Bachelor of Applied Science/Bachelor of Education (Primary) (IX14)

Year offered: 2010
Admissions: Yes
CRICOS code: 037540M
Course duration (full-time): 4 years
Domestic fees (indicative): 2010: CSP $2,350 (indicative) per semester
International Fees (indicative): 2010: $11,500 (indicative) per semester
Domestic Entry: February
International Entry: February
QTAC code: 409142
Past OP cut-off: 77
Past OP cut-off: 12
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 Perry Hartfield (Science & Technology). For science enquiries email: scitech.enquiry@qut.edu.au. For education enquiries email: educationenq@qut.edu.au or phone 3138 8947
Discipline coordinator: Education Course Coordinators Dr Mary Ryan. Science Discipline Coordinators: Dr Perry Hartfield (Biochemistry Major); Dr Marion Bateson (Biotechnology Major); Dr Robert Johnson (Chemistry Major); Dr lan Williamson (Ecology Major); Dr Robin Thwaites (Environmental Science Major); Dr Gary Huffile (Geoscience Major); Dr Scott McCue (Mathematics Major); Dr Christine Knox (Microbiology Major); Dr Greg Michael (Physics Major)
Campus: Gardens Point and Kelvin Grove

Career Opportunities

The Bachelor of Applied Science allows multidisciplinary programs of study that not only help you position yourself within the broad range of science disciplines but also qualifies you as a competent professional in your chosen field. You will be equipped to work as a science professional or undertake research after graduation if you desire.

The Bachelor of Education (Primary) prepares you to teach at all levels of primary school. Students may also complete a discipline/content studies major in one of the key learning areas of the Queensland school curriculum.

Course Design

Graduates from this double degree will have a science degree with the same core support and choice of major study areas as the graduates from the Bachelor of Applied Science (SC01) program. Education studies will comprise the co-major component. Field Studies units will be taken in Queensland schools.

Professional Recognition

Graduates are eligible for registration as teachers in Queensland through the Queensland College of Teachers. Graduates looking for employment in other parts of Australia and overseas may be required to meet additional conditions.

Graduates will satisfy the requirements for membership of the relevant professional body for their chosen science major. See the Bachelor of Applied Science course for details.

Working With Children Check

Working With Children Check - As required by the Commission for Children and Young People and Child Guardian Act (2000), student teachers must undergo a criminal history check and be issued with a Suitability Card (Blue Card) by the Commission.

As soon as you enter your enrolment program for the course, you must submit your Blue Card application to the QUT Student Centre immediately. You must hold a Blue Card to undertake activities in any unit which involves contact with children, including the required field studies blocks.

If you do not apply for a Blue Card, immediately upon enrolment in the course and allow sufficient time for the police check and issuing of the Card, you will be unable to participate in the required activities and may need to be withdrawn from the unit(s) and incur both financial and academic penalty. It may take up to 12 weeks for the Commission to issue the Card. The application form is available at bluecard.qut.com.

Deferment

QUT allows current Year 12 school leavers to defer their undergraduate admission offer for one year, or for six months if offered mid-year admission, except in courses using specific admission requirements such as questionnaires, portfolios, auditions, prior study or work experience.
Non-year 12 students may also request to defer their QTAC offer on the basis of demonstrated special circumstances.

Find out more on deferment.

**Further Information**

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

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

**Faculty of Education**
Student Affairs  
Phone: +61 7 3138 3947  
Email: educationenq@qut.edu.au

**Discipline Coordinators**

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

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

**Chemistry**  
Dr Robert Johnson  
Phone: +61 7 3138 2016  
Email: ra.johnson@qut.edu.au

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

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

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

**Mathematics**  
Dr Scott McCue  
Phone: +61 7 3138 4295  
Email: scott.mccue@qut.edu.au

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

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

**Course structure**

<table>
<thead>
<tr>
<th>Year 1, Semester 1</th>
<th>Course</th>
<th>Description</th>
<th>Requirement</th>
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</thead>
<tbody>
<tr>
<td>EDB002</td>
<td>Teaching and Learning Studies 2: Development and Learning</td>
<td>Science Major Unit</td>
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<th>Course</th>
<th>Description</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>EDB021</td>
<td>Primary Field Studies 1: Development and Learning in the Field</td>
<td>Science Major Unit</td>
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<th>Course</th>
<th>Description</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>MDB120</td>
<td>Mathematics Curriculum and Pedagogies</td>
<td>Science Major Unit</td>
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<th>Course</th>
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<th>Requirement</th>
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<tbody>
<tr>
<td>CLB008</td>
<td>Teaching Primary SOSE</td>
<td>Science Major Unit</td>
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<th>Course</th>
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<th>Course</th>
<th>Description</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>CLB006</td>
<td>Teaching Reading and Writing</td>
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<tr>
<td>EDB003</td>
<td>Teaching and Learning Studies 3: Practising</td>
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<td>Course Code</td>
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<tr>
<td>EDB022</td>
<td>Primary Field Studies 2: Practising Education in the Field</td>
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<tr>
<td>HMB300</td>
<td>Teaching Primary HPE</td>
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<td>Year 4, Semester 1</td>
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<td>EDB004</td>
<td>Teaching and Learning Studies 4: Inclusive Education</td>
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<tr>
<td>EDB023</td>
<td>Primary Field Studies 3: Inclusive Educational Practices</td>
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<tr>
<td>KKB202</td>
<td>Teaching Primary Dance and Drama</td>
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<td>MDB006</td>
<td>Teaching Primary Science</td>
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<td>Year 4, 6TP4</td>
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<tr>
<td>MDB004</td>
<td>Teaching Primary ICT</td>
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<tr>
<td>EDB005</td>
<td>Teaching and Learning Studies 5: Professional Work of Teachers</td>
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<tr>
<td>EDB005 is delivered through the Stepping Out Conference, which for 2010 is held from 12-14 July (subject to change).</td>
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<tr>
<td>EDB024</td>
<td>Primary Field Studies 4: Professional Work of Teachers - Induction into the Field</td>
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<td>EDB025</td>
<td>Internship (Primary)</td>
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**Course structure - Major in Biochemistry**

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<tr>
<th>Year 1, Semester 1</th>
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<tbody>
<tr>
<td>SCB111</td>
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<td>SCB112</td>
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<td>Plus either</td>
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<tr>
<td>MAB101</td>
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<td>Or</td>
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<td>MAB105</td>
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<td>SCB120</td>
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<td>SCB121</td>
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<tr>
<td>LQB381</td>
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<tbody>
<tr>
<td>LQB582</td>
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<tr>
<td>LQB583</td>
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<tr>
<td>LQB584</td>
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<td>LQB585</td>
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**Course structure - Major in Biotechnology**

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<td>Plus either</td>
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<td>MAB101</td>
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<td>Or</td>
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<td>MAB105</td>
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<th>Year 2, Semester 1</th>
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<tbody>
<tr>
<td>SCB120</td>
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<td>SCB121</td>
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<td>SCB122</td>
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<tbody>
<tr>
<td>LQB483</td>
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<tr>
<td>LQB484</td>
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<tr>
<td>Plus select ONE unit from the following:</td>
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<td>LQB481</td>
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<tr>
<td>LQB486</td>
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<td>LQB489</td>
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<td>LQB585</td>
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<tr>
<td>SCB110</td>
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**Course structure - Major in Ecology**

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<tr>
<th>Course structure</th>
<th>Year, Semester</th>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>SCB110</td>
<td>Year 1, Semester 1</td>
<td>SCB110</td>
<td>Science Concepts and Global Systems</td>
</tr>
<tr>
<td>SCB112</td>
<td>Plus either</td>
<td>SCB112</td>
<td>Cellular Basis of Life</td>
</tr>
<tr>
<td>MAB101</td>
<td>Or</td>
<td>SCB101</td>
<td>Statistical Data Analysis 1</td>
</tr>
<tr>
<td>MAB101</td>
<td>Or</td>
<td>SCB105</td>
<td>Preparatory Mathematics</td>
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<tr>
<td>Year 1, Semester 2</td>
<td></td>
<td>SCB101</td>
<td>History of Life on Earth</td>
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<tr>
<td>Year 1, Semester 2</td>
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<td>SCB120</td>
<td>Plant and Animal Physiology</td>
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<td>Year 2, Semester 1</td>
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<td>NQB321</td>
<td>Ecology</td>
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<td>Year 2, Semester 1</td>
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<td>SCB111</td>
<td>Chemistry 1</td>
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<td>NQB322</td>
<td>Invertebrate Biology</td>
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<td>NQB323</td>
<td>Plant Biology</td>
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<td>Year 2, Semester 2</td>
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<td>NQB421</td>
<td>Experimental Design</td>
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<td>Year 2, Semester 2</td>
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<td>NQB302</td>
<td>Soil and Environment</td>
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<td>NQB421</td>
<td>Experimental Design</td>
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<td>NQB601</td>
<td>Sustainable Environmental Management</td>
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## Course structure - Major in Geoscience

**Year 1, Semester 1**
- SCB110 Science Concepts and Global Systems
- SCB112 Cellular Basis of Life
- MAB101 Statistical Data Analysis 1
- MAB105 Preparatory Mathematics

**Year 1, Semester 2**
- NQB201 Planet Earth
- NQB202 History of Life on Earth
- SCB222 Exploration of the Universe

**Year 2, Semester 1**
- NQB311 Mineralogy
- NQB314 Sedimentary Geology
- SCB111 Chemistry 1

**Year 2, Semester 2**
- NQB411 Petrology of Igneous and Metamorphic Rocks
- NQB412 Structural Geology and Field Methods
- NQB614 Groundwater Systems

**Year 3, Semester 1**
- NQB501 Environmental Modelling
- NQB502 Field Methods in Natural Resource Sciences
- NQB503 Spatial Analysis of Environmental Systems

## Course structure - Major in Mathematics (WITH Maths C)

**Year 1, Semester 1**
- MAB101 Statistical Data Analysis 1
- MAB120 Algebra and Calculus
- SCB110 Science Concepts and Global Systems

**Year 1, Semester 2**
- MAB121 Calculus and Differential Equations
- MAB122 Algebra and Analytic Geometry
- MAB210 Statistical Modelling 1

**Year 2, Semester 1**
- MAB200 Computational Mathematics 1
- MAB311 Advanced Calculus
- MAB315 Operations Research 2

**Year 2, Semester 2**
- MAB411 Advanced Calculus
- MAB415 Operations Research 2B
- MAB461 Discrete Mathematics
- SCB112 Cellular Basis of Life

**Year 3, Semester 1**
- MAB521 Applied Mathematics 3
- MAB525 Operations Research 3A
- MAB533 Statistical Techniques
- MAB672 Advanced Mathematical Modelling

## Course structure - Major in Mathematics (WITHOUT Maths C)

**Year 1, Semester 1**
- MAB101 Statistical Data Analysis 1
- MAB120 Algebra and Calculus
- SCB110 Science Concepts and Global Systems

**Year 1, Semester 2**
- MAB121 Calculus and Differential Equations
- MAB122 Algebra and Analytic Geometry
- MAB210 Statistical Modelling 1

**Year 2, Semester 1**
- MAB200 Computational Mathematics 1
- MAB311 Advanced Calculus
- MAB315 Operations Research 2

**Year 2, Semester 2**
- MAB411 Advanced Calculus
- MAB415 Operations Research 2B
- MAB461 Discrete Mathematics

**Year 3, Semester 1**
- MAB521 Applied Mathematics 3
- MAB525 Operations Research 3A
- MAB533 Statistical Techniques
- MAB672 Advanced Mathematical Modelling

**Year 3, Semester 2**
- MAB625 Operations Research 3B
- SCB112 Cellular Basis of Life
- Plus either
  - MAB412 Applied Statistics 2
  - MAB414 Applied Statistics 2
  - MAB422 Mathematical Modelling
- Or
  - MAB422 Mathematical Modelling
  - Plus select ONE unit from the following:
    - MAB313 Mathematics of Finance
    - MAB413 Differential Equations
    - MAB414 Applied Statistics 2
    - MAB422 Mathematical Modelling
  - Plus select THREE units from the following:
    - MAB521 Applied Mathematics 3
    - MAB525 Operations Research 3A
    - MAB533 Statistical Techniques
    - MAB672 Advanced Mathematical Modelling

## Course structure - Major in Geoscience

**Year 1, Semester 1**
- SCB110 Science Concepts and Global Systems
- SCB112 Cellular Basis of Life
- MAB101 Statistical Data Analysis 1
- MAB105 Preparatory Mathematics

**Year 1, Semester 2**
- NQB201 Planet Earth
- NQB202 History of Life on Earth
- SCB222 Exploration of the Universe

**Year 2, Semester 1**
- NQB311 Mineralogy
- NQB314 Sedimentary Geology
- SCB111 Chemistry 1

**Year 2, Semester 2**
- NQB411 Petrology of Igneous and Metamorphic Rocks
- NQB412 Structural Geology and Field Methods
- NQB614 Groundwater Systems

**Year 3, Semester 1**
- NQB501 Environmental Modelling
- NQB502 Field Methods in Natural Resource Sciences
- NQB503 Spatial Analysis of Environmental Systems

**Year 3, Semester 2**
- NQB502 Field Methods in Natural Resource Sciences
- NQB512 Economic Geology
- NQB513 Geophysics
  - Science Elective
Course structure - Major in Microbiology

Year 2, Semester 1
SCB120 Plant and Animal Physiology
SCB121 Chemistry 2
SCB122 Cell and Molecular Biology

Year 2, Semester 2
LQB381 Biochemistry: Structure and Function
LQB383 Molecular and Cellular Regulation
LQB386 Microbial Structure and Function

Year 2, Semester 2
LQB483 Molecular Biology Techniques
LQB486 Clinical Microbiology 1
LQB687 Applied Microbiology 2: Food and Quality Assurance

Year 3, Semester 1
LQB586 Clinical Microbiology 2
LQB587 Applied Microbiology 1: Water, Air and Soil
Plus either
LQB582 Biomedical Research Technologies
Or
LQB583 Genetic Research Technology
Science Elective

Course structure - Major in Physics

Year 1, Semester 1
SCB110 Science Concepts and Global Systems
SCB111 Chemistry 1
Plus either
MAB120 Algebra and Calculus
Or
MAB121 Calculus and Differential Equations
NOTE: Students without Senior Mathematics C must take MAB100 in Semester 1 and MAB111 in Semester 2

Year 1, Semester 2
MAB122 Algebra and Analytic Geometry
PQB250 Mechanics and Electromagnetism
Plus either
MAB121 Calculus and Differential Equations
Or
PQB251 Waves and Optics

Year 2, Semester 1
MAB311 Advanced Calculus
PQB350 Thermodynamics of Solids and Gases
SCB112 Cellular Basis of Life

Year 2, Semester 2
UNIT SYNOPSISES

CLB006 TEACHING READING AND WRITING

New basics emerge in literacy education. The privileged status of print as the almost exclusive basis to literacy has diminished. Postmodern media culture is powerful and pervasive, and knowledge communication today is as much through multimedia as it is through the single medium of print. This unit acknowledges that children now form their early concepts about literacy from textual environments that are considerably more complex than for those of their predecessors. Contemporary language and literacy education must base its practices on texts from a range of technologies, involving different media, and in recognition of diverse contexts and social purposes for communicating.

Credit points: 12  Campus: Kelvin Grove and Caboolture  Teaching period: 2010 SEM-2

CLB008 TEACHING PRIMARY SOSE

This unit focuses on recent developments within the social education curriculum area with particular reference to Studies of Society and Environment (SOSE), a national key learning area and explores teaching and learning approaches in SOSE. Understanding the processes of curriculum development and being able to interpret curriculum documents and their implications for classroom practice are essential professional skills. Students will investigate SOSE as a curriculum area and to consider ways of translating syllabus requirements into worthwhile teaching and learning activities. Students will critically reflect upon both the theory and the practical suggestions throughout the unit and to consider how effective teaching can be achieved.

Prerequisites: CLB005 (can be enrolled in the same teaching period)  Credit points: 12  Campus: Kelvin Grove and Caboolture  Teaching period: 2010 6TP4 and 2010 SEM-2

EDB002 TEACHING AND LEARNING STUDIES 2: DEVELOPMENT AND LEARNING

This unit has the dual purposes of promoting your own personal and professional development as life long, creative, autonomous learners, capable of reflection and high level thinking, and of enabling you, as educators, to promote similar development in your learners. Pursuit of these aims will involve an exploration of human development, from personal and interpersonal perspectives, with sensitivity to socio-cultural contexts, and with a particular focus on the theory, research and practice which informs educators about how learners construct knowledge and become creative, self-motivated thinkers and problem solvers.

Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove, External and Caboolture  Teaching period: 2010 SEM-1

EDB003 TEACHING AND LEARNING STUDIES 3: PRACTISING EDUCATION

Education is a social and cultural activity. This unit provides a sociological and cultural studies framework that provides an insightful explanation of how education in its various sites is constructed and organised. The unit includes a socio-cultural analysis of an educational site which will be
undertaken in conjunction with the Field Studies unit. 
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Internet, Kelvin Grove and Caboolture  
**Teaching period:** 2010 SEM-2

**EDB004 TEACHING AND LEARNING STUDIES 4: INCLUSIVE EDUCATION**

This unit aims to develop students' understanding and appreciation of the contributions that diversity, belonging and trust make towards a quality learning environment for all learners. Students will learn to engage in teaching a broad range of students in diverse and inclusive ways utilising pedagogies and curriculum practices that enhance learning for all students and generate inclusive cultures within the school and classroom settings. Desired outcomes are achieved through descriptive, interpretative, analytic and expressive processes to share learning with fellow students and staff. 

**Credit points:** 12  
**Campus:** Kelvin Grove  
**Teaching period:** 2010 SEM-1

**EDB005 TEACHING AND LEARNING STUDIES 5: PROFESSIONAL WORK OF TEACHERS**

Students will share the responsibility for shaping their beginning career learnings through a process of professional induction with a number of key significant stakeholders. The process will be proactive, collaborative and self determined and students will need to become professionally responsible for developing a professional development program that best accommodates their needs at the close of the teacher education program. 

**Prerequisites:** EDB033, EDB023, or EDB013  
**Credit points:** 12  
**Campus:** Internet, Kelvin Grove, External and Caboolture  
**Teaching period:** 2010 6TP4

**EDB021 PRIMARY FIELD STUDIES 1: DEVELOPMENT AND LEARNING IN THE FIELD**

Designated Unit.

This unit focuses on students' professional development as an educator, and reinforces the twin themes of teacher as researcher, and teacher as reflective practitioner. It provides the first set of teaching experiences, in a graduated sequence over the course of the BEd. Students develop the ability to plan, implement and evaluate effective teaching/learning programs. This requires an understanding of learner needs, curriculum knowledge, procedures for creating supportive classroom environments, and sensitivity to socio-cultural contexts. 

**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Kelvin Grove and Caboolture  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**EDB022 PRIMARY FIELD STUDIES 2: PRACTISING EDUCATION IN THE FIELD**

Designated Unit.

Through critical examination of the socio-cultural dimensions of these sites, this unit aims to utilise aspects of social enquiry to analyse the practice of teaching as a social and cultural activity. At the same time, the unit aims to develop students' pedagogical and curriculum skills as a teacher. 

**Prerequisites:** EDB021, CLB006 and MDB002  
**Credit points:** 12  
**Campus:** Internet, Kelvin Grove and Caboolture  
**Teaching period:** 2010 SEM-2

**EDB023 PRIMARY FIELD STUDIES 3: INCLUSIVE EDUCATIONAL PRACTICES**

Designated Unit.

As a final year teacher education student you will actively engage with the challenges and practices of inclusive education in the classroom and the broader educational setting. This field experience is designed for students to engage in teaching, learning and assessment practices in their field, interacting with individual students, small groups of students and whole class situations. Students will be required to design, implement and evaluate differentiated teaching strategies, programs and assessment tasks in inclusive and critically reflective ways and in a manner that is responsive to the diverse nature of the students in classes. 

**Prerequisites:** EDB022  
**Credit points:** 12  
**Campus:** Internet, Kelvin Grove and External

**EDB024 PRIMARY FIELD STUDIES 4: PROFESSIONAL WORK OF TEACHERS - INDUCTION INTO THE FIELD**

Designated Unit.

Learners remain central to the work of teams and must be recognised as culturally and socially diverse as well as intellectually diverse. Within these constructs the graduating teachers are required to provide a range of educational opportunities that facilitate high quality and meaningful learning engagement for all students across differing educational contexts and sectors. This unit is designed to fully immerse the pre-service teacher into the field with a view to scaffolding their repositioning as autonomous, critically reflective, inclusive professional teachers on completion. 

**Prerequisites:** EDB023  
**Credit points:** 12  
**Campus:** Internet, Kelvin Grove, External and Caboolture  
**Teaching period:** 2010 6TP2 and 2010 SEM-2

**EDB025 INTERNSHIP (PRIMARY)**

Designated Unit.

This unit aims to induct you into the professional work of teachers. The aim of this unit is for you to apply the knowledge, skills and understandings of teaching and learning that you have acquired throughout the course in an extended time in the workplace. 

**Prerequisites:** EDB024 (Can be enrolled in same teaching
period) Assumed knowledge: Completion of all units in your course is assumed knowledge. Credit points: 12
Campus: Internet, Kelvin Grove, External and Caboolture
Teaching period: 2010 5TP3 and 2010 SEM-2

HMB300 TEACHING PRIMARY HPE
This unit provides students with knowledge of how to integrate Health and physical education within the other key learning areas. Students learn the connection between physical activity and health and its role in meeting the developmental needs of children. Additionally, they participate in a range of learning experiences appropriate to the developmental needs of children and acquire the skills necessary to safely deliver student learning in an open environment. Topics include principles of the health and physical education years 1-10 syllabus; motor skill development and ability related expectations for teaching HPE; planning for quality instruction and linking physical activity with health; planning and teaching HPE; classroom management and safety issues.
Credit points: 12 Campus: Kelvin Grove and Caboolture
Teaching period: 2010 SEM-2

KKB202 TEACHING PRIMARY DANCE AND DRAMA
Through both practical and theoretical contexts, you are introduced to curriculum planning and teaching in primary Dance and Drama using The Arts years 1 to 10 Syllabus (Queensland Studies Authority, 2002).
Credit points: 12 Contact hours: 4 per week Campus: Kelvin Grove and Caboolture
Teaching period: 2010 SEM-1

LQB381 BIOCHEMISTRY: STRUCTURE AND FUNCTION
This unit extends basic organic chemistry theory to the level of the biological macromolecules. A clear understanding of the structure and function of these molecules is essential to a student's understanding of the metabolism of living cells. Hence this biomolecular unit is a fundamental prerequisite for all advanced units in the various disciplines in the field of life sciences.
Prerequisites: (SCB121 and SCB122) or (SCB111 and SCB121) or SCB113
Antirequisites: LSB275 and LSB325 and LSB308
Credit points: 12 Contact hours: 4 per week Campus: Gardens Point
Teaching period: 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  
**Teaching 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 (ie bioinformatics) is being used in areas such as gene discovery, disease diagnosis and drug development, students need to understand how the information content of DNA and proteins is extracted and analysed. This unit introduces students to the approaches to database mining and genome exploration.

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

### LQB489 PLANT PHYSIOLOGY AND CELL BIOLOGY
Plants are a vital resource providing food, medicines, fibre and fuel. The utilisation and manipulation of plants requires an understanding of growth and development on a molecular, cellular and whole plant basis. This is an intermediate-level unit covering the principles of plant cell biology and physiology to provide a platform for more advanced studies in plant biology and biotechnology. It integrates the fundamentals of plant physiology, biochemistry and molecular biology in such a way to enable students to understand how plants grow, develop and interact with their environment, and will also be valuable for lifelong appreciation of the potential of agriculture and its contribution to humanity. The aim of this unit is to provide you with an understanding of plant function from the cell to the whole plant, skills in measuring and monitoring these processes and an appreciation of how they are influenced by the environment.

**Prerequisites:** SCB120 or SCB122 or NR270 or LSB338  
**Antirequisites:** LSB397, LSB497  
**Credit points:** 12  
**Teaching 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  
**Teaching 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  
**Teaching 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  
**Teaching 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:** LQB449, 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

**LQB681 BIOCHEMICAL RESEARCH SKILLS**

In the real world, the design and completion of successful research and/or business projects demand that individuals gather information, solve problems, work effectively as a part of a team and analyse and communicate results in a critical manner. This unit offers opportunities for you to develop these skills that are valued highly by potential employers and research project leaders. This unit is a capstone biochemistry unit designed to prepare you as a prospective graduate for independent and group research.

**Prerequisites:** LQB381 or LSB308. Students with equivalent study can apply for a requisite waiver  
**Equivalents:** LSB607  
**Credit points:** 12  
**Contact hours:** 5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**LQB687 APPLIED MICROBIOLOGY 2: FOOD AND QUALITY ASSURANCE**

This unit covers the most significant areas of food microbiology at an advanced level. Topics include: microbial ecology of foods; microbial spoilage and food preservation; foodborne microorganisms of public health significance; food fermentations; laboratory and food processing applications; predictive microbiology; agritzerritorism; and isolation, quantification and identification of microbes from foods. A professional work attitude in a microbiology laboratory, practical, applied laboratory skills and an awareness of the hazards of working with pathogenic cultures are established.

**Prerequisites:** LQB386 or LSB328  
**Assumed knowledge:** Completion of 72 credit points of second level science units is assumed knowledge  
**Equivalents:** LSB628  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

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

**MAB105 PREPARATORY MATHEMATICS**

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

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

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

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

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

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

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

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

MAB210 STATISTICAL MODELLING 1
This unit includes: probability; independence; system reliability; using conditional probability in modelling; Bayes; introductory Markov chains; random variables and distributions; special distributional models; Bernoulli process; Poisson process; exponential; introductory queuing processes; expected values and moments; goodness-of-fit tests; measures of dependence; introductory bivariate and correlation properties; conditioning arguments.

Assumed knowledge: Grade of Sound Achievement in Senior Mathematics C (or equivalent) or MAB120 is assumed knowledge. Students are advised to enrol in either MAB121 or MAB122 in the same semester if not previously completed.
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1 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 SUM

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

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

MAB312 LINEAR ALGEBRA
This unit covers the following broad topics from linear algebra: matrix analysis; eigenvalues and eigenvectors;
vector spaces; inner product spaces.

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

**MAB313 MATHEMATICS OF FINANCE**

This unit includes: interest rates; solution of problems in compound interest; applications of annuities; valuation of securities; quantitative techniques in business and finance. Students need to concurrently enrol in MAB111 unless already completed.

**Prerequisites:** MAB111 or MAB121  
**Antirequisites:** MAN313  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**MAB315 OPERATIONS RESEARCH 2**

This unit introduces the essential features of operations research methods. It develops a number of basic mathematical techniques to solve generic problems and the theoretical foundations of these techniques. Students should develop the ability to apply various operations research methods, algorithms and techniques in the solution of practical problems. Students will also look at the applications of operations research techniques to real-world problems.

**Prerequisites:** MAB210 and (MAB112 or MAB122)  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**MAB413 DIFFERENTIAL EQUATIONS**

This unit includes: linear and nonlinear differential equations; series methods; Laplace transform; transforms of derivatives and integrals; systems of differential equations; basic theory on linear systems; solution of linear systems with constant coefficients; matrix methods; phase plane analysis.

**Prerequisites:** MAB311 or MAB312  
**Antirequisites:** MAN413  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**MAB414 APPLIED STATISTICS 2**

This unit includes: Simple linear regression (revision), multiple linear regression, making inferences from regressions, choosing a model, checking model assumptions, general linear models - analysis of covariance, ANOVA revisited, designing experiments, issues in designing experiments, analysing experimental results, further experimental designs, assumptions, and how to cope if they aren't met, simulations.

**Prerequisites:** MAB101 and MAB111  
**Assumed knowledge:** MAB112 is recommended prior study  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**MAB422 MATHEMATICAL MODELLING**

This unit includes models developed with the "real world" description. These models are taken from the areas of cancer research, population growth and engineering. Emphasis is on mathematical modelling and not on the development of new mathematical content.

**Prerequisites:** MAB121  
**Antirequisites:** MAN422  
**Assumed knowledge:** MAB220 is recommended for prior/concurrent study for exposure to MATLAB  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**MAB461 DISCRETE MATHEMATICS**

This unit has three basic components. They are combinatorics, abstract algebra and number theory. Combinatorics, which is about 60% of the unit, will largely consist of enumeration techniques in various settings. Abstract algebra (~20%) will advance the student's knowledge of groups, rings and fields to include additive groups, multiplicative groups; polynomial rings, finite fields, isomorphisms, and homomorphisms. Number theory (~20%) will include methods of proof including induction and contradiction, modular arithmetic and congruence, gcd/lcm and theorems involving these, fundamental theorem of arithmetic, Fermat's theorems, Euler's theorem.

**Prerequisites:** MAB112 or MAB122  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**MAB480 INTRODUCTION TO SCIENTIFIC COMPUTATION**

This unit teaches students how to implement a mathematical algorithm in a modern scientific computing environment (eg Matlab). A case-study approach is used with an emphasis on writing efficient code. Also an overview of other software packages used in mathematics will be given.

**Prerequisite(s):** MAB112 or MAB132 or MAB182  
(Recommended: MAB210 or MAB220)  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2009 SEM-2  
**Incompatible with:** MAB380, ITB849

**MAB521 APPLIED MATHEMATICS 3**

This unit includes: partial differential equations such as the wave, heat and Laplace equations; special functions(gamma, delta, Bessel and error functions, Legendre polynomials); vector analysis and applications (vector algebra, vector calculus, fields, grad, div, curl, line and surface integrals, divergence theorem, Stoke's theorem, applications); functions of a complex variable (analytic functions, contour integrals, Laurent series, residues).

**Prerequisites:** MAB311  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2
**period:** 2010 SEM-1

**MAB525 OPERATIONS RESEARCH 3A**

This unit develops problem-solving skills and sharpens analytical skills. This unit introduces the technical issues involved in applying operations research principles, methods and algorithms in the solution of real-world problems.

**Prerequisites:** MAB315  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**MAB533 STATISTICAL TECHNIQUES**

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

**Prerequisites:** MAB210 and MAB414  
**Antirequisites:** MAB523  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**MAB625 OPERATIONS RESEARCH 3B**

This unit includes: phases of an operations research study; decision analysis; queuing theory; simulation; implementation in operations research; heuristic techniques.

**Prerequisites:** MAB315  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**MAB672 ADVANCED MATHEMATICAL MODELLING**

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

**Prerequisites:** MAB422 and MAB312  
**Antirequisites:** MAN672  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**MDB004 TEACHING PRIMARY ICT**

Information and Communication Technologies (ICT) play a significant role in contemporary society and therefore technological literacy is increasingly being seen as an essential part of education. This form of literacy involves the ability to create, use, manage and understand ICT in a range of contexts. In addition, new networked technologies have brought about the potential for expanding learning opportunities. These necessitate the re-examination of effective learning and teaching principles, the role of the learner, the role of the teacher, creating worthwhile partnerships and the use of ICT within the learning situation.

**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Internet, Kelvin Grove and Caboolture  
**Teaching period:** 2010 SEM-1 and 2010 6TP4

**MDB006 TEACHING PRIMARY SCIENCE**

Becoming scientific and technologically literate contributes to learners’ capabilities as life-long learners by providing them with the knowledge and dispositions to question systematically their natural environment. In the prerequisite unit about Mathematics and Science Foundations, grounding in some basic concept areas that help to explain children’s everyday experiences of the natural world and an understanding of the nature of science was explored. In this unit the opportunity is presented for students to develop exciting and innovative science programs at all levels of the primary school with a focus on developing scientific skills and abilities to retrieve and explore new scientific knowledge.

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

**MDB120 MATHEMATICS CURRICULUM AND PEDAGOGIES**

This unit provides content knowledge and pedagogical strategies to promote the mathematical development (both cognitive and social) of students’ future pupils.

**Credit points:** 12  
**Campus:** Kelvin Grove  
**Teaching period:** 2010 SEM-1

**NQB201 PLANET EARTH**

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

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

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

Equivalents: NRB340  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

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

Assumed knowledge: NQB201 is assumed knowledge.

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

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

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

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

Assumed knowledge: NQB201 is assumed knowledge.

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

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

Prerequisites: SCB110 or SCB112  Equivalents: NRB331  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

NQB322 INVERTEBRATE BIOLOGY
Anyone pursuing a career as an ecologist, environmental biologist, or teacher needs to be familiar with invertebrates, including their diversity and how they function. Because approximately 90% of all invertebrates are arthropods, this unit focuses on this dominant phylum, which includes all the animals with jointed exoskeletons (the insects, prawns and crabs, spiders, millipedes and more). The aim is to provide you with an overview of arthropod diversity, structure and function, as a basis for exploring the role of arthropods in natural and human-modified systems.

Equivalents: NRB370  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

NQB323 PLANT BIOLOGY
This unit will provide an understanding and appreciation of plants by taking an evolutionary approach to the study of major plant groups. Content includes life cycles, morphology, adaptations for survival in varied environments, economic and ecological aspects of various groups as they
relate to humans, phylogeny and diversity of major groups. This unit will encourage careful observation, curiosity and thinking about plants. The practicals will provide an opportunity to observe and understand form, function and diversity and will emphasise development of skills in plant systematics and identification, with special emphasis on Australian flora.

**Prerequisites:** SCB112  
**Equivalents:** NRB371  
**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:** NRB436  
**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, and NQB321 or NRB311  
**Equivalents:** NRB412  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

**NQB422 GENETICS AND EVOLUTION**

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

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

**NQB501 ENVIRONMENTAL MODELLING**

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

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

**NQB502 FIELD METHODS IN NATURAL RESOURCE SCIENCES**

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

**Prerequisites:** (NQB321 or NQB411) and (NQB302 or NQB412)
**Assumed knowledge:** 36 credit points of second level science units in selected major is assumed knowledge. NQB302 and NQB403 for Env Sc, NQB321 for Ecol. NQB411 and NQB412 for Geosc

**Equivalents:**

NQB601
**Credit points:** 12
**Contact hours:** 4 per week
**Campus:** Gardens Point
**Teaching period:** 2010 SEM-1

NQB503 SPATIAL ANALYSIS OF ENVIRONMENTAL SYSTEMS

TBA

**Equivalents:** NRB501
**Credit points:** 12
**Contact hours:** 4 per week
**Campus:** Gardens Point
**Teaching period:** 2010 SEM-1

NQB512 ECONOMIC GEOLOGY

The unit is divided up into two 6 week modules. The first module concentrates on the formation of coal deposits, the geology of Australian coal basins, formation and exploitation of coal seam gas and coal resource evaluation. The second module concentrates on the formation and preservation of economic mineral deposits.

**Prerequisites:** NQB411, NQB413
**Antirequisites:** NRB535
**Credit points:** 12
**Contact hours:** 4 per week
**Campus:** Gardens Point
**Teaching period:** 2010 SEM-1

NQB513 GEOPHYSICS

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

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

**Equivalents:** NRB534
**Credit points:** 12
**Contact hours:** 4 per week
**Campus:** Gardens Point
**Teaching period:** 2010 SEM-1

NQB521 POPULATION GENETICS AND MOLECULAR ECOLOGY

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

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

NQB523 POPULATION MANAGEMENT

This unit develops the theoretical treatment of populations as a unit of study and integrates the content of previous 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

NQB601 SUSTAINABLE ENVIRONMENTAL MANAGEMENT

Sustainable environmental management requires a multidisciplinary approach to decision-making. This approach must be founded on scientific knowledge about the environment, but to be effective, the science must also be integrated with social, economic, political and technological policies. This unit explores contemporary environmental management issues: the science behind them, linkages between them, their cultural settings and sustainable solutions.

**Assumed knowledge:** 48 credit points of second level science units is assumed knowledge.

**Equivalents:**

NRB600
**Credit points:** 12
**Contact hours:** 4 per week
**Campus:** Gardens Point
**Teaching period:** 2010 SEM-2

NQB614 GROUNDWATER SYSTEMS

This unit focuses on the origin, occurrence and movement of groundwater; aquifer properties; chemistry and quality of groundwater; exploration methods for groundwater; drilling methods and well testing equipment; assessment of groundwater problems, both supply and quality; and introduction to modelling of groundwater systems. Groundwater resources of Australia are covered and current issues. Lectures are supported by desktop exercises. Students will obtain practical experience with pump tests and computer modelling. There is interaction with government and private sector hydrogeologists, and a field site visit for hands-on well testing.

**Prerequisites:** NQB302 or NRB301 or ENB383

**Equivalents:** NRB633
**Credit points:** 12
**Contact hours:** 4 per week
**Campus:** Gardens Point
**Teaching period:** 2010 SEM-2

NQB622 CONSERVATION BIOLOGY

Conservation Biology is the application of ecological theory and principles to the problem of the maintenance of viable populations of rare, threatened or endangered species, or ecological systems. The unit integrates ecological and
first-level unit lays the foundation for discussion of wave phenomena in higher level studies, but will also be relevant to those not considering progressing to a Physics major but wishing to understand more of the Physical world in which we live.

**Assumed knowledge:** Senior Maths B is assumed knowledge.  
**Credit points:** 12  
**Contact hours:** 4.5 hours per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2

### PQB312 ANALYTICAL CHEMISTRY FOR SCIENTISTS AND TECHNOLOGISTS

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

**Prerequisites:** SCB131  
**Equivalents:** PCB414  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

### PQB313 ANALYTICAL CHEMISTRY FOR INDUSTRY

A modern chemist working in industry requires a thorough understanding of the fundamentals of analytical chemistry on which applications in sophisticated, state-of-the-art instrumental methods are based. This unit provides students with a grounding in the classical qualitative and quantitative gravimetric and wet analysis, together with common spectrophotometric and electrochemical methods of analysis. Through the practical program in this unit, students will be able to learn the connections between the theoretical aspects of analytical chemistry and the work in the laboratory. The chemistry behind some applications of these methods is also discussed, eg water, fertilisers, foods, minerals, metals, etc.

**Prerequisites:** SCB131  
**Equivalents:** PCB414  
**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

### PQB331 STRUCTURE AND BONDING

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

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

**PQB502 ADVANCED PHYSICAL CHEMISTRY**

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

**Prerequisites:** PQB250 or PCB250, and MAB111  
**Corequisites:** MAB311  
**Assumed knowledge:** Students should enrol in MAB311 in the same semester if not already completed  
**Equivalents:** PCB562  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB360 GLOBAL ENERGY BALANCE AND CLIMATE CHANGE**

Modern societies are becoming increasingly aware of potential environmental problems associated with conventional energy production technologies. Application of alternative technologies is therefore increasing, with ambitious targets and plans to support research and development for reducing energy related environmental consequences. This unit is designed to offer science and engineering students an opportunity to gain awareness about the expanding field of alternative energy technologies and to understand relationships between use of energy and its impact on local and global environment.

**Prerequisites:** MAB111 or MAB131  
**Equivalents:** PCB563  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB401 REACTION KINETICS, THERMODYNAMICS AND MECHANISMS**

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

**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.

**PQB513 INSTRUMENTAL ANALYSIS**

**TBA**

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

**PQB525 UNIT OPERATIONS**

Having gained an understanding of mass and energy balances in PQB423 you will be able to appreciate the principles underlying the design and operation of the many individual processes, or unit operations, that together make up a large part of any full-scale industrial process. It is vital that Chemists involved in Chemical Technology understand how unit operations work so that they can interact effectively with unit operators and process engineers. An additional role of this unit is to build a knowledge base for the subsequent development of generic skills in Chemical Technology through a problem-solving exercise involving an authentic industrial process in PQB623.

**Prerequisites:** PQB423  
**Equivalents:** PCB524  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB531 ORGANIC MECHANISMS AND SYNTHESIS**

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

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

**PQB550 QUANTUM AND CONDENSED MATTER PHYSICS**

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

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

**PQB651 EXPERIMENTAL PHYSICS**

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

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

**PQB551 PHYSICAL ANALYTICAL TECHNIQUES**

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

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

**PQB663 ADVANCED INORGANIC CHEMISTRY**

Major topics covered are as follows: organometallic chemistry, including metal-carbon bonding, main group and transition metal organometallics and applications of organometallic compounds in synthetic chemistry; bioinorganic chemistry; physical methods of structure determination, such as single crystal X-ray diffraction; chemical applications of group theory.

**Prerequisites:** PQB331  
**Equivalents:** PCB634  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1

**PQB650 ADVANCED THEORETICAL PHYSICS**

This unit consists of three parts. Part A extends the content of previous units in electromagnetism and the application of Maxwell's equations, electromagnetic waves, polarisation, dielectric permittivity, transmission line theory, waveguides, optic fibre theory, antennae. Part B includes a detailed study of magnetic resonance and its applications. Part C presents the extension of studies in statistical mechanics, including microscopic approach to entropy, partition function, paramagnetism, perfect and real classical and quantum gases, phase equilibria, Bose-Einstein condensate, Brownian motion.

**Prerequisites:** (PQB350 or PCB462) and (PQB550 or PCB561)  
**Equivalents:** PCB665  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-2
This unit represents the culmination of the students' experiences in undergraduate experimental work. The unit is offered in the final year of study to take advantage of and integrate the skills acquired in previous units. The student is given the opportunity to select three experiments to be undertaken from a series of extended experiments in the areas of physics research undertaken at QUT.

**Prerequisites:** PQB451 or PCB460  
**Equivalents:** PCB661  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

### SCB110 SCIENCE CONCEPTS AND GLOBAL SYSTEMS

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

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

### SCB111 CHEMISTRY 1

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

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

### SCB112 CELLULAR BASIS OF LIFE

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

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

### SCB120 PLANT AND ANIMAL PHYSIOLOGY

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

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

### 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  
**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