Bachelor of Science (Biological Sciences) (ST01)

Year offered: 2013
Admissions: Yes
CRICOS code: 077696D
Course duration (full-time): 3 years
Course duration (part-time): 6 years
Domestic Fees (indicative): 2013: CSP $4,200 (indicative) per Semester

Student Services and Amenities Fee
You’ll need to pay the Student Services and Amenities Fee (SSAF) as part of your course costs. More information on the SSAF - http://www.student.qut.edu.au/fees-and-finances/study-costs/fee-schedule/table-1-student-services-and-amenities-fee

Start month: February, July
Commencement notes: Only the first year of the degree will be available in 2013. Subsequent years will be progressively introduced, subject to approval. If you are offered a second or third year place you will be admitted to SC01 Bachelor of Applied Science.

QTAC code: 418011
Past rank cut-off: 72
Past OP cut-off: 13
OP Guarantee: Yes
Deferment allowed: Yes
Total credit points: 288
Standard credit points per full-time semester: 48
Standard credit points per part-time semester: 24
Course coordinator: Dr Ian Williamson
Campus: Gardens Point
Attendance: Full-time

Assumed knowledge: Maths B, English
Assumed knowledge notes: We assume that you have knowledge equivalent to four semesters at high school level (Years 11 and 12) with sound achievement (4, SA). Recommended Study: Biology and Chemistry. For information on acquiring assumed knowledge visit http://www.qut.edu.au/assumed-knowledge

Course highlights
- Combine theory and practice in plant and animal biology across study areas including conservation, food security and biotechnology.
- Choose from a wide range of second study areas to diversity to your studies.
- Learn from teaching staff at the top of their research fields internationally in key areas of biology.
- Gain real-world insight and experience with industry guest lectures, site visits and work experience opportunities.
- Access our new multimillion dollar research and teaching facilities, including our new $230M Science and Engineering Centre.
- Prepare yourself for a wide range of career options, from cell biology, biochemistry and ecology to food production and zoology.

Details:
Biological science is the study of life and living things: animals, insects, plants, and microorganisms; everything that breathes, grows and feeds us; creatures that fly through the air majestically and those that lurk in the depths of the ocean, under rocks, or even under the toilet seat.

Biologists are curious about all these things and want to know how they work, how to grow and protect them—how to get involved with life on this planet. Biologists also love a challenge. How will we feed a population of eight billion people in 2025? Can we use biological waste to solve our energy crisis? How can we protect our plants and animals from new and fiendish exotic diseases? And how many rare species can we save from extinction?

Why choose this course?
If you’re seeking a course that combines your curiosity, reasoning, technical know-how, vision and imagination, with a passion for life and living things, the Biological Sciences major is designed for you.

This course will provide broad and applied knowledge in general biology to equip you with an understanding of the diversity of living things, from simple cells to whole organisms. You will also have opportunities to develop a depth of knowledge in the key areas of plant and animal biology and their interaction with each other and the environment.

By integrating theory and practice with a strong focus on experimental design, you will apply key biological principles to important areas such as conservation, food security and biotechnology. You will also have the opportunity to get an early taste of a real research project in these or other key areas of biology through our Vacation Research Experience Scholarships.

As a Biological Sciences graduate, you will be equally skilled at the desk, in the laboratory and in the field and will have the critical thinking ability needed to tackle real-world problems in biology. You will also be able to communicate the importance of biology and biological concepts, as well as understand how biology interfaces with other disciplines.

As well as receiving core training in the basics through the biology major, students can either add breadth to their
degree by choosing a minor from a complementary discipline (e.g. chemistry), or depth to their biological skills through a specialised minor such as biotechnology. During the course you will gain experience in some of the most advanced laboratories in Australia and be taught by staff at the top of their research fields internationally. You can also expect to stay in touch with the real world, as guest lectures, site visits and opportunities for work-integrated learning bring a strong industry flavour to the degree.

Throughout your course, you will be exposed to cutting edge research and have the opportunity to work and develop links with industry partners and research groups. You can also gain real work experience through our Work Integrated Learning program, or study a semester overseas as part of your degree.

**Career outcomes**

Your breadth of skills in experimental design, both in the laboratory and the field, and a strong focus on application to real world problems in biology will prepare you for a range of employment and career pathways.

Biological Science graduates are employed across a variety of industries in the more traditional biology areas such as cell biology, biochemistry and ecology, as well as in cutting edge areas of biotechnology and genomics. Career opportunities in research, education and monitoring are available in a range of government organisations and private companies working with food production, pharmaceutical industries, genetics, botany and zoology, and many other areas.

Laboratory-based careers may include laboratory management, basic research, forensic microbiology, or molecular genetics. Farm and field-based work could entail animal management, plant breeding, entomology, marine biology, or pest and disease management. Industrial work might involve biotechnology to produce food, fuel or pharmaceuticals. Other careers could involve science writing, teaching, policy development, or the commercialisation and the management of biological products and processes.

**Professional recognition**

As a Biological Sciences graduate you will be eligible to join a number of professional associations such as the Genetics Society of Australasia, the Ecological Society of Australia, and the Australian Society for Biochemistry and Molecular Biology.

**Studied at university or TAFE before?**

Bachelor of Science is a new course, and we’re only offering first year units in 2013. This means if you’re offered a place in 2013 and you’re eligible for at least the first year of credit for prior learning (advanced standing), you’ll be admitted to Bachelor of Applied Science (SC01).

**Structures and Units**

**Your science degree**

At QUT you’ll create your own personal science degree program of 24 units. During your first year of study you’ll get to sample a range of core science disciplines, allowing you to decide on your major later.

**Faculty core and Imagine Science units**

These six units give you an introduction to the principles of science the opportunity to learn by enquiry, and to broaden your understanding of the core sciences. You’ll study two Faculty core units, two Imagine Science units and two Optional units of your choice.

From your very first semester, you will collaborate with your peers and teaching staff in QUT’s exciting new learning environments. In your Imagine Science units you will explore real-world problems from multiple scientific perspectives and learn the tools of the trade. Depending on your choices, you may find yourself out in the field, working in the laboratory or learning about the impact of scientific discovery on people, policy, industry and the planet.

Working with data you have collected, you’ll study how to apply fundamental methods of scientific practice, perform scientific analysis, and learn the tools to present your findings. You’ll have the opportunity to explore and discover the range of career and professional outcomes available to you, so you can gain the most from your unit selection and the flexibility the Bachelor of Science has to offer.

**Primary major**

Your major is your main area of study for what you aspire to become professionally. You will receive in-depth knowledge and expertise within your chosen scientific discipline, preparing you for entry into the workforce or further study. It comprises 10 units and there are five majors to choose from:

- Biological Sciences
- Chemistry
- Earth Science
- Environmental Science
- Physics

**Complementary study areas**

This is where you make the degree your own, tailoring your studies to further match your individual career goals with a wide range of complementary study options available. You’ll have the opportunity to develop sought-after professional skills, deepen your understanding of your major discipline, pursue an interest from across the university, or broaden your scientific understanding. You can even work with
industry or study overseas to gain credit towards your degree. You can choose: a Second major (eight units); or an Extended minor (four units) or Breadth minor (four units), plus either a Faculty minor (four units) or Breadth minor (four units).

**Second major (eight units)**
Choose a second area of study to complement your major, and develop a significant depth of knowledge and skills in two discipline areas. Experience another field, learn another academic methodology and experience interdisciplinary networking.

Choose a second Science discipline, or explore different perspectives which might include:
- computational science
- computer science
- innovation
- education (STEM disciplines)
- science communication, or
- science policy.

**Minor (four units)**
You might prefer to expand the breadth and depth of your studies by adding to your chosen science major with two minors. Minors include:

**Extension minor (four units)**
Gain further insights and depth in your primary area of study. Intensify your chosen major to develop additional knowledge, skills and experience for your career in science.

**Breadth minor (four units)**
Broaden your studies to include minors from the list of science majors, second majors or from the list of University-wide minors.

**Biological Sciences Full-time Course Structure: February Entry**

**Year 1, Semester 1**
- SEB101 Science in Context
- SEB102 Understanding Science
- SEB113 Quantitative Methods in Science
- SEB114 Experimental Science

**Core Unit Option**

**Year 2, Semester 1**
- BVB201 Biological Processes
- BVB202 Experimental Biology

- 2nd major or minor unit
- 2nd major or minor unit

**Year 2, Semester 2**
- BVB203 Plant Biology
- BVB204 Ecology

- 2nd major or minor unit
- 2nd major or minor unit

**Year 3, Semester 1**
- BVB301 Animal Biology
- BVB302 Applied Biology

- 2nd major or minor unit
- 2nd major or minor unit

**Year 3, Semester 2**
- BVB303 Advanced Studies in Biology
- BVB304 Integrative Biology

- 2nd major or minor unit
- 2nd major or minor unit

**Core Unit Options**

**Year 1, Semester 2**
- BVB101 Foundations of Biology
- BVB102 Evolution
- CLB110 Environment and Society
- CLB111 Environmental Hazards
- CVB101 General Chemistry
- CVB102 Chemical Structure and Reactivity
- EDB038 Indigenous Australian Culture Studies
- EDB039 Indigenous Politics and Political Culture
- ERB101 Earth Systems
- ERB102 Evolving Earth
- EVB102 Ecosystems and the Environment
- INB102 Emerging Technology
- INB104 Building IT Systems
- INB270 Programming
- MAB120 Foundations of Calculus and Algebra
Biological Sciences Full-time Course Structure: Mid-year Entry

Year 1, Semester 2
- SEB113 Quantitative Methods in Science
  (SEB113 Co-requisite will be waived for mid-year entry students.)
- BVB101 Foundations of Biology
- BVB102 Evolution

Core Unit Option

Year 2, Semester 1
- SEB101 Science in Context
- SEB102 Understanding Science
  Major unit
  Major unit

Year 2, Semester 2
- Major unit
- Major unit
- 2nd major or minor unit
- 2nd major or minor unit

Year 3, Semester 1
- Major unit
- Major unit
- Core Unit Option
- SEB114 Experimental Science
  OR
  3rd Core Unit Option as approved by the Course Coordinator.

Year 3, Semester 2
- Major unit
- Major unit

UNIT SYNOPSISES

BEB701 WORK INTEGRATED LEARNING 1
This unit aims to provide you with the opportunity to learn in a workplace environment. It will involve attendance, participation, observation, critical reflection, and report writing on workplace activities. The emphasis of your critical reflection and report writing will be on identifying and describing aspects of professional relevance incorporating: collaboration and teamwork; work place, health and safety; professional conduct; ethical responsibility, and other aspects of your work place experience.

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

Assumed knowledge: This unit is not designed for first year students. It is recommended that you check WIL Community Blackboard site for information on enrolment pattern. If you are EN40 student you can only enrol after completing a minimum of 192 cp.

Credit points: 12
Campus: Gardens Point
Teaching period: 2013 SEM-1, 2013 SEM-2 and 2013 SUM

BEB702 WORK INTEGRATED LEARNING 2
This unit aims to provide you with the opportunity to continue to learn in a work place environment. It will involve attendance, participation, observation, and reflection on activities negotiated with the work place supervisor. The emphasis of your critical reflection for this unit is to explicate the culture of the organisation you work for via the profile it presents to its employees, clients and the public and critique the role of an individual in a work place and how this relates to other employees in meeting the organisations aims and objectives.

Credit points: 12
Campus: Gardens Point
Teaching period: 2013 SEM-1 and 2013 SEM-2

BVB101 FOUNDATIONS OF BIOLOGY
Biology is the study of living things. But what is “living”? Cells are considered the basic structural unit of life, existing in diverse forms from simple single-celled microbes to complex multicellular organisms such as plants and animals. Using collaborative approaches in workshops and the laboratory you will investigate the diverse nature of cells and consider how they are built and powered and how they interact and reproduce. You will use the concepts developed in this unit to discuss more complex questions such as “are viruses alive” and “can we synthesise life”? 

**CVB101 GENERAL CHEMISTRY**
Chemistry deals with the fundamental building blocks of our universe. An understanding of chemistry is essential to understanding our world and to addressing big challenges faced by our society. The knowledge and skills you will learn in this unit, complemented by CVB102 Chemical Structure and Reactivity, provide the broad foundation to progress to more specialised topics in analytical, inorganic, and physical chemistry.

**Assumed knowledge:** Successful completion of year 12 Chemistry or equivalent

**Equivalents:** SCB112

**Credit points:** 12

**Campus:** Kelvin Grove

**Teaching period:** 2013 SEM-2

CVB102 CHEMICAL STRUCTURE AND REACTIVITY
Chemistry relates to all aspects of our lives. An understanding of chemistry is needed to make sense of our world and to address big challenges faced by our society. Together with its companion unit General Chemistry, this unit provides you with a foundation in the science of Chemistry. It builds on the fundamental scientific concepts and skills introduced in first semester. For Chemistry majors, it provides grounding in the sub-discipline of organic chemistry that you will encounter in second and third year. For students majoring in Biology, it provides the chemical framework necessary for the understanding of the behaviour of organic molecules in complex biological systems.

**Equivalents:** SCB121

**Credit points:** 12

**Campus:** Gardens Point

**Teaching period:** 2013 SEM-2

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**Assumed knowledge:** Successful completion of year 12 Chemistry or equivalent

**Equivalents:** SCB111

**Credit points:** 12

**Campus:** Gardens Point

**Teaching period:** 2013 SEM-2

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**Equivalents:** SCB121

**Credit points:** 12

**Campus:** Gardens Point

**Teaching period:** 2013 SEM-2

**EDB038 INDIGENOUS AUSTRALIAN CULTURE STUDIES**
This unit encourages an appreciation of the two distinct indigenous cultures of Australia and how external forces to Aboriginal and Torres Strait Islander cultures caused social, economic and political changes. It looks at traditional family life and organisation.

**Credit points:** 12

**Campus:** Kelvin Grove

**EDB039 INDIGENOUS POLITICS AND POLITICAL CULTURE**
This unit examines issues and influences underlying the world of indigenous politics: political representation; land rights; health; education; community development; criminal justice; culture and heritage. This unit has an Australian focus with New Zealand and North American comparisons.

**Credit points:** 12

**Campus:** Kelvin Grove

**ERB101 EARTH SYSTEMS**
In ERB101 Earth System you will focus on the key components of our planet – the lithosphere, hydrosphere, and atmosphere. The focus will be on these large-scale processes and how these systems interact and determine the landscapes we live on, how they change in time and the
potential impacts on society. This provides a fundamental introduction to Earth Sciences, building on the knowledge and skills developed through Semester 1, and prepares you for more in depth exploration of Earth evolution, natural hazards, environmental management, resource sustainability and climate change.

Equivalents: NQB201  Credit points: 12  Campus: Gardens Point  Teaching period: 2013 SEM-1 and 2013 SEM-2

ERB102 EVOLVING EARTH
In ERB102 Evolving Earth you will focus on key events in the history of our planet – the formation of our planet, the concept of geologic time, the origin of the oceans and atmosphere and the evolution of life. You will learn about the connections between the evolution of life and geological processes and events, to appreciate the complexity of life that exists on Earth today. This provides a fundamental introduction to evolution and geological time, building on the knowledge and skills developed through Semester 1, Imagine Science, and prepares you for more in depth exploration of Earth system connectivity, natural hazards, environmental management and climate change.

Equivalents: NQB202  Credit points: 12  Campus: Gardens Point  Teaching period: 2013 SEM-2

EVB102 ECOSYSTEMS AND THE ENVIRONMENT
In EVB102 Ecosystems and the Environment you will focus on broad-scale factors that shape ecological systems to assess ecosystem change and human impacts on the environment. As well as providing an introduction to the science of ecology, this unit further develops foundation knowledge and skills developed through Semester 1, and prepares you for the exploration of global environmental issues.

Credit points: 12  Campus: Gardens Point  Teaching period: 2013 SEM-2

INB102 EMERGING TECHNOLOGY
The aim of this unit is to provide you with a conceptual framework to understand the technologies that enable IT. This will be a fun exploration of a wide spectrum of ideas where we will examine some currently popular technologies, their history and their future. Information Technology has become so entwined with everyday life that identifying its scope is difficult, which also makes it difficult to identify opportunities where IT might further infiltrate into our daily lives for work and play. To achieve these aims, the unit introduces you to some of the theories and engineering practicalities that have produced recent technological advances in IT. Concepts leading to existing technologies are introduced during lectures, which are followed by laboratory sessions where you will be encouraged to discuss social change, future information tools and explore the concepts required for constructing these technologies.

Equivalents: ITB005  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2013 SEM-1 and 2013 SEM-2

INB104 BUILDING IT SYSTEMS
Today’s modern integrated technology is built on IT systems which run in a range of contexts (e.g. mobile computing, robotics, and web-based systems) using a range of technological solutions such as programming and scripting, databases, web development and network programming. This unit is an integrated introduction to information technology designed to engage, inspire and inform and will demonstrate the important role that technical system design and development plays in achieving robust operation of a large variety of technological solutions. This unit will give you substantial hands-on, practical learning experiences and will motivate you through engagement in the creative, explorative and meaningful development of technological artefacts that operate in real world contexts.

Equivalents: ITB001  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2013 SEM-1 and 2013 SEM-2

INB270 PROGRAMMING
This unit aims to give you a positive introduction to the skills required in solving computational problems and implementing solutions in a programming or scripting language. Although some theoretical aspects of computer programming are introduced briefly, the overall emphasis of the unit is programming practice. The unit emphasises generic programming concepts and related problem-solving strategies. The skills you learn in this unit will be applicable to a wide variety of commonly-used, industrially-significant programming and scripting languages.

Prerequisites: INB104 or ENB246  Antirequisites: INN270  Equivalents: ITB003  Credit points: 12  Contact hours: 3 per week  Campus: Gardens Point  Teaching period: 2013 SEM-1 and 2013 SEM-2

MAB120 FOUNDATIONS OF CALCULUS AND ALGEBRA
This unit introduces you to the fundamental mathematical ideas of functions, calculus, vectors and matrices, through the use of contextualized problems. In solving these problems you will develop both an understanding of the mathematical concepts and competency in appropriate solution methods.

Antirequisites: MAN120  Equivalents: MAB100, MAB125, MAB180  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2013 SEM-1, 2013 SEM-2 and 2013 SUM

PV8101 PHYSICS OF THE VERY LARGE
This unit introduces you to the physics that affects the universe on a large scale, stretching from the edge of the
observable universe down to the Earth’s atmosphere, and addresses the underlying physics of some of the big questions of our time, for example dark energy and global warming. The topics presented include gravity, special relativity, thermodynamics, and fluid mechanics and form a foundation for a degree in physics. Theory will be complemented by practical exercises.

Assumed knowledge: Maths B or equivalent  
Credit points: 12  
Campus: Gardens Point  
Teaching period: 2013 SEM-2

PVB102 PHYSICS OF THE VERY SMALL
This unit introduces physics which affects the universe on a microscopic scale. The concepts and phenomena studied here, such as atomic and nuclear physics, physical optics and waves are fundamental to later studies. Theory will be complemented by practical exercises.

Assumed knowledge: Maths B or equivalent  
Credit points: 12  
Campus: Gardens Point  
Teaching period: 2013 SEM-2

SEB101 SCIENCE IN CONTEXT
SEB101 'Science in Context' lays the foundation for an understanding of the theory and practice of science in the context of broader social, economic and political considerations. Legal and ethical implications of scientific research will provide context for how you, as scientists, will work. This unit is closely integrated with SEB102 'Understanding Science' and provides an opportunity for you to explore in more depth, the contextual factors related to your choice of problem/challenge in that unit.

Corequisites: SEB102  
Credit points: 12  
Campus: Gardens Point  
Teaching period: 2013 SEM-1

SEB102 UNDERSTANDING SCIENCE
SEB102 'Understanding Science' explores world events, problems or phenomena from a scientific perspective, discovering the many ways in which science is used and misused by practicing scientists and the public. You will understand the problems and challenges of modern scientific inquiry using a range of multidisciplinary perspectives and explore solutions focussed approaches.

Corequisites: SEB101  
Credit points: 12  
Campus: Gardens Point  
Teaching period: 2013 SEM-1

SEB113 QUANTITATIVE METHODS IN SCIENCE
Mathematics and Statistics underpins Science and Engineering research and practice. In SEB113 'Quantitative Methods' in Science you will learn to apply the tools and skills of mathematics and statistics, to analyse, model and represent data for scientific purposes. It develops your practical quantitative problem-solving skills in real multidisciplinary scientific contexts. You will apply and augment your quantitative skills using real-world data you collected during field- and laboratory work in SEB114 'Experimental Science' and other units where relevant. This unit also builds awareness of how the different Science disciplines use and represent data, which will facilitate your choice of a discipline major in second semester.

Corequisites: SEB114  
Credit points: 12  
Campus: Gardens Point  
Teaching period: 2013 SEM-1 and 2013 SEM-2

SEB114 EXPERIMENTAL SCIENCE
Science is concerned with developing testable, quantifiable models of the world around us for the purpose of creating a sustainable, safe future for humankind. To this end scientists employ a unique methodology termed the Scientific Method. SEB114 'Experimental Science' focuses on the applied principles and concepts embodied by the Scientific Method. You will do experimental science, via inquiry-led practice, working both individually and collaboratively. Through field and/or laboratory experiences, you will focus in-depth on real world applications in two disciplines of your choice.

Corequisites: SEB113  
Credit points: 12  
Campus: Gardens Point  
Teaching period: 2013 SEM-1