Students will work on a project that involves the design and implementation of an electrical circuit or system. The project will be based on a specific problem or application, and will give students the opportunity to apply their knowledge of electrical engineering in a practical setting.

ENB275 COMPUTER-AIDED DESIGN OF ELECTRICAL CIRCUITS

This unit covers the use of computer-aided design (CAD) tools for the design and analysis of electrical circuits. Students will learn how to use CAD tools to design and simulate electrical circuits, as well as how to use these tools to solve circuit problems and to design circuits that meet specific requirements.

ENB276 REAL-TIME COMPUTER-BASED SYSTEMS

This unit covers the design and implementation of real-time computer systems. Students will learn about the principles of real-time systems, including the behavior of real-time algorithms, the selection of real-time operating systems, and the design of real-time software. The unit also covers the basics of real-time simulation and the use of simulation tools for the design and testing of real-time systems.

ENB277 ELECTRICAL ENGINEERING PROBLEMS AND PROJECTS

This unit focuses on the application of electrical engineering concepts in real-world projects. Students will work on a project that involves the design and implementation of an electrical circuit or system. The project will be based on a specific problem or application, and will give students the opportunity to apply their knowledge of electrical engineering in a practical setting.

ENB278 COMPUTER-AIDED DESIGN OF ELECTRICAL CIRCUITS

This unit covers the use of computer-aided design (CAD) tools for the design and analysis of electrical circuits. Students will learn how to use CAD tools to design and simulate electrical circuits, as well as how to use these tools to solve circuit problems and to design circuits that meet specific requirements.
deadlock. Students develop a simple real-time process control application using programmable logic and micro-controllers.

**Prerequisites:** ENB244  
**Equivalents:** EEB566  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

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**ENB352 COMMUNICATION ENVIRONMENTS FOR EMBEDDED SYSTEMS**

This unit addresses the following: computer networks; network programming; open network foundations; embedded systems; client/server; bus architectures; network controllers; distributed systems in automation and process control; embedded Java; distributed objects; distributed databases; distributed operating systems.

**Prerequisites:** ENB350  
**Equivalents:** EEB666  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**ENB354 INTRODUCTION TO SYSTEMS DESIGN**

Introduction systems engineering methodologies and techniques as applied to Aerospace Engineering projects. The students receive formal lectures and apply the knowledge gained to a specific case study or mini project.

**Equivalents:** EEB585  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

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**ENB355 ADVANCED SYSTEMS DESIGN**

Students apply the systems engineering documentation and specifications developed in ENB345 Introduction to Systems Design and complete the project to the final systems engineering review stage.

**Prerequisites:** ENB354  
**Equivalents:** EEB685  
**Credit points:** 12  
**Contact hours:** 2 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**INB210 DATABASES**

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.

**Assumed knowledge:** Students are expected to have solid IT background knowledge (e.g., completion of at least 192 credit points)  
**Equivalents:** ITB004, ITB115  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**INB251 NETWORKS**

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

**Antirequisites:** ITB006  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**INB270 PROGRAMMING**

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

**Prerequisites:** INB104 or ENB246  
**Antirequisites:** ITB003, ITB112, ITB411, INN270  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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**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:** 2010 SEM-2

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**INB301 THE BUSINESS OF IT**
As an IT professional you are more and more evaluated in terms of the business value that you produce. This unit will prepare you for professional practice by making you "business savvy," i.e. giving you the business knowledge and skills that will help you with your future career and job. In particular the unit will address three themes: (1) career planning and job applications, (2) entrepreneurship & innovation, and (3) business and IT strategy. You will be introduced to career development tools that enable you to self-manage your career and life. You will learn how to critically think about the requirements of a job and reflect upon your own experiences and learn how to communicate them. You will also learn about the entrepreneurial process of identifying a business opportunity and how to take advantage of that opportunity. In addition, you will gain an understanding of core strategic concepts and models, discuss typical strategy tools and then apply them to the "Business of IT".

**Prerequisites:** INB309-1 (can be enrolled in the same teaching period)  
**Antirequisites:** ITB844  
**Assumed knowledge:** Completion of at least 144 credit points of IT units, including INB101, INB102, INB103, INB104, INB201 and four Breadth option and one specialisation option units is assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**INB309 MAJOR PROJECT**  
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 over two semesters. 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 provide you with an opportunity 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 and INB102 and INB103 and INB104 and INB201  
**Assumed knowledge:** Completion of at least 144 credit points of IT units, including INB101, INB102, INB103, INB104, INB201 and four Breadth option and one specialisation option units is assumed knowledge.  
**Equivalents:** ITB844  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

**INB309 MAJOR PROJECT**  
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 over two semesters. 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 provide you with an opportunity 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 and INB102 and INB103 and INB104 and INB201  
**Assumed knowledge:** Completion of at least 144 credit points of IT units, including INB101, INB102, INB103, INB104, INB201 and four Breadth option and one specialisation option units is assumed knowledge.  
**Equivalents:** ITB844  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

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**Prerequisites:** INB101 and INB102 and INB103 and INB104 and INB201  
**Assumed knowledge:** Completion of at least 144 credit points of IT units, including INB101, INB102, INB103, INB104, INB201 and four Breadth option and one specialisation option units is assumed knowledge.  
**Equivalents:** ITB844  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

**INB309 MAJOR PROJECT**  
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 over two semesters. 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 provide you with an opportunity 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 and INB102 and INB103 and INB104 and INB201  
**Assumed knowledge:** Completion of at least 144 credit points of IT units, including INB101, INB102, INB103, INB104, INB201 and four Breadth option and one specialisation option units is assumed knowledge.  
**Equivalents:** ITB844  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Teaching period:** 2010 SEM-1, 2010 SEM-2 and 2010 SUM

**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.

**Prerequisites:** 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:** 2010 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  
**Antirequisites:** INN365, ITB745, ITB706  
**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:** 2010 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 or INN270  **Credit points:** 12  **Contact hours:** 3 per week  **Campus:** Gardens Point  **Teaching period:** 2010 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:** 2010 SEM-1

**INB372 AGILE SOFTWARE DEVELOPMENT**

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

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

**INB373 WEB APPLICATION DEVELOPMENT**

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

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

**INB374 ENTERPRISE SOFTWARE ARCHITECTURE**

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

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

**INB381 MODELLING AND ANIMATION TECHNIQUES**

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:** 2010 SEM-1 and 2010 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:** 2010 SEM-2
MAB127 MATHEMATICS FOR ENGINEERING 2
This unit extends the areas of function, calculus, matrices and vectors introduced in MAB125 by introducing functions of more than one variable, partial derivatives and multiple integrals, vector valued functions, and matrix methods for the solution of systems of ordinary differential equations. Each of these topics is realised by contextualised engineering related problems.

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics C (or equivalent) or MAB125 or MAB120 or MAB131 or MAB182 is assumed knowledge

Equivalents: MAB112, MAB122, MAB132

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

MAB233 ENGINEERING MATHEMATICS 3
This unit is mostly introductory statistics for engineering but also includes a small component on foundations of computational mathematics. Statistics includes: the planning, execution, analysis and reporting of data investigations; use of a statistical package; modelling data; relationships between variables; estimation; confidence intervals; tolerance limits; hypothesis testing; fitting and investigating relationships; regression; design and analysis of experiments; risk; random variables; special distributions; linear combinations of correlated variables; reliability. The introduction to computational mathematics includes: function approximation; polynomial interpolation; numerical solution of ordinary differential equations.

Prerequisites: MAB131 or MAB182 or MAB121 or MAB126 or MAB127  
Antirequisites: BSB123  
Credit points: 12  
Contact hours: 4 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1