Bachelor of Applied Science/Bachelor of Education (Secondary) (IX02)

Year offered: 2010
Admissions: Yes
CRICOS code: 020322E
Course duration (full-time): 4 years
Domestic fees (indicative): 2010: CSP $2,151 (indicative) per semester
International Fees (indicative): 2010: $11,250 (indicative) per semester
Domestic Entry: February
International Entry: February
QTAC code: 409112
Past rank 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: 432
Standard credit points per full-time semester: 48 (semesters 1, 6-8), 60 (semesters 2-5)
Course coordinator: Dr Perry Hartfield (Science & Technology); Dr Mal Shield (Secondary). For science enquiries email: scitech.enquiry@qut.edu.au. For education enquiries email: educationenq@qut.edu.au or phone 3138 8947
Discipline coordinator: Dr Perry Hartfield (Biochemistry Major); Dr Marion Bateson (Biotechnology Major); Dr Dennis Arnold (Chemistry Major); Dr Ian Williamson (Ecology Major); Dr Robin Thwaites (Environmental Science Major); Dr Gary Hutfile (Geoscience Major); Prof Graeme Pettet (Mathematics Major); Dr Christine Knox (Microbiology Major); Dr Stephen Hughes (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 are equipped to work as a science professional or undertake research after graduation if you desire.

The Bachelor of Education (Secondary) prepares you to teach in two curriculum areas in secondary school. The science majors that are most relevant to students intending to follow a career in secondary school teaching are Chemistry, Ecology, Geoscience, Mathematics or Physics.

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

Course Design
See the Bachelor of Applied Science course information for details of major areas of study. To allow you to complete the double degree in a shorter period of time, co-majors are to be taken from the education technology program.

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 (SC01) 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 8 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.

**Limits on grades of 3**

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

**Further Information**

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

**Science & Technology Coordinator**

Dr Perry Hartfield  
Phone: +61 7 3138 2984  
Email: p.hartfield@qut.edu.au  
Alternative phone contact: +61 7 3138 2782  
Alternative email contact: enquiry.scitech@qut.edu.au

**Education Coordinator**

Dr Mal Shield  
Phone: +61 7 3138 3323  
Email: m.shield@qut.edu.au

**Faculty of Education Office**

Phone: +61 7 3138 3948  
Fax: +61 7 3138 3949  
Email: jo.wakefield@qut.edu.au

**Discipline Coordinators**

**Biochemistry Major (Cell and Molecular Biosciences Discipline)**

Dr Perry Hartfield  
Phone: +61 7 3138 2984  
Email: p.hartfield@qut.edu.au  
Alternative phone contact: +61 7 3138 2782  
Alternative email contact: enquiry.scitech@qut.edu.au

**Biotechnology Major (Cell and Molecular Biosciences Discipline)**

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

**Chemistry Major (Chemistry Discipline)**

Dr Dennis Arnold  
Phone: +61 7 3138 2482  
Email: d.arnold@qut.edu.au  
Alternative phone contact: +61 7 3138 2782  
Alternative email contact: enquiry.scitech@qut.edu.au

**Ecology Major (Biogeosciences Discipline)**

Dr Ian Williamson  
Phone: +61 7 3138 2782  
Email: enquiry.scitech@qut.edu.au

**Environmental Science Major (Biogeosciences Discipline)**

Dr Robin Thwaites  
Phone: +61 7 3138 2782  
Email: enquiry.scitech@qut.edu.au

**Geoscience Major (Biogeosciences Discipline)**

Dr Gary Huftile  
Phone: +61 7 3138 2782  
Email: enquiry.scitech@qut.edu.au

**Mathematics Major (Mathematical Sciences Discipline)**

Prof Graeme Pettet  
Phone: +61 7 3138 2782  
Email: enquiry.scitech@qut.edu.au

**Microbiology Major (Cell and Molecular Biosciences Discipline)**

Dr Christine Knox  
Phone: +61 7 3138 2782  
Email: enquiry.scitech@qut.edu.au

**Physics Major (Physics Discipline)**

Dr Stephen Hughes  
Phone: +61 7 3138 2782  
Email: enquiry.scitech@qut.edu.au

**Course structure**

<table>
<thead>
<tr>
<th>Year 1, Semester 1</th>
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<tbody>
<tr>
<td>Science Major Unit</td>
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<table>
<thead>
<tr>
<th>Year 1, Semester 2</th>
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<tbody>
<tr>
<td>Science Major Unit</td>
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<tr>
<td>Year, Semester</td>
<td>Course Details</td>
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<tr>
<td>Year 2, Semester 1</td>
<td>Science Major Unit</td>
</tr>
<tr>
<td>EDB002</td>
<td>Teaching and Learning Studies 2: Development and Learning</td>
</tr>
<tr>
<td>EDB031</td>
<td>Secondary Field Studies 1</td>
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<tr>
<td>Please note: The teaching prac component of EDB031 will be organised to commence as soon as schools return for Term 1 in January. Students will have to be available for four weeks prior to commencement of semester 1. This is to alleviate the problem of students studying 13 week discipline units in the same semester as a teaching prac. Contact the Student Affairs Office on 3138 3948 for further information.</td>
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<tr>
<td>Year 2, Semester 2</td>
<td>Science, Technology and Society</td>
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<tr>
<td>MDB454</td>
<td>Secondary Field Studies 4</td>
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<tr>
<td>EDB003</td>
<td>Teaching and Learning Studies 3: Practising Education</td>
</tr>
<tr>
<td>EDB032</td>
<td>Secondary Field Studies 2</td>
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<tr>
<td>Year 4, Semester 1</td>
<td>Science Major Unit</td>
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<tr>
<td>EDB004</td>
<td>Teaching and Learning Studies 4: Inclusive Education</td>
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<tr>
<td>EDB033</td>
<td>Secondary Field Studies 3</td>
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<tr>
<td>Year 4, 6TP4</td>
<td>Curriculum Studies 3X (See List 3)</td>
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<tr>
<td>EDB005</td>
<td>Teaching and Learning Studies 5: Professional Work of Teachers</td>
</tr>
<tr>
<td>EDB007</td>
<td>Culture Studies: Indigenous Education (students must enrol in the 6TP4 mode for both EDB005 and EDB007)</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>Year 4, Semester 2</td>
<td>EDB034</td>
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<tr>
<td>EDB035</td>
<td>Internship (Secondary)</td>
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<td>Course structure - Major in Biochemistry</td>
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<td>Year 1, Semester 1</td>
<td>SCB110</td>
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<tr>
<td>SCB111</td>
<td>Chemistry 1</td>
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<tr>
<td>SCB112</td>
<td>Cellular Basis of Life</td>
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<td>Plus either:</td>
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<tr>
<td>MAB101</td>
<td>Statistical Data Analysis 1</td>
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<td>Or</td>
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<tr>
<td>MAB105</td>
<td>Preparatory Mathematics</td>
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<td>Year 1, Semester 2</td>
<td>SCB120</td>
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<td>SCB121</td>
<td>Chemistry 2</td>
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<td>SCB122</td>
<td>Cell and Molecular Biology</td>
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<tr>
<td>SCB123</td>
<td>Physical Science Applications</td>
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<tr>
<td>SCB222</td>
<td>Exploration of the Universe</td>
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<tr>
<td>Year 2, Semester 1</td>
<td>LQB381</td>
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<td>LQB383</td>
<td>Molecular and Cellular Regulation</td>
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<tr>
<td>Year 2, Semester 2</td>
<td>LQB481</td>
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<tr>
<td>LQB483</td>
<td>Molecular Biology Techniques</td>
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<td>MDB454</td>
<td>Science, Technology and Society</td>
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<tr>
<td>LQB682</td>
<td>Protein Biochemistry and Bioengineering</td>
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<tr>
<td>Science Elective (See list)</td>
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</table>
### Course structure - Major in Biotechnology

**Year 1, Semester 1**
- SCB110 Science Concepts and Global Systems
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life
  - Plus either:
  - MAB101 Statistical Data Analysis 1
  - Or
  - MAB105 Preparatory Mathematics

**SCB112 Cellular Basis of Life**

**Year 1, Semester 2**
- SCB120 Plant and Animal Physiology
- SCB121 Chemistry 2
- SCB122 Cell and Molecular Biology
- SCB123 Physical Science Applications
- SCB222 Exploration of the Universe

**Year 2, Semester 1**
- LQB381 Biochemistry: Structure and Function
- LQB383 Molecular and Cellular Regulation

**Year 2, Semester 2**
- LQB483 Molecular Biology Techniques
- LQB484 Introduction to Genomics and Bioinformatics
  - Science Elective (See list)
  - Science Elective (See list)
- MDB454 Science, Technology and Society

**Year 3, Semester 1**
- LQB582 Biomedical Research Technologies
- LQB583 Genetic Research Technology
- LQB584 Medical Cell Biology
- LQB585 Plant Genetic Manipulation

### Course structure - Major in Chemistry

**Year 1, Semester 1**
- SCB110 Science Concepts and Global Systems
- SCB111 Chemistry 1
- SCB12 Cerebral Basis of Life
  - Plus either:
  - MAB101 Statistical Data Analysis 1
  - Or
  - MAB105 Preparatory Mathematics

**Year 1, Semester 2**
- MAB120
- SCB121 Chemistry 2
- SCB123 Physical Science Applications
- SCB131 Experimental Chemistry
- SCB222 Exploration of the Universe

**Year 2, Semester 1**
- PQB312 Analytical Chemistry For Scientists and Technologists
- PQB331 Structure and Bonding

**Year 2, Semester 2**
- PQB401 Reaction Kinetics, Thermodynamics and Mechanisms
- PQB442 Chemical Spectroscopy
- PQB631 Advanced Inorganic Chemistry
  - Science Elective (See list)
- MDB454 Science, Technology and Society

**Year 3, Semester 1**
- PQB502 Advanced Physical Chemistry
- PQB513 Instrumental Analysis
- PQB531 Organic Mechanisms and Synthesis
  - Science Elective (See list)

### Course structure - Major in Ecology

**Year 1, Semester 1**
- SCB110 Science Concepts and Global Systems
- SCB111 Chemistry 1
- SCB112 Cerebral Basis of Life
  - Plus either:
  - MAB101 Statistical Data Analysis 1
  - Or
  - MAB105 Preparatory Mathematics

**Year 1, Semester 2**
- NQB201 Planet Earth
- NQB202 History of Life on Earth
Course structure - Major in Environmental Science

Year 1, Semester 1
- SCB110 Science Concepts and Global Systems
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life
  Plus either:
  - MAB101 Statistical Data Analysis 1
  - MAB105 Preparatory Mathematics

Year 1, Semester 2
- NQB201 Planet Earth
- NQB202 History of Life on Earth
- SCB120 Plant and Animal Physiology
- SCB123 Physical Science Applications
- SCB222 Exploration of the Universe

Year 2, Semester 1
- NQB302 Earth Surface Systems
- NQB321 Ecology

Year 2, Semester 2
- NQB403 Soils and the Environment
- NQB421 Experimental Design
- NQB601 Sustainable Environmental Management
  - Science Elective (See list)
- MDB454 Science, Technology and Society

Year 3, Semester 1
- NQB501 Environmental Modelling
- NQB502 Field Methods in Natural Resource Sciences
- NQB503 Spatial Analysis of Environmental Systems
  - Science Elective (See list)

Course structure - Major in Geoscience

Year 1, Semester 1
- SCB110 Science Concepts and Global Systems
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life
  Plus either:
  - MAB101 Statistical Data Analysis 1
  - MAB105 Preparatory Mathematics

Year 1, Semester 2
- NQB201 Planet Earth
- NQB202 History of Life on Earth
- SCB120 Plant and Animal Physiology
- SCB123 Physical Science Applications
- SCB222 Exploration of the Universe

Year 2, Semester 1
- NQB311 Mineralogy
- NQB314 Sedimentary Geology

Year 2, Semester 2
- NQB411 Petrology of Igneous and Metamorphic Rocks
- NQB412 Structural Geology and Field Methods
- NQB614 Groundwater Systems
  - Science Elective (See list)
- MDB454 Science, Technology and Society

Year 3, Semester 1
- NQB502 Field Methods in Natural Resource Sciences
NQB503  Spatial Analysis of Environmental Systems
NQB513  Geophysics
Science Elective (See list)

Course structure - Major in Mathematics (WITH Maths C from Senior)

WITH GENERAL SCIENCE AS A SECOND TEACHING AREA

Year 1, Semester 1
MAB101  Statistical Data Analysis 1
MAB121  Calculus and Differential Equations
SCB110  Science Concepts and Global Systems
SCB111  Chemistry 1

Year 1, Semester 2
MAB122  Algebra and Analytic Geometry
MAB210  Statistical Modelling 1
MAB220  Computational Mathematics 1
SCB112  Cellular Basis of Life

Year 2, Semester 1
MAB311  Advanced Calculus
MAB315  Operations Research 2

Year 2, Semester 2
MAB625  Operations Research 3B
MDB454  Science, Technology and Society
PQB251  Waves and Optics
Plus either
MAB414  Applied Statistics 2
Or
MAB422  Mathematical Modelling
Plus ONE unit from the following:
MAB313  Mathematics of Finance
MAB413  Differential Equations
MAB414  Applied Statistics 2
MAB422  Mathematical Modelling
MAB480  Introduction to Scientific Computation

Year 3, Semester 1
Select THREE units from the following:
MAB521  Applied Mathematics 3
MAB525  Operations Research 3A

MAB533  Statistical Techniques
MAB672  Advanced Mathematical Modelling
Plus
PQB350  Thermodynamics of Solids and Gases

Course structure - Major in Mathematics (WITHOUT Maths C)

WITH GENERAL SCIENCE AS A SECOND TEACHING AREA

Year 1, Semester 1
MAB101  Statistical Data Analysis 1
MAB120  Algebra and Calculus
SCB110  Science Concepts and Global Systems
SCB111  Chemistry 1

Year 1, Semester 2
MAB121  Calculus and Differential Equations
MAB122  Algebra and Analytic Geometry
MAB210  Statistical Modelling 1
MAB220  Computational Mathematics 1
PQB250  Mechanics and Electromagnetism

Year 2, Semester 1
MAB311  Advanced Calculus
MAB315  Operations Research 2

Year 2, Semester 2
MAB625  Operations Research 3B
Plus either
MAB414  Applied Statistics 2
Or
MAB422  Mathematical Modelling
MDB454  Science, Technology and Society
PQB251  Waves and Optics
Plus select ONE unit from the following:
MAB313  Mathematics of Finance
MAB413  Differential Equations
MAB414  Applied Statistics 2
MAB422  Mathematical Modelling
MAB480  Introduction to Scientific Computation

Year 3, Semester 1
Select THREE units from the following:
**Course structure - Major in Microbiology**

**Year 1, Semester 1**
- SCB110 Science Concepts and Global Systems
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life
  - Plus either:
  - MAB101 Statistical Data Analysis 1
  - Or
  - MAB105 Preparatory Mathematics

**Year 1, Semester 2**
- SCB120 Plant and Animal Physiology
- SCB121 Chemistry 2
- SCB122 Cell and Molecular Biology
- SCB123 Physical Science Applications
- SCB222 Exploration of the Universe

**Year 2, Semester 1**
- LQB381 Biochemistry: Structure and Function
- 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
  - Science Elective (See list)
- MDB454 Science, Technology and Society

**Year 3, Semester 1**
- LQB586 Clinical Microbiology 2
- LQB587 Applied Microbiology 1: Water, Air and Soil
  - Either
  - LQB582 Biomedical Research Technologies
  - Or
  - LQB583 Genetic Research Technology
  - Science Elective (See list)

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**Course structure - Major in Physics (WITH Maths C from Senior)**

**WITH GENERAL SCIENCE AS A SECOND TEACHING AREA**

**Year 1, Semester 1**
- MAB121 Calculus and Differential Equations
- SCB110 Science Concepts and Global Systems
- SCB111 Chemistry 1
- SCB112 Cellular Basis of Life

**Year 1, Semester 2**
- MAB122 Algebra and Analytic Geometry
- MAB220 Computational Mathematics 1
- PQB250 Mechanics and Electromagnetism
- PQB251 Waves and Optics
- MAB101 Statistical Data Analysis 1

**Year 2, Semester 1**
- MAB311 Advanced Calculus
- PQB350 Thermodynamics of Solids and Gases

**Year 2, Semester 2**
- PQB450 Energy, Fields and Radiation
- PQB451 Electronics and Instrumentation
- PQB650 Advanced Theoretical Physics
- MDB454 Science, Technology and Society
  - Plus select ONE unit from the following:
  - MAB210 Statistical Modelling 1
  - MAB313 Mathematics of Finance
  - MAB413 Differential Equations
  - MAB422 Mathematical Modelling
  - MAB480 Introduction to Scientific Computation

**Year 3, Semester 1**
- MAB312 Linear Algebra
- PQB550 Quantum and Condensed Matter Physics
- PQB551 Physical Analytical Techniques
- PQB651 Experimental Physics

**WITH MATHEMATICS AS A SECOND TEACHING AREA**

**Year 1, Semester 1**
- MAB121 Calculus and Differential Equations
SCB110 Science Concepts and Global Systems
SCB111 Chemistry 1
SCB112 Cellular Basis of Life

Year 1, Semester 2
MAB122 Algebra and Analytic Geometry
MAB220 Computational Mathematics 1
PQB250 Mechanics and Electromagnetism
PQB251 Waves and Optics

Plus either

MAB101 Statistical Data Analysis 1
Or

MAB210 Statistical Modelling 1

Year 2, Semester 1
MAB311 Advanced Calculus
PQB350 Thermodynamics of Solids and Gases

Year 2, Semester 2
PQB450 Energy, Fields and Radiation
PQB451 Electronics and Instrumentation
PQB650 Advanced Theoretical Physics

Year 3, Semester 1
PQB550 Quantum and Condensed Matter Physics
PQB551 Physical Analytical Techniques
PQB651 Experimental Physics

WITH MATHEMATICS AS A SECOND TEACHING AREA

Year 1, Semester 1
MAB120 Algebra and Calculus
SCB110 Science Concepts and Global Systems
SCB111 Chemistry 1
SCB112 Cellular Basis of Life

WITH GENERAL SCIENCE AS A SECOND TEACHING AREA

Year 1, Semester 1
MAB120 Algebra and Calculus
SCB110 Science Concepts and Global Systems
SCB111 Chemistry 1

Course structure - Major in Physics (WITHOUT Maths C from Senior)
Year 3, Semester 1

PQB550 Quantum and Condensed Matter Physics
PQB551 Physical Analytical Techniques
PQB651 Experimental Physics
Either
MAB101 Statistical Data Analysis 1
Or
MAB312 Linear Algebra

Second Teaching Area - General Science

SCB120 Plant and Animal Physiology
Or
SCB222 Exploration of the Universe
Plus
MDB454 Science, Technology and Society
In addition, choose 2 units from the Science Electives List

Science Electives

Select TWO units that you have not already done from the following:

Semester 1 Units:
NQB321 Ecology
NQB322 Invertebrate Biology
NQB323 Plant Biology
SCB121 Chemistry 2

Semester 2 Units:
NQB201 Planet Earth
NQB202 History of Life on Earth
NQB403 Soils and the Environment
NQB423 Vertebrate Biology
PQB250 Mechanics and Electromagnetism
SCB120 Plant and Animal Physiology
SCB121 Chemistry 2
SCB122 Cell and Molecular Biology
SCB123 Physical Science Applications

List 1: Curriculum Studies 1X & 1Y

Prerequisite: Normally minimum of 24 credit points of relevant discipline. Students undertaking a double Science major will undertake MDB031 as Curriculum Studies 1X, and an education elective as Curriculum Studies 1Y. Students studying Maths or Physics as a major or minor will take MDB031 as Curriculum Studies 1X, and can take MDB021 as their Curriculum Studies 1Y unit.

MDB021 Mathematics Curriculum Studies 1
MDB031 Science Education Curriculum Studies 1

List 2: Curriculum Studies 2X & 2Y

Prerequisites: Curriculum Studies 1X & 1Y

MDB010 Biology Curriculum Studies 2
(MDB010 is suitable for students studying Biochemistry, Biotechnology, Ecology, Environmental Science, Microbiology)
MDB013 Chemistry Curriculum Studies 2
(MDB013 is suitable for students majoring in Biochemistry or Biotechnology – contains more emphasis on chemistry rather than biology)
MDB019 Earth Science Curriculum Studies 2
(MDB019 is suitable for students majoring in Environmental Science or Geoscience – contains more emphasis on geology rather than biology)
MDB022 Mathematics Curriculum Studies 2
MDB025 Physics Curriculum Studies 2
MDB028 Science Curriculum Studies 2
(MDB028 is suitable for students interested in teaching junior science)

List 3: Curriculum Studies 3X & 3Y

Prerequisites: Curriculum Studies 2X & 2Y. Students undertaking a double Science major will undertake MDB033 as Curriculum Studies 3X, and an education elective as Curriculum Studies 3Y. Students studying Maths or Physics as a major or minor will take MDB033 as Curriculum Studies 3X, and can take
MDB023 as their Curriculum Studies 3Y unit.

MDB023  Mathematics Curriculum Studies 3
MDB033  Science Education Curriculum Studies 3

Education Electives

LIST 4: EDUCATION ELECTIVES

CLB049  The Global Teacher
MDB021  Mathematics Curriculum Studies 1
SPB012  Classroom and Behaviour Management
SPB018  Teaching Strategies
SPB020  Classroom Assessment Practices
SPB006  Educational Counselling

(If enrolled in SPB006, must choose BLOCK option as teaching prac commences in week 10)

Potential Careers:

UNIT SYNOPSES

CLB049 THE GLOBAL TEACHER
This unit enhances the skills of educators to design curriculum and pedagogy in ways that address global citizenship and educational and human rights.
Credit points: 12  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

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

EDB007 CULTURE STUDIES: INDIGENOUS EDUCATION
Numerous government reports and recent discussions about reconciliation have called for an increased commitment to Indigenous education in Australia. Teachers are increasingly being asked to improve their skill, knowledge and understanding to teach Indigenous students, and to teach curricula which incorporates Indigenous
viewpoints on social, cultural and historical matters. This unit begins with an analysis of the students' own cultural place in the Australian context and afterwards moves towards an understanding of Aboriginal and Torres Strait Islander perspectives on history and contemporary issues, and an understanding of why Aboriginal and Torres Strait Islander students have been so disadvantaged by the Australian education system.

**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Internet, Kelvin Grove and Caboolture  
**Teaching period:** 2010 6TP4 and 2010 SEM-2

**EDB031 SECONDARY FIELD STUDIES 1**

Designated Unit.  
This unit focuses on the 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.

Please note in Semester 2 this unit is ONLY available to students who have previously failed the unit and have received approval from the faculty to be enrolled in the alternate offering. This unit is not available to Visiting or Cross-Institutional students.  
**Prerequisites:** HMB231, HMB292, CLB018, CLB036, CLB021, CLB051, CLB054, MDB015, MDB021, MDB031, or PUB343 (can be enrolled in the same teaching period)  
**Credit points:** 12  
**Contact hours:** 3 per week  
**Campus:** Kelvin Grove  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**EDB032 SECONDARY FIELD STUDIES 2**

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 teachers.  
**Prerequisites:** EDB031, and HMB331, HMB396, CLB019, CLB025, CLB037, CLB022, CLB010, CLB013, CLB016, CLB028, CLB031, CLB034, CLB040, MDB010, MDB013, MDB016, MDB022, MDB025, MDB028, MDB453, or PUB643 (can be enrolled in the same teaching period)  
**Credit points:** 12  
**Campus:** Internet, Kelvin Grove and External  
**Teaching period:** 2010 SEM-2 and 2010 SUM

**EDB033 SECONDARY FIELD STUDIES 3**

Designated Unit.  
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 your classes. Students will be required to argue that their orientations to curriculum, teaching and assessment reflect practices that offer all students access to quality learning experiences.  
**Prerequisites:** EDB032, and HMB431, HMB496, CLB020, CLB026, CLB038, CLB023, CLB053, CLB056, MDB017, MDB023, MDB033, or PUB743 (can be enrolled in the same teaching period)  
**Credit points:** 12  
**Campus:** Internet and Kelvin Grove  
**Teaching period:** 2010 SEM-1 and 2010 SEM-2

**EDB034 SECONDARY FIELD STUDIES 4**

Designated Unit.  
This unit is designed to fully immerse the pre-service teacher into the field with a view to scaffolding their repositioning as an autonomous, critically reflective, inclusive professional teacher on completion.  
**Prerequisites:** EDB033  
**Credit points:** 12  
**Campus:** Internet and Kelvin Grove  
**Teaching period:** 2010 5TP2 and 2010 SEM-2

**EDB035 INTERNSHIP (SECONDARY)**

Designated Unit.  
This unit aims to induct students into the professional work of teachers. The aim of this unit is to apply the knowledge, skills and understandings of teaching and learning that students have acquired throughout the course in an extended time in the workplace.  
**Prerequisites:** EDB034  
**Assumed knowledge:** Completion of all units in your course is assumed knowledge.  
**Credit points:** 12  
**Campus:** Internet and Kelvin Grove  
**Teaching period:** 2010 5TP3 and 2010 SEM-2

**LQB381 BIOCHEMISTRY: STRUCTURE AND FUNCTION**

This unit extends basic organic chemistry theory to the level of the biological macromolecules. A clear understanding of the structure and function of these molecules is essential to a student's understanding of the metabolism of living cells. Hence this biomolecular unit is a fundamental prerequisite for all advanced units in the various disciplines in the field of life sciences.  
**Prerequisites:** (SCB121 and SCB122) or (SCB111 and SCB121) or SCB113  
**Antirequisites:** LSB275 and LSB325 and LSB308  
**Credit points:** 12  
**Contact hours:** 4 per week  
**Campus:** Gardens Point  
**Teaching period:** 2010 SEM-1
LQB383 MOLECULAR AND CELLULAR REGULATION
Molecular and Cellular Regulation is a second year unit and is a continuation and expansion of topics introduced in SCB112 Cellular Basis of Life and SCB122 Cell & Molecular Biology. Molecular and Cellular Regulation strengthens the focus on the molecular and genetic aspects of cellular processes and the consequences to the organism of failure of these basic processes. Topics taught relate to gene structure and regulation in prokaryotes and eukaryotes and the role of gene expression in the development of complex organisms. Related concepts such as cell signalling, communication, proliferation and survival are further developed in this unit.

Prerequisites: SCB122 or LSB238
Antirequisites: LSB468 and LSB338
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1

LQB386 MICROBIAL STRUCTURE AND FUNCTION
Aspects of microbiology impinge upon many facets of daily life, for example, human health, genetic engineering, the food industry and the built and natural environment. The unit introduces you to and provides you with a solid foundation in the basic microbiology required for progression to advanced studies in Microbiology. This unit provides knowledge about safe handling and study of microorganisms that is also very important in many other disciplines, because microorganisms 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, LSB468, LSB483
Assumed knowledge: LSB383 is recommended prior study
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2010 SEM-2

LQB484 INTRODUCTION TO GENOMICS AND BIOINFORMATICS
The completion of the Human Genome project, along with similar projects on other organisms of a prokaryote and eukaryote nature, marked the beginning of a major revolution in fundamental biology that changed our understanding of the natural world. To understand how information on genome structure-function relationships (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
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2010 SEM-2

LQB486 CLINICAL MICROBIOLOGY 1
Micro-organisms are very important as pathogens of humans and animals, and their accurate clinical diagnosis is essential for appropriate treatment and management of infections. This unit builds upon the foundational topics in microbiology that you learned in LQB386 (Microbial Structure and Function) and starts preparing you for a career in a microbiology laboratory in clinical practice, industry or research. The unit will advance your knowledge and skills in classical methods of isolation and identification of bacteria in clinical specimens and introduce aspects of microbial pathogenesis and antibiotic sensitivity. The unit will provide you with an understanding of clinically important viruses, and will commence your training in diagnostic parasitology.

Prerequisites: LQB386 or LSB328
Antirequisites: LSB435, LSB547
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2010 SEM-2
LQB581 FUNCTIONAL BIOCHEMISTRY
This unit will study advanced biochemical concepts with a focus on metabolism, signalling pathways, systems and networks that coordinate and regulate the functional behaviour of cells and tissues.
Credit points: 12  
Contact hours: 5 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1

LQB582 BIOMEDICAL RESEARCH TECHNOLOGIES
This unit will study the technical principles and practical techniques that are essential for advancing research and development in biochemistry and biotechnology.
Credit points: 12  
Contact hours: 4 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1

LQB583 GENETIC RESEARCH TECHNOLOGY
The tools available for the discovery and manipulation of new genes are increasing exponentially and, in turn, this is having a significant impact in many areas of the life sciences. The true potential for this ultimately relies on the ability to link genes and their function. There are many strategies, both targeted and global, which facilitate an understanding of gene and genome structure function relationships. These strategies rely on integrated technologies based on molecular genetics, molecular biology and genetic engineering. The identification of function leads then to unlimited potential for detection and manipulation of these genes in human, animal and plant systems.
Prerequisites: LQB483  
Credit points: 12  
Contact hours: 4 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1

LQB584 MEDICAL CELL BIOLOGY
This unit builds and extends the understanding of basic theoretical and practical aspects of molecular cell biology developed in previous cell and molecular biology units. Medical Cell Biology develops and extends the context of the cellular environment and its central role within the organism providing all of the biological functions required by the organism to survive, defend and protect itself from disease and trauma. An understanding of cell biology theory and molecular mechanisms of animal development and disease is essential for introduction to higher level units in medical biotechnology.
Prerequisites: LQB383 or LSB338  
Antirequisites: LSB449, LSB503, LSN584  
Credit points: 12  
Contact hours: 4 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1

LQB585 PLANT GENETIC MANIPULATION
The potential of plant biotechnology can only be recognised as a result of the significant advances being made in technologies enabling the genetic manipulation of plants.
Familiarity with the strategies, techniques and breadth of applications is essential as a basis for anyone planning a career in plant biotechnology. The unit is designed with a significant emphasis on achieving technical expertise in plant genetic manipulation and control of gene expression.
Credit points: 12  
Contact hours: 4 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1

LQB586 CLINICAL MICROBIOLOGY 2
TBA
Credit points: 12  
Contact hours: 4 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1

LQB587 APPLIED MICROBIOLOGY 1: WATER, AIR AND SOIL
Issues relating to microbial populations within the environment are of great interest and relevance to the community, and also to scientists. Building on the foundation of basic microbiology, in this advanced level unit you will gain a strong understanding of the nature of microbial populations in water, air and soil, and their importance to the human population. This unit is issues-based, encouraging a problem solving approach as you investigate/study microbial pollution, bioremediation, biogeochemical cycles and a healthy environment. You will gain knowledge and skills in analysis and interpretation of water, air and soil populations, which will permit you to investigate real-world problems.
Prerequisites: LQB386, LSB328, or LSB492  
Equivalents: LSB528  
Credit points: 12  
Contact hours: 4 per week  
Campus: Gardens Point  
Teaching period: 2010 SEM-1

LQB682 PROTEIN BIOCHEMISTRY AND BIOENGINEERING
This unit is designed to give you the essential concepts and techniques driving research and industrial biotechnology so that you will be equipped for multiple careers in the biological sciences. The skills you develop will allow you to enter a practical laboratory environment or to apply your knowledge in related areas of evaluations of technologies and intellectual property.
Prerequisites: LQB381 or LSB308 or LSN101and LSN102  
Antirequisites: LSB605, LSB608  
Credit points: 12  
Contact hours: 5 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: 4 per week  Campus: Gardens Point  Teaching period: 2010 SUM-2, 2010 SEM-1 and 2010 SEM-2

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

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

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

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

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

Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics 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, 2010 SEM-2 and 2010 SUM

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 MAB21 or MAB22 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 SEM-2

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

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

**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:** MAB113  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-1

**MAB315 OPERATIONS RESEARCH 2**
This unit introduces the essential features of operations research methods. It develops a number of basic mathematical techniques to solve generic problems and the theoretical foundations of these techniques. Students should develop the ability to apply various operations research methods, algorithms and techniques in the solution of practical problems. Students will also look at the applications of operations research techniques to real-world problems.  
**Prerequisites:** MAB210 and (MAB112 or MAB122)  **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:** MAB413  **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:** MAB422  **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

**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-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

**MDB021 MATHEMATICS CURRICULUM STUDIES 1**
Teachers of middle and secondary school mathematics need a range of understandings and skills to be effective practitioners in the complex social and technological environment of the classroom. This unit introduces students to the teaching and learning of mathematics at the secondary school level. It begins development of students' knowledge and understanding of the secondary mathematics curriculum and their curriculum development skills. The unit is an important component of preparation for Field Studies 1.

**Assumed knowledge:** 24 credit points in Mathematics discipline studies is assumed knowledge.    **Credit points:** 12    **Contact hours:** 3 per week    **Campus:** Kelvin Grove    **Teaching period:** 2010 SEM-1

**MDB023 MATHEMATICS CURRICULUM STUDIES 3**
This unit extends students' knowledge and understanding of mathematics curriculum with an emphasis on catering for the range of students engaged in secondary education, inclusive practices and diagnosis of mathematical learning difficulties.

**Prerequisites:** MDB022 or MDB453 (can be enrolled in the same teaching period)    **Credit points:** 12    **Campus:** Internet and Kelvin Grove    **Teaching period:** 2010 SEM-1

**MDB031 SCIENCE EDUCATION CURRICULUM STUDIES 1**
This unit is to provide you with opportunities to examine praxis in science classrooms in order to help you develop principles for the establishment and management of effective science learning environments.

**Assumed knowledge:** 24 credit points in discipline studies from any of the following is assumed knowledge: Biology, Chemistry, Earth Science, Physics, and Science Studies.    **Credit points:** 12    **Campus:** Kelvin Grove    **Teaching period:** 2010 SEM-1

**MDB033 SCIENCE EDUCATION CURRICULUM STUDIES 3**
This unit is to provide opportunities for you to develop an understanding of the theoretical underpinnings of a selection of strategies and resources used in the teaching of science.

**Prerequisites:** MDB010 or MDB013 or MDB019 or MDB025 or MDB028    **Credit points:** 12    **Campus:** Internet and Kelvin Grove    **Teaching period:** 2010 SEM-1

**MDB454 SCIENCE, TECHNOLOGY AND SOCIETY**
This unit investigates the interactions and effects that exist between modern science, technology and society both from a social and historical viewpoint. Advances such as the advent of the Internet, genetic modification and
nanotechnology are discussed within a context of globalization, global communications and social change. The unit also includes a study of the nature of science and technology and the nature of scientific knowledge. A major feature of the unit involves groups of students developing and delivering 'a hypothetical' on a contemporary science and technology issue affecting society.

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

**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-1

**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 is a foundation unit for the Earth and Environmental Sciences as well as Ecology, Biological Sciences and Education.

**Equivalents:** NRB240  **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 the detailed processes of the range of features. Sedimentology and geologic time. 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 is a foundation unit for the Earth and Environmental Sciences as well as Ecology, Biological Sciences and Education.

**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 the dual role of providing a thorough grounding in ecology for students from all faculties; and laying the conceptual foundation for later subjects in the ecology and environmental science.

**Prerequisites:** SCB110 or SCB112  **Equivalents:** NRB311  **Credit points:** 12  **Contact hours:** 4 per week
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

NQB423 VERTEBRATE BIOLOGY
Any graduate wishing to pursue a career in the biological or environmental sciences should be familiar with the evolution and ecology of vertebrates. Vertebrates are often considered key wildlife species and are often the focus of conservation efforts. However, we use vertebrates for food, recreation, work, and medical research, and they are also pests and vectors of disease. This unit will examine the evolutionary diversity of the major groups of both extinct and extant vertebrates, and apply concepts relating to their phylogeny, morphology, physiology and behaviour. Practicals will provide an opportunity to observe and understand form, function and diversity and to develop skills in identification of Australian vertebrates.

Prerequisites: SCB112  Equivalents: NRB470  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:

NRB601  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

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

PQB250 MECHANICS AND ELECTROMAGNETISM
The experimental means by which we have arrived at our modern understanding of the universe is central to the scientific philosophy. Students of physics and physics related areas need to possess skills in quantitative handling, processing, communication and evaluation of data. Higher level studies in specialised areas of Physics require a familiarity with a range of fundamental topics in Physics and an ability to apply critical thinking and advanced
mathematical techniques to the analysis and solution of Physical problems. This first-level unit lays the foundation for these higher level studies by introducing the fundamental topic areas of mechanics and electromagnetism. **Assumed knowledge:** Senior Maths B is assumed knowledge. **Credit points:** 12  **Contact hours:** 4.5 hours per week  **Campus:** Gardens Point  **Teaching period:** 2010 SEM-2

**PQB251 WAVES AND OPTICS**

Wave phenomena are used to describe and explain many of the physical processes in the universe. Sound and light are the most commonly experienced of these and have far-reaching human applications, including their use as experimental tools for science. The study of wave phenomena has led to the development of quantum mechanics, a cornerstone of modern scientific thought. This first-level unit lays the foundation for discussion of wave phenomena in higher level studies, but will also be relevant to those not considering progressing to a Physics major but wishing to understand more of the Physical world in which we live. **Assumed knowledge:** Senior Maths B is assumed knowledge. **Credit points:** 12  **Contact hours:** 4.5 hours per week  **Campus:** Gardens Point  **Teaching period:** 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

**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

**PQB350 THERMODYNAMICS OF SOLIDS AND GASES**

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

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
TBA

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

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, nanotechnology and materials research and development.
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

### PQB651 EXPERIMENTAL PHYSICS

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 counterpoint, you will explore the breadth of philosophical developments underlying our search for knowledge; fundamental thoughts and ideas that span the last 2,500 years of human history. Ultimately, these concepts evolved through the development of a scientific method and we explore its workings in relation to the ongoing enterprise of human understanding.

**Credit points:** 12  
**Contact hours:** 4.5 per week  
**Campus:** Gardens Point  
**Teaching period:** 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). SCB111 can be studied in the same teaching period.  
**Antirequisites:** SCB113  
**Credit points:** 12  
**Contact hours:** 4.5 per week
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 of the molecular basis of the cell. This unit expands on the basic principles and concepts relating to cell structure, function, perpetuation and specialisation introduced in SCB112 and introduces students to fundamental molecular mechanisms central to the organisation of the cell. Students will be shown how macromolecular interactions are crucial to information flow and heredity. Students are taught the relationships between chromosomes, genes and cellular function and ultimately how these may determine an organism's phenotype. This unit underpins cell biology and molecular biology units that are offered in second year Life Science units. SCB122 is also ideal for interfaculty students (eg Education, Business, Arts) who will undertake no further life science studies.
Prerequisites: SCB112  Antirequisites: LSB238
Credit points: 12  Contact hours: 4.5 per week
Campus: Gardens Point  Teaching period: 2010 SEM-2

SCB123 PHYSICAL SCIENCE APPLICATIONS
Physics principles underpin all of the sciences and ‘new technologies’. This unit adopts an investigative team-based approach to provide students with an appreciation of fundamental concepts in physical science, together with experience in the application of these concepts to a range of ‘real world’ problems. The unit should be taken in the first year of study as the fundamental principles introduced here will be built upon in later units in the context of each science student’s major discipline area. Employers in cutting-edge industries expect science graduates to have effective strategies for problem solving, skills for collaborative work and scientific communication and research skills. This unit aims to develop these skills by applying the fundamental concepts of physical science to problems in a team environment.
Credit points: 12  Contact hours: 4.5 per week
Campus: Gardens Point  Teaching period: 2010 SEM-2

SCB131 EXPERIMENTAL CHEMISTRY
A study of chemistry and related disciplines such as medical science, biochemistry, molecular biology and pharmacy requires the development of practical laboratory skills used in synthesis and chemical analysis. This unit is a laboratory-based unit which is designed for students who intend to continue with experimental science units. The lectures complement the weekly practical sessions and teach the theory required to interpret experimental results.
Prerequisites: SCB111 or SCB113  Corequisites: SCB121 unless SCB113 has been successfully completed
Credit points: 12  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

SPB006 EDUCATIONAL COUNSELLING
This unit includes the following: the nature of counselling/helping in educational contexts; the educator as counsellor; characteristics of effective helpers; practical development of communications skills; building an empathic relationship; structuring the counselling process; application of some counselling theories to the educational contexts; practical sessions using educationally based role plays to demonstrate effective use of the skills learned. The unit includes a compulsory study school for external students. It is incompatible with studies in Counselling or equivalent at Diploma of Teaching level.
Antirequisites: SPN651  Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1 and 2010 SEM-2

SPB012 CLASSROOM AND BEHAVIOUR MANAGEMENT
This unit integrates concepts of behaviour development, management and discipline within a defensible pattern of classroom management and appropriate curricula processes.  
Credit points: 12  Campus: Internet, Kelvin Grove, External and Caboolture  Teaching period: 2010 SEM-1, 2010 6TP4, 2010 SEM-2 and 2010 SUM

SPB018 TEACHING STRATEGIES
This unit includes: evaluation of the students’ teaching strategies; the literature on teaching strategies; critical evaluation of strategies/models of teaching available.  
Credit points: 12  Contact hours: 3 per week  Campus: Kelvin Grove  Teaching period: 2010 SEM-1

SPB020 CLASSROOM ASSESSMENT PRACTICES
This unit includes: examination of the nature and purpose of assessment; traditional and contemporary developments in the assessment of students in a range of settings; test construction and validation; record keeping and reporting,
with emphasis on practical applications by practising teachers.

**Credit points**: 12    **Contact hours**: 3 per week    **Campus**: Internet, External and Caboolture    **Teaching period**: 2010 SEM-1, 2010 6TP4 and 2010 SEM-2