Bachelor of Technology Innovation (Biomedical Science) (ST50)

Year offered: 2010
Admissions: Yes
CRICOS code: 070694G
Course duration (full-time): 4 years
Domestic fees (indicative): 2010: CSP $2,125 (indicative) per semester
International Fees (indicative): 2010: $11,750 (indicative) per semester
Domestic Entry: February
International Entry: February and July
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
Total credit points: 384
Standard credit points per full-time semester: 96
Course coordinator: Associate Professor Chris Collet
Campus: Gardens Point

Overview
Biomedical science is the study of the medical and clinically oriented biological sciences.

Career Outcomes
Graduates can build careers in the world of commercialisation and technology transfer of research innovation and complex emerging technologies pertaining to their specific discipline and beyond. Graduates could pursue careers in all aspects of the new product development continuum including business development officers, venture capital associates, investment analysts, commercialisation managers, technology transfer officers, intellectual property analysts, policy development officers and, of course, research scientists.

Biomedical Science Major Course Structure

Year 1, Semester 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAB141</td>
<td>Mathematics and Statistics for Medical Science</td>
</tr>
<tr>
<td>SCB110</td>
<td>Science Concepts and Global Systems</td>
</tr>
<tr>
<td>SCB111</td>
<td>Chemistry 1</td>
</tr>
<tr>
<td>SCB112</td>
<td>Cellular Basis of Life</td>
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Year 1, Semester 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>LSB255</td>
<td>Human Anatomy</td>
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Year 2, Semester 1

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PCB150</td>
<td>Physics 1H</td>
</tr>
<tr>
<td>SCB121</td>
<td>Chemistry 2</td>
</tr>
<tr>
<td>SCB122</td>
<td>Cell and Molecular Biology</td>
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Year 2, Semester 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>LQB383</td>
<td>Molecular and Cellular Regulation</td>
</tr>
<tr>
<td>LQB386</td>
<td>Microbial Structure and Function</td>
</tr>
<tr>
<td>LQB388</td>
<td>Medical Physiology 1</td>
</tr>
<tr>
<td>LSB325</td>
<td>Biochemistry</td>
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Year 3, Semester 1

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BSB115</td>
<td>Management</td>
</tr>
<tr>
<td>STB551</td>
<td>Engaging with the Innovation Industry</td>
</tr>
<tr>
<td></td>
<td>Plus any TWO of the following units</td>
</tr>
<tr>
<td>LQB583</td>
<td>Genetic Research Technology</td>
</tr>
<tr>
<td>LQB584</td>
<td>Medical Cell Biology</td>
</tr>
<tr>
<td>LQB586</td>
<td>Clinical Microbiology 2</td>
</tr>
<tr>
<td>LSB525</td>
<td>Clinical Biochemistry 1</td>
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<tr>
<td></td>
<td>One University Wide Unit elective</td>
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</tbody>
</table>

Year 3, Semester 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>BSB126</td>
<td>Marketing</td>
</tr>
<tr>
<td>MGB223</td>
<td>Entrepreneurship and Innovation</td>
</tr>
<tr>
<td></td>
<td>Plus any TWO units of the following units</td>
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<tr>
<td></td>
<td>provided the prerequisites are met:</td>
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<tr>
<td>LQB488</td>
<td>Medical Physiology 2</td>
</tr>
<tr>
<td>LQB684</td>
<td>Medical Biotechnology</td>
</tr>
<tr>
<td>LSB625</td>
<td>Clinical Biochemistry 2</td>
</tr>
<tr>
<td>LSB658</td>
<td>Clinical Physiology</td>
</tr>
<tr>
<td></td>
<td>One University Wide Unit elective</td>
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</table>

Year 4, Semester 1

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>AMB240</td>
<td>Marketing Planning and Management</td>
</tr>
<tr>
<td>LWS007</td>
<td>Introduction To Intellectual Property Law</td>
</tr>
<tr>
<td>MGB324</td>
<td>Managing Business Growth</td>
</tr>
</tbody>
</table>

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STB709-1  Innovation and Commercialisation Project
Year 4, Semester 2

BSB311  Innovation Commercialisation Strategies
MGB225  Intercultural Communication and Negotiation Skills

STB709-2  Innovation and Commercialisation Project
STB709-3  Innovation and Commercialisation Project

UNIT SYNOPSES

AMB240 MARKETING PLANNING AND MANAGEMENT
This unit extends the student’s knowledge of the fundamental marketing concepts and theories introduced in the Faculty Core unit in Marketing, by adding further breadth and depth of knowledge of marketing and developing skills in the application of this knowledge to marketing planning and management within the business environment. Emphasis is on the role of the marketing manager at the product management level in undertaking analysis, planning, implementation and control of marketing activities. 
Prerequisites: BSB126 or CTB126  Equivalents: CTB240  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point and Caboolture  Teaching period: 2010 SEM-1 and 2010 SEM-2

BSB115 MANAGEMENT
The unit provides an introduction to the theories and practice of management and organisations. Emphasis is on the conceptual and people skills that are needed in all areas of management and in all areas of organisational life. The unit acknowledges that organisations exist in an increasingly international environment where the emphasis will be on knowledge, the ability to learn, to change and to innovate. Organisations are viewed from individual, group, corporate and external environmental perspectives.
Antirequisites: BSD115  Equivalents: CTB115  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point and Caboolture  Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

BSB126 MARKETING
This introductory subject examines the role and importance of marketing to the contemporary organisation. Emphasis is placed on understanding the basic principles and practices of marketing such as the marketing concept, market segmentation, management information systems and consumer behaviour. The unit explores the various elements of the marketing mix, with special reference to product, price, distribution, and promotion, including advertising and public relations. By way of introduction only, key issues relating to services marketing, e-marketing and strategic marketing are also canvassed.
Antirequisites: BSB116  Equivalents: CTB126  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point and Caboolture  Teaching period: 2010 SEM-1, 2010 SEM-2 and 2010 SUM

BSB311 INNOVATION COMMERCIALISATION STRATEGIES
Students study strategies and approaches used in industry and government organisations for the research, development and commercialisation of biotechnology innovations. The unit offers the opportunity to read widely as well as in depth about the commercialisation of molecular biology and biotechnology research. Theoretical concepts are integrated with prepared case studies prior to guest speaker seminars.
Prerequisites: BSB310 or MGB223  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

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)
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

LSB435, LSB547

Contact hours: 4 per week

Campus: Gardens Point

Teaching period: 2010 SEM-2

**LQB488 MEDICAL PHYSIOLOGY 2**

This unit deals specifically with the physiological systems that are responsible for the maintenance of health in humans. In the course of the semester students will investigate half the systems that constitute the human body (with the remainder dealt with in the second semester unit Physiology 2 [LQB488]). The unit offers a useful frame of reference for students enrolled in courses such as animal biology, biochemistry, microbiology, molecular biology, nutrition and human movements. Together with Physiology 2 [LQB488] this unit is a prerequisite to the third level unit, Applied Physiology [LQB588] and will be of particular interest to students considering medicine as a postgraduate career option.

**Prerequisites:** SCB120, LSB131, LSB142, LSB255, LSB258 or NRB270

Antirequisites: LSB358

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, LSB648, 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 (i.e. bioinformatics) is being used in areas such as gene discovery, disease diagnosis and drug development, students need to understand how the information content of
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

**LQB586 CLINICAL MICROBIOLOGY 2**
TBA

**LSB255 HUMAN ANATOMY**
The medically oriented biological scientist requires a detailed understanding and knowledge of human anatomy. This unit exposes the student to the theoretical and practical facets of both microscopic and macroscopic anatomy of the human body with the emphasis on the microscopic anatomy.

**Prerequisites:** SCB112 or LSB118  Antirequisites: LSB152  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

**LSB325 BIOCHEMISTRY**
The study of biochemistry and cell biology, along with anatomy and physiology, provides students with the knowledge required for the proper understanding of the structure and function of the human body and its organ systems in health and disease, as a preparation for their clinical studies.

**Prerequisites:** SCB121 or SCB113  Antirequisites: LSB275, LQB381, LQB481  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

**LSB425 QUANTITATIVE MEDICAL SCIENCE**
This unit integrates physics, chemistry, biochemistry, maths and statistics for applications to chemical analysis, as preparation to clinical biochemistry.

**Prerequisites:** LSB325 and MAB141  Antirequisites: LSN425  Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2

**LSB525 CLINICAL BIOCHEMISTRY 1**
This course of study (along with LSB625 Clinical Biochemistry 2) provides the graduating students with sufficient biochemical knowledge and laboratory experience to work effectively in both the smaller general-purpose laboratory performing a limited number of biochemical tests and the larger specialised laboratory performing in-depth studies of all aspects of clinical biochemistry.

**Prerequisites:** LSB425  Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2010 SEM-1

**LSB625 CLINICAL BIOCHEMISTRY 2**
This course of study (along with LSB525) provides the graduating scientists with sufficient biochemical knowledge and laboratory experience to work effectively in both the smaller general-purpose laboratory performing a limited number of biochemical tests and the larger specialised laboratory performing in-depth studies of all aspects of clinical biochemistry.

**Prerequisites:** LSB525  Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2010 SEM-2
LSB658 CLINICAL PHYSIOLOGY
In this unit students explore the physiological basis, pathogenesis, clinical features and treatment rationale of the major disorders of the cardiovascular, respiratory, haematological, renal, gastrointestinal, nervous and endocrine systems. One of the objectives of the unit is to develop critical thinking and apply this to the discussion of pathophysiological cases.
Prerequisites: (LSB255 or LSB142 or LSB131) AND (LQB388 or LSB250 or LSB451 or LSB231)
Corequisites: LQB488
Assumed knowledge: Students should enrol in LQB488 in the same semester if not previously completed
Credit points: 12
Contact hours: 5 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1

LWS007 INTRODUCTION TO INTELLECTUAL PROPERTY LAW
Intellectual property protection is undeniably of paramount importance in the research, development and commercialisation of emerging technologies. Managers and researchers need to be aware of the different types of property that can be protected and how the property needs to be protected. There have also been significant developments in the field of intellectual property law in recent years. The concepts taught in Introduction to Intellectual Property Law are of significant relevance to persons intending to practice in the emerging fields of science.
Credit points: 12
Contact hours: 3 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1

MAB141 MATHEMATICS AND STATISTICS FOR MEDICAL SCIENCE
This unit includes: mathematics (functions, limits and continuity; differentiation of functions and applications of differentiation; solutions of equation by iteration; interpolation methods; integration and applications of integration); statistics (data collection; exploring, presenting and modelling data; Normal distribution; hypothesis testing and confidence intervals for means and proportions; one-way and two-way ANOVA; simple and multiple regression; design of experiments). These topics are presented in the context of medical science. Students must have completed four semesters of Senior Mathematics B with an exit level of Sound Achievement or better, or have passed MAB105.
Antirequisites: MAN101
Assumed knowledge: Grade of at least Sound Achievement in Senior Mathematics B (or equivalent) or MAB105 is assumed knowledge.
Equivalents: MAB140
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2010 SEM-1

MGB223 ENTREPRENEURSHIP AND INNOVATION
This unit introduces students to the nature and characteristics of entrepreneurship and innovation and explores the inter-relationship between the two within contemporary economies from managerial perspective. Learning will be directed towards developing the theoretical and applied knowledge, skills, and attitudes that will support and enhance innovation and enterprise creation activity, through the development of a business plan. The unit is designed for those individuals interested in creating a new venture or working in industries as employees of venture owners or those that serve this sector. Students will have opportunity to build a comprehensive plan of their business concept.
Prerequisites: BSB115 or CTB115
Equivalents: CTB223
Credit points: 12
Contact hours: 3 per week
Campus: Gardens Point and Caboolture
Teaching period: 2010 SEM-1 and 2010 SEM-2

MGB225 INTERCULTURAL COMMUNICATION AND NEGOTIATION SKILLS
The course develops students' abilities to identify and resolve problems in cross-cultural communication or negotiation situations where cultural differences have created misunderstandings or undesirable or unexpected outcomes. It first explores the concept of 'national culture' by considering the work of major theorists of cultural value dimensions - from Hall to Schwartz. Students are encouraged to analyse communication/negotiation process issues in terms of these value dimensions and to practise managing the process of communication/negotiation to improve their outcomes.
Prerequisites: BSB115, CTB115, BSB119 or BSB124
Antirequisites: MGB312
Credit points: 12
Contact hours: 3
Campus: Gardens Point
Teaching period: 2010 SEM-1 and 2010 SEM-2

MGB324 MANAGING BUSINESS GROWTH
This unit is designed to provide skills in the analysis, solutions and implementation of the general management issues that SME owners have to manage in their growing operations. The unit brings together the different functional aspects of managing an established SME and how they are best managed from the owner's (general manager's) point of view. It also provides opportunity to bring students into contact with real world SME owners and their venture management issues.
Prerequisites: MGB223
Equivalents: MGB218
Credit points: 12
Contact hours: 3
Teaching period: 2010 SEM-1

PCB150 PHYSICS 1H
This unit introduces basic physical measurements, mechanics, heat, waves, acoustics and optics, and the instrumentation used to measure physical parameters.
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 underling 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 and 2010 SEM-2

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.

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

SCB121 CHEMISTRY 2
Chemistry is the central science. This is a unit of fundamental importance as it covers the background and general principles that underpin understanding in many Science and Health related disciplines, particularly in regards to the chemistry of life. In this unit students will be introduced to fundamental aspects of chemistry including the electronic structure of atoms, chemical bonding and molecular structure. From this basis students will develop an understanding of the fundamentals of organic chemistry including chirality, functional groups and organic reactions which will lead to important bio-inorganic molecules and coordination complexes.

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

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

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