

# BIOMEDICAL SCIENCE

USQ FACULTY OF SCIENCES

## YOUR FUTURE – A CAREER FOR LIFE

Learn more about life – study biomedical science

*Do you want to study postgraduate medicine?*

*Do you want to work in biomedical research, medical science, clinical physiology or scientific marketing?*

*Want to up-grade qualifications?*

*Want to study full-time or part-time?*

USQ is offering professional qualifications in the form of:

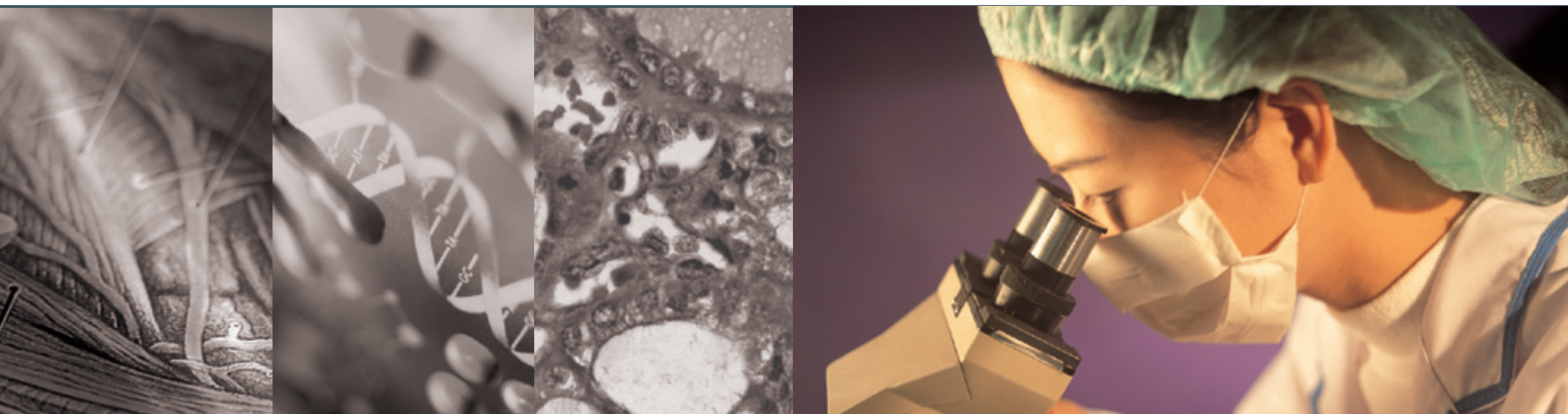
- Bachelor of Biomedical Science
- Bachelor of Science (Human Biology)
- Master of Biomedical Science
- Honours, MSc, MPhil, and PhD programs

### FOR MORE INFORMATION

Email: [Studysci@usq.edu.au](mailto:Studysci@usq.edu.au)

Phone: 1800 640 678

Web: [www.usq.edu.au/biophysci](http://www.usq.edu.au/biophysci)



# BIOMEDICAL SCIENCE

*Biomedical Science provides an opportunity to study the Human Body in health and disease. Various levels of complexity from the whole body, organs, tissues, cells, genes and molecular interactions can be studied. Modern technologies allow various cellular and genetic mechanisms to be studied and analysed using computer modelling. This new era is allowing unprecedented discovery of mechanisms causing disease and new opportunities or approaches to improve human health.*

USQ offers Biomedical Science qualifications in the following:

## Undergraduate Programs

- Bachelor of Biomedical Science
- Bachelor of Biomedical Science (Honours)
- Bachelor of Science (Human Biology)
- Bachelor of Science (Honours)

## Postgraduate Programs by Coursework

- Masters of Biomedical Science

## Postgraduate Research Programs

- Postgraduate Diploma in Science
- Master of Science
- Master of Philosophy
- Doctor of Philosophy

## Careers in Biomedical Science

A degree in Biomedical Science provides graduates with the knowledge and information to sit the Graduate Australian Medical Schools Admissions Test (GAMSAT) to seek entry into postgraduate medicine. Graduates from either the Bachelor of Biomedical Science or Bachelor of Science (Human Biology) may obtain employment as medical scientists in hospitals and private pathology laboratories, clinical physiologists in hospitals and in marketing/scientific reporting for biomedical/ pharmaceutical companies. Graduates interested in research careers may obtain employment in biomedical research laboratories or progress to further studies such as Honours, Masters and Doctor of Philosophy degrees within Biomedical Research. After completion of the Bachelor of Biomedical Science or Bachelor of Science (Human Biology), students may enrol in further study to become science teachers.

## PROGRAM STRUCTURE

The Bachelor of Biomedical Sciences or Bachelor of Science (Human Biology) can be undertaken either in a full-time or part-time attendance pattern. The first year of the program provides foundation courses in areas such as Human Anatomy and Physiology, Biology and Chemistry. From second year students undertake courses in Biomedical topics such as Physiology, Genetics, Cell Biology, Biochemistry and Microbiology. In third year students undertake advanced courses in Pharmacology, Immunology, Microbial Pathogenesis, Medical Microbiology, Molecular Biology, Physiology and Biochemistry. From second year, students can choose electives in pathophysiology, psychology, chemistry, bioinformatics or physics to compliment their particular interests.

The Bachelor of Science (Human Biology) includes courses in the broader field of biology such as human impact on the environment in courses such as Ecology.

## ENTRY REQUIREMENTS FOR THE BACHELOR OF BIOMEDICAL SCIENCE

Applicants who have completed Year 12 at a Queensland secondary school or equivalent are eligible for consideration under the standard admission requirements (OP<10). In addition, applicants should have:

- four semesters of English attaining a minimum of Sound Achievement
- four semesters of Mathematics B attaining a minimum of Sound Achievement
- one of Biology, Chemistry or Physics

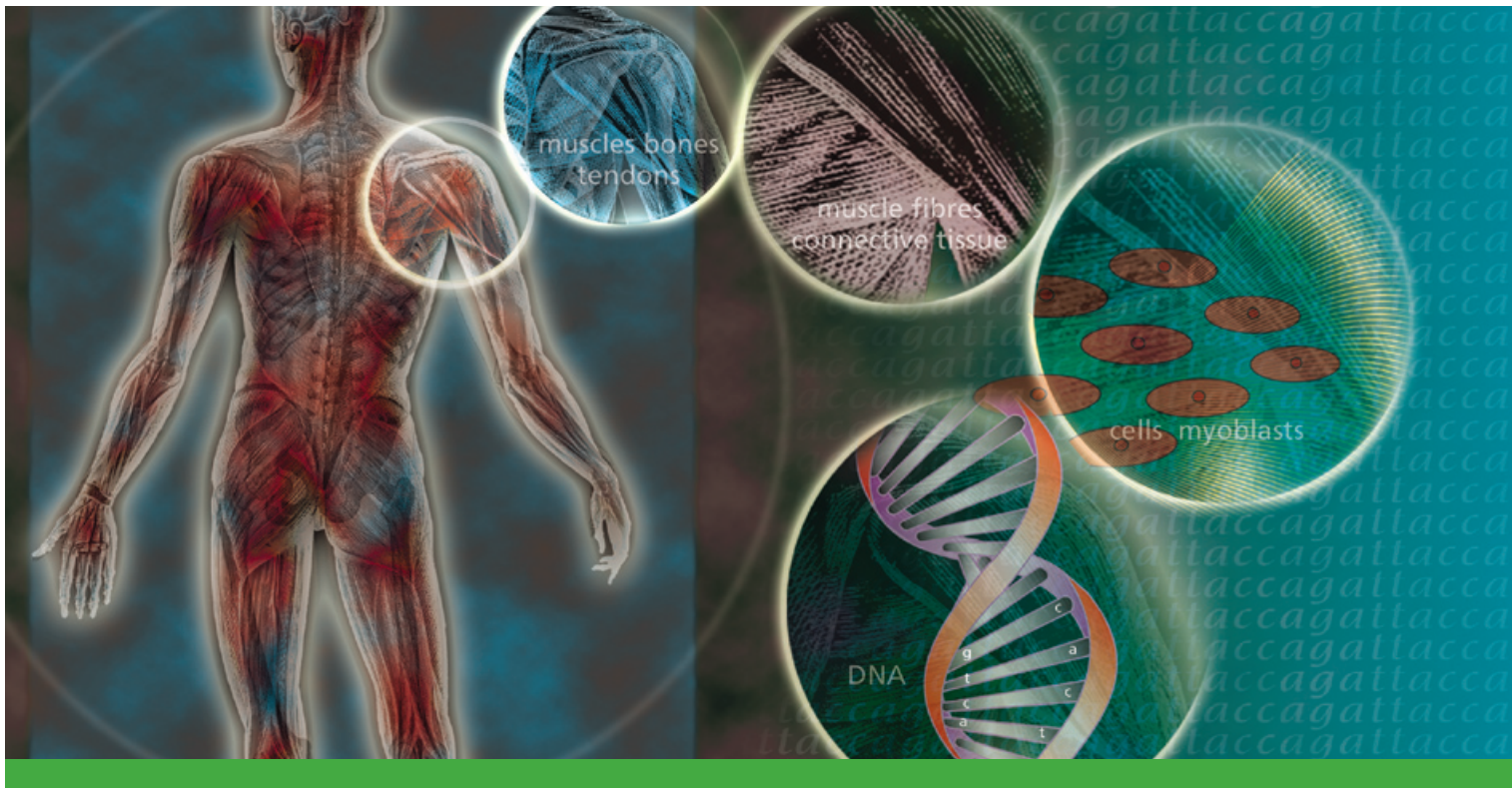
Applicants who do not have formal qualifications but age and previous experience demonstrate there is a reasonable chance of success may apply via alternative entry.

## ENTRY REQUIREMENTS FOR THE BACHELOR OF SCIENCE (HUMAN BIOLOGY)

Applicants who have completed Year 12 at a Queensland secondary school or equivalent but are not able to or do not wish to enrol in the Bachelor of Biomedical Science may seek enrolment in the Bachelor of Science (Human Biology) under the standard admission requirements. Applicants should have:

- four semesters of English attaining a minimum of Sound Achievement
- four semesters of Mathematics B attaining a minimum of Sound Achievement
- one of Biology, Chemistry or Physics is desirable, but not essential.

Applicants who do not have formal qualifications but age and previous experience demonstrate there is a reasonable chance of success may apply via alternative entry. Subject to satisfactory progress and grades, it is possible to enrol in the Bachelor of Biomedical Science upon completion of first year of the Bachelor of Science (Human Biology).



## Bachelor of Biomedical Science or Bachelor of Science (Honours)

The Honours program is available to graduates who have performed at a high level in the undergraduate program at USQ or other universities. It allows students to expand their knowledge in certain topics with Biomedical Science and gain experience in the conduct of high level scientific research. Successful completion of the Honours year qualifies students for entry into postgraduate programs including Masters and PhD studies.

## Postgraduate coursework programs in Biomedical Science

The Master of Biomedical Science is available as a full fee paying program for students who have completed an undergraduate degree in Biomedical Science. It allows studies in advanced courses in Immunology and Microbial Pathogenesis, Medical Microbiology, Physiology, Computational Biology and Experimental Bioinformatics.



## Postgraduate research programs in Biomedical Science

Research programs leading to Postgraduate Diploma of Science (PGDSc), Master of Science (MSc), Master of Philosophy (MPhil) and Doctor of Philosophy (PhD) qualifications in Biomedical Science are available to students with appropriate qualifications. These programs provide opportunities for motivated and highly qualified students to undertake advanced study to produce a research-based dissertation. Students develop the appropriate research skills and specialist knowledge that will enhance their career prospects.

### PROGRAM DURATIONS

- PGDSc: Minimum period of one year (full-time) or two years (part-time).
- MPhil: Minimum period of one year (full-time) or two years (part-time).
- MSc: Minimum period of two years (full-time) or four years (part-time).
- PhD: Minimum period of three years (full-time) or five years (part-time).

### ENTRY REQUIREMENTS

Entry requirements differ between these postgraduate programs and prospective candidates should consult the University Handbook for details. As the programs are based on supervision by a principal and an associate supervisor, it is essential that intending candidates clarify their topic for research and seek an academic staff member able to provide supervision. Details of Staff and their Research Interests can be found at <http://www.usq.edu.au/sciences/biophysci/research/interests.htm>

Application forms and advice on procedures for enrolment may be obtained from the Office of Research and Higher Degrees.

## DESCRIPTIONS OF SOME CORE COURSES IN THE BACHELOR OF BIOMEDICAL SCIENCE

### HUMAN ANATOMY AND PHYSIOLOGY (BIO1203)

This course provides an introduction to the structure and function of human cells, tissues and organs. An emphasis on human anatomy with an associated introduction to physiology provides the foundation knowledge for subsequent studies in physiology and other health related courses.

### INTRODUCTORY MICROBIOLOGY (BIO2205)

Microbiological considerations are important in most areas of biology including medical sciences, animal, plant and microbial biotechnologies and general plant and environmental sciences. It is thus important that professionals in any of these fields become aware of the potential involvement of micro-organisms in their fields of study and become sufficiently familiar with the subject to gain an appreciation of the role played by micro-organisms in our daily lives and the environment.

### MOLECULAR BIOLOGY (BIO3309)

A revolution in biology has occurred as a result of recent advances in the field of molecular biology and genetic engineering. An appreciation of the potential applications of molecular biology is of growing importance in many areas of biological and medical research. This course serves to develop an understanding of many fundamental principles and current techniques in molecular biology. The potential impact of this technology on the nature of the world in which we live is also discussed.

### IMMUNOLOGY AND MICROBIAL PATHOGENESIS (BIO3315)

The course aims to provide a thorough understanding of the essential principles of immunity, the ability to distinguish self from non-self antigens, immunochemistry, immunobiology, immunogenetics, abnormal immune responses including autoimmunity and allergies/hypersensitivities and cancer immunology. Emphasis will also be given to principles underpinning prokaryotic-eukaryotic cell interactions which contribute to the development of therapeutic strategies against devastating diseases of humans or animals.

### ENDOCRINE AND NEUROPHYSIOLOGY (BIO3323)

The aim of this course is to provide an in-depth understanding of the nervous and endocrine systems as the major control systems of the human body.

### SYSTEMS PHYSIOLOGY (BIO2203)

The unifying theme of this course is the physiology of whole organs and organ systems within the human body. It provides a basic understanding of the functions of each system and the ways in which the various systems interact in the healthy body.

### GENETICS (BIO2207)

Genetics is the study of inheritance. Not only is this study essential as a basic part of biology but an understanding of the principles of genetics is important for students whose future professions involve plant or animal breeding, genetic engineering, microbiology and related disciplines. Furthermore an understanding of genetics is necessary for an informed awareness of many human problems related to genetic dysfunction.

### PHARMACOLOGY (BIO3313)

The aim of this course is to provide students with an understanding of the principles of pharmacology. The ways that drugs work and affect the human body at the molecular, cellular, organ and organism level is important clinically as well as in research that seeks to develop new and better drugs to treat diseases.

### MEDICAL MICROBIOLOGY (BIO3317)

The aim of this course is to enhance the student's understanding of medical microbiology at an advanced level. This requires a detailed knowledge of the mechanisms of microbial pathogenesis from a classical and molecular perspective. Detailed analysis of specific disease syndromes, together with discussion of relevant diagnostic and therapeutic options will enable the student to integrate these different fields of study and will enhance their capacity to make critical and informed judgements in a professional setting.

### CARDIORESPIRATORY AND SPORTS PHYSIOLOGY (BIO3333)

The aim of this course is to provide an in-depth understanding of the cardiorespiratory system of the human body and gain knowledge regarding adaptations to the human body as a consequence of acute and chronic exercise.