Bachelor of Applied Science/Bachelor of Games and Interactive Entertainment (IX65)

Year offered: 2010
Admissions: Yes
CRICOS code: 063032D
Course duration (full-time): 4 years
Domestic fees (indicative): 2010: CSP $2,960 (indicative) per semester
International Fees (indicative): 2010: $11,000 (indicative) per semester
Domestic Entry: February
International Entry: February
QTAC code: 419682
Past rank cut-off: 77
Past OP cut-off: 12
Assumed knowledge: English (4,SA), 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 Perry Hartfield (Science), Dr Peta Wyeth (Information Systems)
Discipline coordinator: Dr Perry Hartfield (Biochemistry Major); Dr Marion Bateson (Biotechnology Major); Dr Robert Johnson (Chemistry Major); Dr Ian Williamson (Ecology Major); Dr Robin Thwaites (Environmental Science Major); Dr Emad Kiriakous (Forensic Science Major); Dr Gary Huftile (Geoscience Major); Dr Christine Knox (Microbiology Major); Dr Greg Michael (Physics Major)
Campus: Gardens Point

Course overview
In this double degree students complete the requirements for two separate degrees in four years. The course consists of units in both applied science and games and interactive entertainment. In the science component students complete a set of core units in science to support advanced level studies in specialist areas. Students select a science major as outlined below and undertake laboratory work and may participate in fieldwork. In the games and interactive entertainment component students complete core units in introductory design, games studies, professional skills and basic programming and then choose a major from the list below. In final year, students participate in a major group project to produce a significant piece of work using PC, mobile devices, consoles or virtual reality. Full time students can take part in the Cooperative Education Program, offering one year paid industry placement and credit towards their degree (subject to satisfying eligibility requirements).

Majors:

Science: biochemistry; biotechnology; chemistry; ecology; environmental science; forensic science; geoscience; microbiology; and physics.
Games and Interactive Entertainment: animation and computational arts; digital media; game design; and software technologies.

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

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

Find out more about the Cooperative Education Program.

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

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Bachelor of Applied Science(Study Area A)/Bachelor of Games and Interactive Entertain (Study Area A)

Year 1, Semester 1

- Applied Science Unit
- Applied Science Unit
- INB180 Computer Games Studies

Year 2, Semester 1

- Applied Science Unit
- Applied Science Unit
- INB103 Industry Insights
  Games & Interactive Entertainment Major Unit
- INB104 Building IT Systems
- INB181 Introduction to Games Production
- INB379 Game Project Design
  Games & Interactive Entertainment Major Unit

Year 2, Semester 2

- Applied Science Unit
- Applied Science Unit
- INB182 Introducing Design
  Applied Science Unit
- INB181 Introduction to Games Production
- INB104 Building IT Systems
- INB103 Industry Insights
  Games & Interactive Entertainment Major Unit

Year 3, Semester 1

- Applied Science Unit
- Applied Science Unit
- INB103 Industry Insights
  Games & Interactive Entertainment Major Unit
- INB104 Building IT Systems
- INB181 Introduction to Games Production
- INB379 Game Project Design
  Games & Interactive Entertainment Major Unit

Year 3, Semester 2

- Applied Science Unit
- Applied Science Unit
- INB103 Industry Insights
  Games & Interactive Entertainment Major Unit
- INB104 Building IT Systems
- INB181 Introduction to Games Production
- INB379 Game Project Design
  Games & Interactive Entertainment Major Unit

Year 4, Semester 1

- Applied Science Unit
- Applied Science Unit
- INB379 Game Project Design
  Games & Interactive Entertainment Major Unit

Year 4, Semester 2

- Applied Science Unit
- Applied Science Unit
- INB380 Games Project
- Bachelor of Games & Interactive Entertainment Majors

Course structure (Block B)
## Animation

- **KIB105**: Animation and Motion Graphics
- **KIB108**: Animation History and Practices
- **KVB105**: Drawing for Design
- **KVB106**: Drawing for Animation
- **KIB220**: Animation Production
- **KIB203**: Introduction to 3D Computer Graphics
- **KIB225**: Character Development, Conceptual Design and Animation Layout
- **KIB325**: Real-Time 3D Computer Graphics

## Digital Media

- **KIB101**: Visual Communication
- **KIB102**: Visual Interactions
- **INB345**: Mobile Devices
- **INB396**: Advanced Multimedia Systems
- **KIB309**: Embodied Interactions
- **KIB230**: Interface and Information Design
- **INB385**: Multimedia Systems
- **KIB314**: Tangible Media

## Game Design

- **INB280**: Fundamentals of Game Design
- **INB272**: Interaction Design
- **KIB201**: Concept Development for Game Design and Interactive Media
- **KIB202**: Enabling Immersion
- **INB281**: Advanced Game Design
- **KIB214**: Design for Interactive Media
- **AND**: Two units selected from the following:
  - **DAB110**: Architectural Design 1
  - **DEB201**: Digital Communication
  - **DTB101**: Interior Design 1
  - **DNB101**: Industrial Design 1

## Software Technologies*

- **INB270**: Programming
- **MAB281**: Mathematics for Computer Graphics
- **INB210**: Databases
- **INB250**: Systems Architecture
- **INB370**: Software Development
- **INB371**: Data Structures and Algorithms

* Requirements for this Major is a SA or better in Queensland Maths B (or equivalent)

## Course structure - Major in Biochemistry

### Year 1, Semester 1

- **SCB111**: Chemistry 1
- **SCB112**: Cellular Basis of Life

### Year 1, Semester 2

- **SCB120**: Plant and Animal Physiology
- **SCB121**: Chemistry 2

### Year 2, Semester 1

- **SCB110**: Science Concepts and Global Systems
  - Plus either:
    - **MAB101**: Statistical Data Analysis 1
    - **Or**
      - **MAB105**: Preparatory Mathematics

### Year 2, Semester 2

- **SCB122**: Cell and Molecular Biology
- **SCB123**: Physical Science Applications

### Year 3, Semester 1

- **LQB381**: Biochemistry: Structure and Function
- **LQB383**: Molecular and Cellular Regulation

### Year 3, Semester 2

- **LQB481**: Biochemical Pathways and Metabolism
- **LQB483**: Molecular Biology Techniques

### Year 4, Semester 1

- **LQB581**: Functional Biochemistry
- **LQB582**: Biomedical Research Technologies

### Year 4, Semester 2

- **LQB681**: Biochemical Research Skills
- **LQB682**: Protein Biochemistry and Bioengineering

## Course structure - Major in Biotechnology

### Year 1, Semester 1

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

#### Year 1, Semester 1
- SCB111  Chemistry 1  
  Plus either:  
  - MAB101  Statistical Data Analysis 1  
  - Or  
  - MAB105  Preparatory Mathematics

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

#### Year 2, Semester 1
- MAB120  Algebra and Calculus  
- SCB111  Chemistry 1  
- SCB112  Cellular Basis of Life

#### Year 2, Semester 2
- SCB120  Plant and Animal Physiology  
- SCB121  Chemistry 2  
- SCB122  Cell and Molecular Biology  
- SCB123  Physical Science Applications  
- SCB124  Experimental Chemistry  

### Course structure - Major in Ecology

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

#### Year 1, Semester 2
- SCB120  Plant and Animal Physiology  
- SCB122  Cell and Molecular Biology  

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

#### Year 2, Semester 2
- SCB120  Plant and Animal Physiology  
- SCB121  Chemistry 2  
- SCB122  Cell and Molecular Biology  
- SCB123  Physical Science Applications  
- SCB124  Experimental Chemistry  

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

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

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

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

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CRICOS No. 00213J ABN 83 791 724 622
### Course structure - Major in Environmental Science

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

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

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

#### Year 2, Semester 2
- NQB202 History of Life on Earth
- SCB123 Physical Science Applications

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

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

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

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

### Course structure - Major in Forensic Science

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

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

#### Year 2, Semester 1
- SCB123 Physical Science Applications
- SCB131 Experimental Chemistry

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

#### Year 3, Semester 1
- LQB383 Molecular and Cellular Regulation
- SCB384 Forensic Sciences - From Crime Scene to Court

#### Year 3, Semester 2
- JSB979 Forensic Scientific Evidence
- PQB312 Analytical Chemistry For Scientists and Technologists

#### Year 4, Semester 1
- PQB513 Instrumental Analysis
- PQB584 Forensic Physical Evidence

#### Year 4, Semester 2
- LQB680 Forensic DNA Profiling
- PQB684 Forensic Analysis

### Course structure - Major in Geoscience

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

#### Year 4, Semester 2
- LQB680 Forensic DNA Profiling
- PQB684 Forensic Analysis
Year 1, Semester 1
SCB111 Chemistry 1
SCB112 Cellular Basis of Life

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

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

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

Year 3, Semester 1
NQB311 Mineralogy
NQB314 Sedimentary Geology

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

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

Year 4, Semester 2
NQB602 Environmental Chemistry
NQB614 Groundwater Systems

Course structure - Major in Microbiology

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

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

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

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

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

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

Year 4, Semester 1
LQB586 Clinical Microbiology 2
LQB587 Applied Microbiology 1: Water, Air and Soil

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

Course structure - Major in Physics

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

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

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

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

Year 3, Semester 1
MAB311 Advanced Calculus
This unit introduces students to the foundational aspects of digital design communication, placing generic design in context and focusing on multidisciplinarity in the stages of the design process. This unit is an approach to the theory and practice of digital media, exploring the translation from manual to digital media in design communication and presentation.

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

**DNB101 INDUSTRIAL DESIGN 1**
Industrial design revolves around the creation of products that satisfy human needs within the constraints of industrial and commercial production. This involves the manipulation of form with an understanding of structure, function, and beauty. Through projects students will be exposed to: basic design elements and principles; introduction to product visualisation techniques including concept sketching and marker rendering; design process and concept development; basic model making techniques; design presentation.

**Prerequisites:** DEB103 or DAB110 or DLB130 or DNB101.
DEB103 can be studied in the same teaching period as DAB101  **Equivalents:** ADB201  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**DTB101 INTERIOR DESIGN 1**
This unit provides foundational material for the study of interior design. Students will be introduced to design theory, methodology and aesthetics. Design will be explored as an interpretive process. Topics covered in the context of projects for the unit include: The studio as a way of learning; Introductory design exercises exploring two and three dimensional elements as they relate to the interior design context; Freehand sketching, principles of perspective; Mechanical drawing, principles of scaled drawing; Presentation and visual communication skills; Environmental issues and sustainability.

**Prerequisites:** DEB103 or DAB110 or DLB130 or DNB101. DEB103 can be studied in the same teaching period as DAB101  **Equivalents:** ADB101  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**INB103 INDUSTRY INSIGHTS**
This unit aims to develop your awareness of the career possibilities in the ICT industry and to equip you with some of the essential skills required of an ICT professional. The unit helps you to derive a roadmap for your career; to enable you to identify the qualities, skills and interests you need to possess, to plan your career path. The unit will also introduce you the inter-disciplinary nature of ICT careers.
Antirequisites: ITB002  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

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

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

INB180 COMPUTER GAMES STUDIES
This unit is designed to give you a clear understanding of the socio-cultural issues that affect the computer game industry. Through critical review of games and games industry literature, playing games and actively participating in classroom discussion you will develop your capacity to join in the discourse about the design, impact and future direction of computer games in our society.

Antirequisites: INN180, ITB750  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

INB181 INTRODUCTION TO GAMES PRODUCTION
This subject will provide you with knowledge and skills in games production. By gaining an overview of the production process, you will learn how the technology and the people involved integrate into a coherent and efficient manufacturing process. By the end of this subject you will have the knowledge to conceive, create, integrate and optimise tools and personnel into a complete games production system.

Antirequisites: INN181  Equivalents: ITB751, ITN751  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

INB182 INTRODUCING DESIGN
TBA
Antirequisites: DEB101  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

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

INB250 SYSTEMS ARCHITECTURE
Contemporary computer-based systems are built from a wide range of technologies working at different levels of abstraction, from microprocessor hardware, to operating system and application software, to entire communications networks. At each abstraction level different techniques are needed to understand emergent properties of the system. This unit introduces some of the foundational principles commonly used to reason about the behaviour of computer-dependent systems at different levels of abstraction. Such techniques are especially important in the context of safety-, security- or mission-critical systems.

Assumed knowledge: Basic familiarity with set theory (Venn diagrams and set operators), elementary algebra (polynomial and summation expressions, exponents and logarithms, etc) and simple probability concepts (permutations and combinations).  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

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

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
INB280 FUNDAMENTALS OF GAME DESIGN
Modern games production is a complex process involving various businesses and organisations, working with budgets in the tens of millions. One of the roles within a game production team is that of the game designer. It is crucial that a game designer understands how to create a game world, the rules that govern game play and other high level design tasks. This subject provides an introduction to game design, by starting with high level conceptual design tasks before moving to more concrete tasks.

Prerequisites: INB180    Equivalents: ITB016, ITN016
Credit points: 12    Contact hours: 3 per week    Campus: Gardens Point    Teaching period: 2010 SEM-2

INB281 ADVANCED GAME DESIGN
This unit will provide you with theoretical and practical knowledge of advanced games design concepts; that is, specific activities undertaken by game designers and their purpose. By the end of this unit you will have the knowledge to identify problems and suggest solutions for innovative game designs, as well as understand how to carry out the process of designing a game yourself. You will possess practical and theoretical knowledge of game design issues such as: how to design a game level, how to design a task and reward a player for completing it, how to ensure that the player knows how to progress through the game and how to design characters whose behaviour and dialogue provide clues and prompts to the player.

Prerequisites: INB280    Equivalents: ITB017
Credit points: 12    Contact hours: 3 per week    Campus: Gardens Point    Teaching period: 2010 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: 2010 SEM-1

INB379 GAME PROJECT DESIGN
INB379 Bgie Game Project Design (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: INB270 or ITB003    Antirequisites: ITB017, ITN016
Credit points: 12    Contact hours: 3 per week    Campus: Gardens Point    Teaching period: 2010 SEM-1

INB380 GAMES PROJECT
This unit seeks to give you the opportunity to apply, under appropriate guidance, the knowledge and skills gained in your course to date and to execute a substantial related project. The unit also aims to allow you to develop the critical professional skills of working within a cross-disciplinary team and, through implementation of your project, develop the understanding of the role of careful planning, scope control and task management in ensuring that the project is successful.
Prerequisites: INB379 or INB305   Antirequisites: ITB020
  Assumed knowledge: Students undertaking this unit
must be enrolled in the Bachelor of Games and Interactive
Entertainment  Credit points: 24   Contact hours: 3 per week
  Campus: Gardens Point   Teaching period: 2010 SEM-1 and 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
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

INB383 AI FOR GAMES
The aim of this unit is to provide students with an intermediate to advanced level course in computer game AI, involving algorithmic and utility-based approaches to solving a wide range of problems in the interactive entertainment and game industries. You will gain both practical and theoretical knowledge about a range of AI techniques applied in computer games. You will be able to identify and explain different types of AI agents, describe their algorithms using a pseudo code convention, identify and explain different structures and algorithms used to represent and solve a range of problems in computer game AI.
Prerequisites: INB371 or MAB281  Antirequisites: INB304 completed in semester 1 2009
  Credit points: 12   Contact hours: 4 per week
  Campus: Gardens Point   Teaching period: 2010 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: 2010 SEM-1

INB386 ADVANCED MULTIMEDIA SYSTEMS
This advanced level unit will give you high level design and
development skills in some of the current and emerging areas of the new media. Web delivered applications, stand-alone systems and installations will be included. It will endeavour to give you an in-depth understanding of interactive Multimedia Systems. You will be given the theoretical basis and practical skills to motivate you in the design and creation of a state-of-the-art system in this discipline. In the process it will encourage a professional team approach appropriate to the industry environment.
Prerequisites: INB385
  Equivalents: ITB259, ITN259
  Credit points: 12
  Contact hours: 3 per week
  Campus: Gardens Point
  Teaching period: 2010 SEM-2

JSB979 FORENSIC SCIENTIFIC EVIDENCE
The word 'forensic' once meant anything relating to a law court. However today the term 'forensic science' refers to a whole new subject: it means using science to solve legal issues. As science, and the many sub-disciplines of science, are appearing in court with ever-increasing rapidity, there is a clear need for scientists to understand the foundations to the law, the ways in which law reasons, the adversarial process, and the basics to the key area of evidence law. The aim of this unit is first to provide you with an understanding of evidence law, with a particular emphasis upon the foundations to reception of scientific evidence, and the ways in which expert scientific witnesses are received in our courts. The unit aims to clarify the links between science and law, as well as to articulate the differences between these two increasingly inter-twined disciplines.
Equivalents: JSB937, JSB444
  Credit points: 12
  Contact hours: 3
  Campus: Gardens Point and External
  Teaching period: 2010 SEM-2

KIB101 VISUAL COMMUNICATION
Communication Design deals with visual communication
and the creation of meaning through images. This unit will
introduce you to the principles, production and presentation of visual design and communication.

**Equivalents:** KIB801  Credit points: 12  Contact hours: 4 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1 and 2010 SEM-2

**KIB102 VISUAL INTERACTIONS**
This unit further develops interface design skills for communications technologies including design priorities, interaction, visual systems, refinement of concepts, project analysis and problem solving through presentation models.

**Prerequisites:** KIB101 or KIB801 or KPB101 or KPB150 or KPB155  **Equivalents:** KIB802  Credit points: 12  Contact hours: 3.5 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-2

**KIB105 ANIMATION AND MOTION GRAPHICS**
This unit provides an introduction to animation and motion graphics concepts and practices, with an emphasis on principles of design in motion.

**Equivalents:** KIB804  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-2

**KIB108 ANIMATION HISTORY AND PRACTICES**
The unit is an introductory examination of the development of animation. It addresses social, cultural, economic and technological themes that have shaped notable practitioners and established animation as a significant medium for the expression of popular culture, artistic experiment and philosophical, social and political comment.

**Equivalents:** KIB825  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

**KIB201 CONCEPT DEVELOPMENT FOR GAME DESIGN AND INTERACTIVE MEDIA**
This unit addresses theoretical issues associated with non-linear story structures and interactive narratives through the analysis of game structures, the creation of original game ideas and the application of techniques of information design to the structuring of non-narrative content. Addressing the creative and analytical roles of writers, conceptual designers and information designers in the context of interactive digital media and the Creative Industries.

**Equivalents:** KIB816  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

**KIB202 ENABLING IMMERSION**
As creative practitioners within a highly networked technological society, it is important to develop a critical understanding of how the application of technology influences modes of communication, production processes and creative practices, particularly within the Creative Industries. This unit provides an introductory overview of the philosophies underlying applications of technology, and critically examines current applications in order to explore creative visions of future technology.

**Prerequisites:** KIB201  **Equivalents:** KIB814  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-2

**KIB203 INTRODUCTION TO 3D COMPUTER GRAPHICS**
The field of 3D computer graphics has grown from being a highly specialist field, supported by large film studios, into a vast and growing industry. Throughout film and television, scientific visualization, industrial and architectural design, physical modelling, animation and gaming; 3D visualisation has become a significant contributor to the construction of virtual worlds and the simulation of physical environments. This unit provides an introduction to the world of 3D graphics, paying particular attention to pre-production techniques, project management, 3D modelling techniques, and designing virtual environments. It establishes a foundation for advanced study in subsequent units on Real-time Computer Graphics and Virtual Environments. Theoretical understandings gained through lectures will be supplemented with technical skills in workshops, and applied to the production of 3D environments in design studios.

**Credit points:** 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

**KIB214 DESIGN FOR INTERACTIVE MEDIA**
Designing for contemporary media requires a sophisticated understanding of how we effectively interact with new technologies, software applications, displays and environments. This unit focuses on the field of interaction design and user experience design. It develops an understanding of the theories, methods, and processes employed by Interaction Designers through a series of lectures and tutorials. These principles are then applied to authentic design briefs within design studios.

**Prerequisites:** KIB102 or KIB202 or KIB802 or KIP402  **Equivalents:** KIB210  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

**KIB220 ANIMATION PRODUCTION**
Animation employs a studio-based production process that introduces you to workflows, practice-based investigations, critical thinking and problem-based learning. Animation: Studio Production will support you to build animation studio production skills by introducing design briefs, networking, teamwork and collaboration This unit will focus particular attention on image-based solutions for the production of animated work. It will allow you to advance your skills and

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techniques in matte painting, image-based modeling, terrain and environment modeling, particle systems for environments, and 3D object creation and shading, as you develop an area of specialisation through personal investigation and self-directed inquiry.

Prerequisites: KIB105 and KVB106  Credit points: 12  Contact hours: 6 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

KIB225 CHARACTER DEVELOPMENT, CONCEPTUAL DESIGN AND ANIMATION LAYOUT
This unit emphasizes production in practice. By considering type and generic attributes within a technological context, you will be guided through the key concepts involved in the development of working drawings and final artworks.

Prerequisites: KIB203 or KIB107  Equivalents: KIB106, KIB807  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-2

KIB230 INTERFACE AND INFORMATION DESIGN
With the advent of new technologies for communication, graphical user interfaces have become fundamental to the design of effective communication, and a key factor in the uptake, ease of use and experience of technology systems. This unit builds upon knowledge and skills acquired in units on visual communication and Web design to establish the knowledge and skills required to design and produce effective visual interfaces for technology applications such as Web, small screens in mobile media, and interactive displays. It will cover theories and principles of visual communication, information architecture and user experience design, which will be applied in the production of interfaces for interactive media and digital projects. The unit will be taught through a combination of lectures, tutorials and practical classes, in which skills and knowledge will be applied.

Prerequisites: KIB101 or KIB801  Equivalents: KIB211  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

KIB309 EMBODIED INTERACTIONS
Interaction with technology has advanced beyond the desktop paradigm of mouse and keyboard to embodied interfaces that incorporate video tracking, audio input, and gestural interaction techniques. Applications range from wearable technology to tangible media installations. This unit introduces an experimental field of interactive media design through the practical application of the processes and techniques of tangible media applications. Lectures, which provide the theoretical grounding of the study area, methodologies and examples of the application of tangible media are complemented by practical classes which extend the technical skills acquired in Programming for Designers and Artists and support the development of tangible media outcomes within design studios.

Prerequisites: KIB205 or INB385  Equivalents: KIB311  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

KIB314 TANGIBLE MEDIA
This unit extends the understandings of tangible media interfaces and applications gained in the embodied media unit. In this unit students will develop a tangible media project from concept through to design, production, evaluation, and exhibition. Theoretical understandings on tangible media object design, interaction and installation gained through lectures will be supplemented with production skills in workshops, and applied to the development of tangible media works in design studios. Finished works will be displayed in a final exhibition where members of the public will interact with them.

Prerequisites: KIB309  Equivalents: KIB311  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-2

KIB325 REAL-TIME 3D COMPUTER GRAPHICS
This unit provides the opportunity for extending the principles of 3D computer graphics into the emerging field of virtual environments that respond to interaction in real time. In this unit you will cover the principals of real-time modeling; texture acquisition for real-time environments and interaction design in the 3D context. This unit provides an opportunity where students studying 3D computer graphics can apply animation and interactive design principles to real-time spaces. These principles can be applied to the fields of game design and interactive 3D environments.

Prerequisites: KIB225  Equivalents: KIB310, KIB821  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

KVB105 DRAWING FOR DESIGN
This is a studio based unit that introduces you to media, processes, strategies and traditions of drawing and associated imagery for use in animated media. The development of critical/reflective frameworks of traditional and contemporary practice underpins studio development.

Equivalents: KVB755  Credit points: 12  Contact hours: 4 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

KVB106 DRAWING FOR ANIMATION
This unit develops individual knowledge, concepts and skills to enable you to articulate and present capabilities of motion through drawing for contemporary animation practices.

Equivalents: KVB756  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-2
LQB381 BIOCHEMISTRY: STRUCTURE AND FUNCTION

This unit extends basic organic chemistry theory to the level of the biological macromolecules. A clear understanding of the structure and function of these molecules is essential to a student's understanding of the metabolism of living cells. Hence this biomolecular unit is a fundamental prerequisite for all advanced units in the various disciplines in the field of life sciences.

**Prerequisites:** (SCB121 and SCB122) or (SCB111 and SCB121) or SCB113

**Antirequisites:** LSB275 and LSB325 and LSB308

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1

LQB383 MOLECULAR AND CELLULAR REGULATION

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

**Prerequisites:** SCB122 or LSB238

**Antirequisites:** LSB468 and LSB338

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1

LQB386 MICROBIAL STRUCTURE AND FUNCTION

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

**Prerequisites:** SCB112 and (SCB121 or SCB113)

**Antirequisites:** LSB328

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1

LQB481 BIOCHEMICAL PATHWAYS AND METABOLISM

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

**Prerequisites:** LQB381 or LSB308

**Antirequisites:** LSB275, LSB325, LSB408

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-2

LQB483 MOLECULAR BIOLOGY TECHNIQUES

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

**Prerequisites:** LSB238 or SCB122

**Antirequisites:** LSB468, LSN468, LSN483

**Assumed knowledge:** LQB383 is recommended prior study

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-2

LQB484 INTRODUCTION TO GENOMICS AND BIOINFORMATICS

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

**Prerequisites:** LQB383 or LSB338 or LSN101 and LSN102

**Antirequisites:** LSB537, LSB619, LSB469

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-2

LQB486 CLINICAL MICROBIOLOGY 1

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

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

**LQB581 FUNCTIONAL BIOCHEMISTRY**  
This unit will study advanced biochemical concepts with a focus on metabolism, signalling pathways, systems and networks that coordinate and regulate the functional behaviour of cells and tissues.

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

**LQB582 BIOMEDICAL RESEARCH TECHNOLOGIES**  
This unit will study the technical principles and practical techniques that are essential for advancing research and development in biochemistry and biotechnology.

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

**LQB583 GENETIC RESEARCH TECHNOLOGY**  
The tools available for the discovery and manipulation of new genes are increasing exponentially and, in turn, this is having a significant impact in many areas of the life sciences. The true potential for this ultimately relies on the ability to link genes and their function. There are many strategies, both targeted and global, which facilitate an understanding of gene and genome structure function relationships. These strategies rely on integrated technologies based on molecular genetics, molecular biology and genetic engineering. The identification of function leads then to unlimited potential for detection and manipulation of these genes in human, animal and plant systems.

**Prerequisites:** LQB483  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**LQB584 MEDICAL CELL BIOLOGY**  
This unit builds and extends the understanding of basic theoretical and practical aspects of molecular cell biology developed in previous cell and molecular biology units. Medical Cell Biology develops and extends the context of the cellular environment and its central role within the organism providing all of the biological functions required by the organism to survive, defend and protect itself from disease and trauma. An understanding of cell biology theory and molecular mechanisms of animal development and disease is essential for introduction to higher level units in medical biotechnology.

**Prerequisites:** LQB383 or LSB338  
**Antirequisites:** LSB449, LSB503, LSN584  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**LQB585 PLANT GENETIC MANIPULATION**  
The potential of plant biotechnology can only be recognised as a result of the significant advances being made in technologies enabling the genetic manipulation of plants. Familiarity with the strategies, techniques and breadth of applications is essential as a basis for anyone planning a career in plant biotechnology. The unit is designed with a significant emphasis on achieving technical expertise in plant genetic manipulation and control of gene expression.

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

**LQB586 CLINICAL MICROBIOLOGY 2**  
TBA

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

**LQB587 APPLIED MICROBIOLOGY 1: WATER, AIR AND SOIL**  
Issues relating to microbial populations within the environment are of great interest and relevance to the community, and also to scientists. Building on the foundation of basic microbiology, in this advanced level unit you will gain a strong understanding of the nature of microbial populations in water, air and soil, and their importance to the human population. This unit is issues-based, encouraging a problem solving approach as you investigate/study microbial pollution, bioremediation, biogeochemical cycles and a healthy environment. You will gain knowledge and skills in analysis and interpretation of water, air and soil populations, which will permit you to investigate real-world problems.

**Prerequisites:** LQB386, LSB328, or LSB492  
**Equivalents:** LSB528  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**MAB101 STATISTICAL DATA ANALYSIS 1**  
Experiments, observational studies, sampling, and polls; data and variables; framework for describing and manipulating probability; independence; Binomial and Normal distributions; population parameters and sample statistics; concepts of estimation and inference; standard error; confidence intervals for means and proportions; tests of hypotheses on means and proportions (one sample and two independent samples); inference using tables of counts;
modelling relationships using regression analysis; model
diagnosis; use of statistical software.

**Antirequisites:** BSB123, EFB101, MAB141, MAN101

**Assumed knowledge:** Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge. **Credit points:** 12

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

**MAB105 PREPARATORY MATHEMATICS**
This unit is a substitute for Senior Mathematics B for those students who need the equivalent background for the successful study of units which assume it. It includes: basic number facts, natural numbers, integers, rational numbers, real numbers and their operations; basic algebra; functions and equations, graphs, linear functions, equations and applications; systems of linear equations; quadratic, exponential, logarithmic and trigonometric functions, properties and applications; introduction to calculus; rates of change, derivatives, rules of differentiation, second derivatives, maxima and minima and applications; integration and applications. This unit is incompatible with an exit assessment of High Achievement or better in Senior Mathematics B.

**Assumed knowledge:** Year 10 Level 6 Mathematics is assumed knowledge  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

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

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

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

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

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

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

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

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

**MAB281 MATHEMATICS FOR COMPUTER GRAPHICS**
This unit introduces students to the mathematics involved in computer graphics, computer games and virtual reality. It is heavily reliant on analytic, Euclidean and projective geometries in 2D and 3D, elementary trigonometry, elementary linear algebra and elementary calculus. The unit will develop the mathematical concepts and where practicable show how these concepts are then applied in the field of computer graphics. Students must have completed four semesters of Senior Mathematics B with an exit level of Sound Achievement, or have passed MAB105 (or equivalent).
**NQB302 EARTH SURFACE SYSTEMS**

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

**Assumed knowledge:** NQB201 is assumed knowledge.

**Equivalents:** NRB301  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

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**NQB311 MINERALOGY**

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

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

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**NQB314 SEDIMENTARY GEOLOGY**

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

**Assumed knowledge:** NQB201 is assumed knowledge.

**Equivalents:** NRB331  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

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**NQB321 ECOLOGY**

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

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

**NQB403 SOILS AND THE ENVIRONMENT**

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

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

**NQB411 PETROLOGY OF IGNEOUS AND METAMORPHIC ROCKS**

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

**Prerequisites:** NQB311 or NRB333  
**Equivalents:** NRB434  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**NQB412 STRUCTURAL GEOLOGY AND FIELD METHODS**

Structural geology, the deformation of earth materials, is one of the main elements in the core curriculum in geology. It is also essential to other subdisciplines of geology, such as foundation engineering and petroleum and mineral exploration. Geologists need to be able to describe and map structures, to understand the mechanical principles of rock deformation, and to be able to manipulate and calculate structural data.

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

**NQB421 EXPERIMENTAL DESIGN**

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

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

**NQB422 GENETICS AND EVOLUTION**

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

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

**NQB501 ENVIRONMENTAL MODELLING**

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

**Prerequisites:** NQB412 or NQB421  
**Assumed knowledge:** 48 credit points of second level science units is assumed knowledge.  
**Equivalents:** NRB500  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**NQB502 FIELD METHODS IN NATURAL RESOURCE SCIENCES**

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

**PQB250 MECHANICS AND ELECTROMAGNETISM**

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

**Assumed knowledge:** Senior Maths B is assumed knowledge.

**Credit points:** 12

**Contact hours:** 4.5 hours per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-2

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**PQB251 WAVES AND OPTICS**

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

**Assumed knowledge:** Senior Maths B is assumed knowledge.

**Credit points:** 12

**Contact hours:** 4.5 hours per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-2

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**NQB513 GEOPHYSICS**

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

**Prerequisites:** (NQB201 or NRB230) and (NQB412 or NRB434)

**Equivalents:** NRB534

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1

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**NQB521 POPULATION GENETICS AND MOLECULAR ECOLOGY**

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

**Prerequisites:** NQB422

**Antirequisites:** NRB510

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1

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**NQB523 POPULATION MANAGEMENT**

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

**Prerequisites:** NQB321, NQB421

**Antirequisites:** NRB511

**Credit points:** 12

**Contact hours:** 4 per week

**Campus:** Gardens Point

**Teaching period:** 2010 SEM-1
coordination theory and crystal field theory. The cause and effect relationships between bonding and structure are developed leading to an understanding of structural variability, chirality, and other modes of isomerism for a broad range of chemical compounds. An introduction to molecular symmetry, which is central to the study of molecular geometry and shape, also provides the background for later studies in spectroscopy. Lectures are complemented by 7 laboratory experiments and 4 hands-on style workshops.

Prerequisites: SCB121 and SCB131    Antirequisites: PCB334, PCB354    Credit points: 12    Contact hours: 4.5 per week    Campus: Gardens Point    Teaching period: 2010 SEM-1

PQB350 THERMODYNAMICS OF SOLIDS AND GASES
This unit provides students with an overview of the basic thermodynamic principles that describe how heat and other forms of energy are transported through matter in its solid and gaseous states. Through integrated lecture and practical classes, it provides students with a foundation for more advanced studies later in areas such as condensed matter physics and quantum mechanics. The three areas of study in this unit; thermodynamics, solid state physics and statistical physics; are essential core topics if students are considering postgraduate study in the physical sciences or professional employment as a physicist.
Prerequisites: PQB250 or PCB250, and MAB111    Corequisites: MAB311    Assumed knowledge: Students should enrol in MAB311 in the same semester if not already completed    Equivalents: PCB562    Contact hours: 4 per week    Campus: Gardens Point    Teaching period: 2010 SEM-1

PQB401 REACTION KINETICS, THERMODYNAMICS AND MECHANISMS
This unit deals with the way in which the fundamental concepts of physical chemistry govern the extent and rates of chemical reactions and applies them to actual reaction types from the fields of organic and inorganic chemistry. Topics include: thermodynamics including enthalpy, heat capacity, entropy, Gibbs free energy, chemical equilibria and an introduction to electrochemistry; chemical kinetics including rate laws, mechanisms of chemical reactions, collision theory of reaction rates and the steady state principle as well as acids and bases in both aqueous and non aqueous environments.
Prerequisites: PQB331    Antirequisites: PCB354, PCB405    Credit points: 12    Contact hours: 4.5 per week    Campus: Gardens Point    Teaching period: 2010 SEM-2

PQB442 CHEMICAL SPECTROSCOPY
Spectroscopic techniques are now widespread in scientific laboratories. An appreciation of both the principles and practice of spectroscopy is essential for those contemplating a career in chemistry. The use of spectroscopic methods to elucidate molecular structure provides an excellent vehicle for training in the scientific method, particularly the logical application of experimental data to deduce the solution to a complex problem. Whilst the fundamental theoretical concepts will be dealt with in the early part of the unit, later emphasis will be on developing practical skills in problem solving, a skill of value to all fields of scientific and technological endeavour.
Prerequisites: PQB331    Equivalents: PCB444    Credit points: 12    Contact hours: 4 per week    Campus: Gardens Point    Teaching period: 2010 SEM-2

PQB450 ENERGY, FIELDS AND RADIATION
The common theme of the topics covered in this unit is fields, the energy contained in these fields and the transfer of this energy. This theme is addressed in the specific topics of classical mechanics, electromagnetism and radiation physics. The classical mechanics and electromagnetism components build on material presented in introductory units and apply this to complex real world problems. The unit is designed to prepare students for more advanced studies in these areas but the unit will also provide a useful background for students undertaking a comajor in Physics or preparing for a career in secondary education.
Prerequisites: PQB250 or PCB250, and MAB311    Equivalents: PCB362    Credit points: 12    Contact hours: 4 per week    Campus: Gardens Point    Teaching period: 2010 SEM-2

PQB451 ELECTRONICS AND INSTRUMENTATION
Instrumentation plays an increasingly important role in the life of a scientist. This unit is designed to give the student a working knowledge in instrumentations and the principles of circuit theory and electronics that underlie instrumentation. It is offered at this stage of the program since it relies on work developed in the earlier advanced-level units and provides a basis for experimental work in later units.
Prerequisites: PQB250 or PCB250    Antirequisites: PCB361, PCB460    Credit points: 12    Contact hours: 4 per week    Campus: Gardens Point    Teaching period: 2010 SEM-2

PQB502 ADVANCED PHYSICAL CHEMISTRY
A Chemistry graduate in today's highly technological world requires knowledge of the principles that govern the behaviour of solids, liquids, gases, and mixtures thereof. This leads to an appreciation of how fundamental physical chemical principles determine the bulk properties of materials and how the chemical nature of interfaces govern chemical reactions in many important applications. This unit is placed appropriately in fifth semester, following the second year units that provide the basic principles, language and tools of chemistry.
introduce you to the physical evidence processing techniques of questioned documents and computer forensics and the forensic examination techniques of optical and electron microscopy. The unit will also discuss the physical and chemical structure of some common types of physical evidence (fibres, fabrics & severance, soils and physical fits) and the analytical methods used for their analysis. It is placed appropriately in the fifth semester of the course to coincide with and complement the Instrumental Analysis unit PQB513 which the core knowledge for the instrumental techniques used within the forensic analysis of various types of physical evidence.

PQB531 ORGANIC MECHANISMS AND SYNTHESIS
This unit deals with organic reaction mechanisms and their application in organic synthesis. Topics in mechanisms include: structural and electronic effects that govern reactivity of organic molecules; major classes of mechanisms including elimination reactions, nucleophilic additions to carbonyl compounds, nucleophilic acyl substitution, electrophilic addition to alkenes and electrophilic substitution of aromatics. Topics in synthesis include the principles of organic synthesis design using the retrosynthetic approach; carbon-carbon bond formation to build the major functional group classes; and the use of protecting and activating groups.

PQB550 QUANTUM AND CONDENSED MATTER PHYSICS
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PQB551 PHYSICAL ANALYTICAL TECHNIQUES
Modern methods of physical analysis are an important tool for the physical scientist. This unit provides an introduction to the physical principles and applications in three fields of analysis: X-ray diffraction, analytical electron microscopy and physical spectroscopy. Each of these topics encompasses a variety of measurement techniques. The methodologies presented have wide application in a number of areas of science and technology including nanotechnology and materials research and development. Lectures are supplemented by laboratory practicals to enable students to gain familiarity and experience with the instrumentation.

PQB584 FORENSIC PHYSICAL EVIDENCE
This unit provides a theoretical and practical framework to introduce you to the physical evidence processing techniques of questioned documents and computer forensics and the forensic examination techniques of optical and electron microscopy. The unit will also discuss the physical and chemical structure of some common types of physical evidence (fibres, fabrics & severance, soils and physical fits) and the analytical methods used for their analysis. It is placed appropriately in the fifth semester of the course to coincide with and complement the Instrumental Analysis unit PQB513 which the core knowledge for the instrumental techniques used within the forensic analysis of various types of physical evidence.
research advances in molecular and cellular biology to provide a comprehensive foundation for later units in the medical, biotechnological and ecological sciences. The unit begins by constructing cells from the four quantitatively important groups of biological molecules (proteins, lipids, carbohydrates and nucleic acids). Molecular and evolutionary aspects of genetics are then introduced, with the great diversity of reproductive strategies found among organisms being emphasised. Finally, bioenergetics (photosynthesis and respiration) and its relevance to environmental issues is outlined.

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

**SCB120 PLANT AND ANIMAL PHYSIOLOGY**

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

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

**SCB121 CHEMISTRY 2**

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

**Prerequisites:** (SCB111 or PCB142) . SCB111 can be studied in the same teaching period  Antirequisites: SCB113  Credit points: 12  Contact hours: 4.5 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1 and 2010 SEM-2

**SCB122 CELL AND MOLECULAR BIOLOGY**

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

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

**SCB123 PHYSICAL SCIENCE APPLICATIONS**

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

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

**SCB131 EXPERIMENTAL CHEMISTRY**

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

**Prerequisites:** SCB111 or SCB113  Corequisites: SCB121 unless SCB113 has been successfully completed  Credit points: 12  Contact hours: 4.5 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

**SCB222 EXPLORATION OF THE UNIVERSE**

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

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

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

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