

BACHELOR OF SCIENCE (PHYSICAL SCIENCES)

USQ FACULTY OF SCIENCES

A SCIENCE DEGREE BY FLEXIBLE DELIVERY


A degree offering scientific knowledge & skills of broad and lasting use

The foundations of a career in science, technology or education

Includes courses in physics, astronomy & climatology, plus electives

Innovative distance education methods provide you with a choice of flexible study options. You can choose to study full-time or part-time, whatever suits your lifestyle.

Our lecturers are highly experienced and committed to providing you with a quality learning experience



The USQ physical sciences major provides students with a broad knowledge of physics and its key modern-day applications, and offers an appropriate grounding for those pursuing a career as a scientist, technologist or physics teacher. As part of this major students gain an understanding of the Sun and its radiation, study the Earth and its climate, and learn physical principles relevant to the health sciences. Elective courses provide opportunities to follow a variety of interests.

Image courtesy NASA

BSc. (Physical Sciences)

The physical sciences major provides students with a knowledge of physics and its application in the physical sciences. The major is aimed at providing an appropriate grounding for those pursuing a career as a physics teacher or a scientist. As part of this major students are also able to gain understanding of our planet and its climate, and learn physical principles relevant to the health sciences. Elective courses provide opportunities for broader study.

Program objectives

On completion of the program graduates will:

- possess more than a basic competence in at least one chosen discipline
- possess skill in drawing upon the growing content of knowledge in these disciplines
- understand the principles underlying these disciplines
- be capable of applying these principles to the solving of problems, particularly practical problems
- be capable of working with people trained in other disciplines towards the solution of common problems
- be motivated to sustain adaptive, independent learning
- be aware of the social, moral and legal responsibilities of professional scientists

Career opportunities

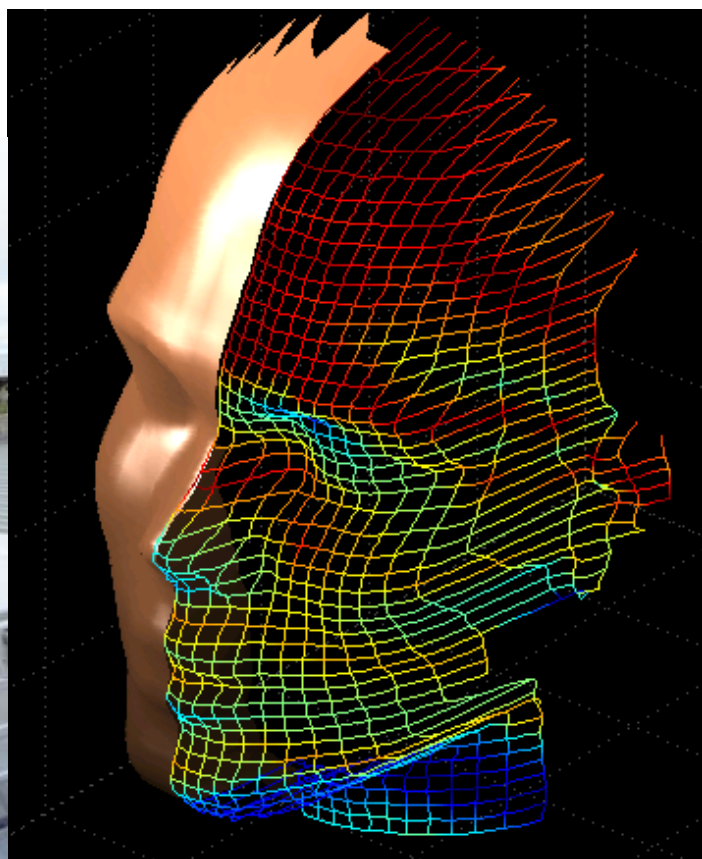
Science Teacher (with further study), Scientist or Research Officer (Universities, Defence, CSIRO, DPI, Industry, Environment, Government, Health), Science Communicator, Technical Officer (Labs or Field Work).

Admission requirements

To be eligible for a place in this program, applicants will have achieved a level of Sound Achievement over four semesters in Queensland Senior (Year 12) English or equivalent.

Recommended study: Biological Science, Chemistry, Physics or Multi-strand science or equivalent.

Students who have completed four semesters of Mathematics B in the Queensland Senior School Certificate or equivalent will select two electives in place of two Mathematics courses.



PROGRAM STRUCTURE

The Bachelor of Science (Physical Sciences) consists of 24 units comprising four units of Foundation Studies courses with 8 units of Core Studies and a second major or elective courses.

The second 8-unit major can be chosen from any approved 8-unit major in the University.

At least four courses in the program will be at level 3. Where two majors are chosen which have some compulsory courses in common, the overlap will be made up by taking electives defined in those majors.

FOUNDATION STUDIES

CMS1000 Communication and Scholarship **OR**

CMS1100 Communicating in the Sciences

CSC1402 Foundation Computing

STA2300 Data Analysis

MAT1100 Foundation Mathematics **OR**

MAT1102 Algebra and Calculus I

CORE STUDIES

PHY1104 Physics Concepts 1

PHY1911 Physics Concepts 2

PHY2204 Astronomy & Astrophysics

CLI2201 Climate Change and Variability

PHY2206 Medical Physics

PHY3303 Modern Physics

PHYS312 Applied Photonics*

PLUS ONE OF THE FOLLOWING COURSES

PHYS207 Fluid Mechanics* **OR**

PHYS211 Electronics*

*These courses are offered by distance education by the University of New England and are made available to USQ students due to a collaborative arrangement

SECOND MAJOR

Second majors can be chosen from any of the other eight-unit majors defined for the Bachelor of Science, or (with the approval of the Program Coordinator) from other eight-unit majors from other undergraduate programs in the University.

Alternatively, students may elect a combination of minor studies and electives (see Handbook).

How to Apply

Domestic students

Application for this program may be made through the Queensland Tertiary Admissions Centre (QTAC).

If you completed Year 12 at a Queensland secondary school you will be assessed for entry on the basis of your Overall Position (OP) or equivalent score. Year 12 students from other states or territories are considered for entry on the basis of their UAI, ENTER or TER and the subject prerequisites indicated. Other applicants will be based on their overall Rank.

International students

For information about applying to study the Bachelor of Science at USQ please contact our Student Relationship Officers via email: international@usq.edu.au or refer to the USQ International website: www.usq.edu.au/international. Phone (outside Australia): +61 7 4631 5543 or (within Australia): 1800 105 359.

Fees

Student Contribution Amount

For domestic students who are offered Commonwealth supported places, the Government pays some money directly to the University, but students are also required to make a contribution. For more information about student contribution refer to USQ Handbook.

Tuition Fees

Domestic fee-paying places are funded entirely through the tuition/direct fees paid by the student. Tuition/direct fees vary depending on the courses that are taken. For more information about Tuition Fees refer to USQ Handbook.

International fees

For details about international student fees, please contact our Student Relationship Officers via email: international@usq.edu.au or refer to the USQ International website: www.usq.edu.au/international.



Descriptions of the Mandatory Core USQ courses

PHY1104 Physics Concepts 1

SEMESTER 1, EXT (TWMBA)

This Physics is about the fundamental natural laws governing our universe. Taken as a whole, physics can be considered as the behaviour of just two fundamental quantities (space-time and mass-energy) in the presence of just four fundamental forces (gravitational, electromagnetic and strong and weak nuclear forces). Using physics, small set of profound natural laws thus can be used to make sense of the complexities of the natural world, as well as the design and operation of our technology. Physics can be divided into different fields of study, with "classical physics" covering mechanics, acoustics, thermodynamics, electromagnetism and optics, and "modern physics" encompassing relativity and the quantum mechanics of light of matter. This course is called Physics Concepts 1 as it examines the conceptual basis of mechanics, acoustics and thermodynamics, and is a companion course to Physics Concepts 2, which covers electromagnetism, optics and modern physics. In this course students are provided with an introduction to key concepts, and obtain practice with relevant problem solving and experiments.

PHY1911 Physics Concepts 2

SEMESTER 2, EXT (TWMBA)

Physics is about the fundamental natural laws governing our universe. Taken as a whole, physics can be considered as the behaviour of just two fundamental quantities (space-time and mass-energy) in the presence of just four fundamental forces (gravitational, electromagnetic and strong and weak nuclear forces). Using physics, small set of profound natural laws thus can be used to make sense of the complexities of the natural world, as well as the design and operation of our technology. Physics can be divided into different fields of study, with "classical physics" covering mechanics, acoustics, thermodynamics, electromagnetism and optics, and "modern physics" encompassing relativity and the quantum mechanics of light of matter. This course is called Physics Concepts 2 as it examines the conceptual basis of electromagnetism, optics and modern physics and is a companion course to Physics Concepts 1, which covers mechanics, acoustics and thermodynamics. In this course students are provided with an introduction to key concepts, and obtain practice with relevant problem solving and experiments.

PHY2204 Astronomy & Astrophysics

SEMESTER 1, EXT (TWMBA)

This course is about the use of observational astronomy and astrophysical theory to understand our vast, ancient, and evolving universe. Observations inform us about the history of the cosmos from the Big Bang to today. These observations are interpreted using testable theories that provide a deep scientific understanding of our place in the universe. This course aims to help students appreciate our cosmic origins, today's observable universe, and the long-term future of our planet. There is also an opportunity to gain practical experience in observational astronomy using Mt Kent Observatory.

PHY2206 Medical Physics

SEMESTER 2, EXT (TWMBA)

An understanding of the physical processes that govern some diagnostic techniques and the functioning of aspects of the human body will be provided. The topics covered are the eye and light, fibre optics and lasers, sound and hearing, ultrasonics, electrical signals, pressure, X-rays, radionuclides, radiotherapy, measuring and safety with ionising radiation, detectors and magnetic resonance imaging.

CLI2201 Climate Change and Variability

SEMESTER 2, ONC (TWMBA) & EXT

The course discusses the underlying physical processes and mechanism that drive the world's climate system and future climate change. Students examine the architecture and design of climate models ranging from simple energy balance models to complex climate system models. Insight is provided into the phenomena of climate change and variability, past climates of the planet on regional and global scales are investigated in the context of presently observed climatic changes. The course highlights examples of climate change and variability and historical approaches to adapting to climate change and harnessing the opportunities that arise from projecting climate variability and its application to managing economic activities.

PHY3303 Modern Physics

SEMESTER 1, (TWMBA) & EXT (TWMBA)

"Modern" physics covers the extraordinary developments in physics that have taken place over the last century or so (and which promise to continue, thanks to the search for a unified theory of everything and the discovery of an expanding universe). This course covers special and general relativity, the quantum description of light and matter, and quantum and statistical mechanics. Also covered are topics on atoms, molecules, solids, and nuclear and particle physics, and a concluding online section on modern cosmology. The theory in this course is supported by practice with relevant problem solving, and experiments.

For more information

Phone: 1800 269 500

Email: studysci@usq.edu.au

Web: www.usq.edu.au/biophysi

For information on the Higher Education Loan Program FEE-HELP, visit: www.usq.edu.au/fees

QTAC Codes: Distance education 906355
Program CRICOS code (International Applicants): 042230E