The Faculty of Science is internationally renowned for its record of innovative and dynamic research. Researchers from the Faculty have been recognised through awards such as election to the Australian Academy of Science, Fulbright and Humboldt Fellowships. Recent highlights include being part of the research team that discovered the skeleton of the human species Homo floresiensis in Indonesia. The Faculty’s researchers maintain a high level of funding grants from the Australian Research Council, the National Health and Medical Research Council and other prominent agencies. Research partnerships also exist with other Government agencies, Australian and international industry and regional organisations.

As a postgraduate student in the Faculty of Science, you will join around 100 academic and specialist research staff and more than 150 Doctoral and Masters research students. A distinctive feature of the Faculty’s programs is the close connection between research and teaching. Many of the Faculty’s postgraduate coursework degrees are linked directly to research programs, and many postgraduate research students are also extensively involved in teaching at an undergraduate level. Weekly research seminars are held throughout the year, and independent research may also be undertaken in collaboration with partner universities overseas. Collaborative international research is ongoing with scientists based in many countries including the UK, USA, Germany and Thailand.

The Faculty has a wide range of dedicated research laboratories. It also has strong capabilities in computer-aided molecular modelling, state-of-the-art facilities for mass spectrometry, NMR spectroscopy, FTIR spectroscopy, optically stimulated luminescence and thermoluminescence dating; several spatial analysis techniques; and instruments for a diverse range of analytical methods within the biological, chemical and earth and environmental sciences.

Research Groups within the Faculty have established close and expanding interactions with many industrial and governmental organisations including leading Australian biotechnology developer AMRAD, the Australian Nuclear Science and Technology Organisation (ANSTO), BHP Billiton, GlaxoSmithKline, Johnson & Johnson, the Commonwealth Science and Industrial Research Organisation (CSIRO) and the mining company Rio Tinto.

The Centre for Medical Bioscience (CMB) brings together a multidisciplinary team of chemists and biologists from the Schools of Chemistry and Biological Sciences, with exciting research programs focused in three key areas: anti-microbial agents (e.g. targeted at new anti-bacterials), age-related diseases (cataract; neurodegenerative disease), and cancer (new therapeutics for breast and prostate cancer).

These programs are underpinned by basic science directed towards the discovery and structural characterisation of biological targets. The long-term goals are to develop strategies to address problems of drug resistance in infectious disease and to tackle in a new and more effective way diseases associated with ageing.
synthesis, chromatography, sensors, materials in membrane technology, asymmetric application of these intelligent multifunctional processing, polymer characterisation and the development of new pharmaceuticals. The three major disease states currently being targeted by the CMCP are: anti-infectives, encompassing antibacterial agents, including multi-drug resistant strains, anti-viral agents (e.g. HIV, Dengue fever, hepatitis C, anti-fungals) and anti-malarial agents; anti-cancer agents, incorporating both drug design and development as well as formulation and clinical aspects; and cardio-vascular disease, including fundamental research associated with phospholipids and diet as well as the development of new small molecule therapeutics.

The Centre for Medicinal Chemistry and Pharmacology (CMCP) endeavours to enhance the understanding of the molecular origins of disease and undertake modern drug design, leading to the development of new pharmaceuticals. The three major disease states currently being targeted by the CMCP are: anti-infectives, encompassing antibacterial agents, including multi-drug resistant strains, anti-viral agents (e.g. HIV, Dengue fever, hepatitis C, anti-fungals) and anti-malarial agents; anti-cancer agents, incorporating both drug design and development as well as formulation and clinical aspects; and cardio-vascular disease, including fundamental research associated with phospholipids and diet as well as the development of new small molecule therapeutics.

The Institute for Conservation Biology & Law (ICB) is one of the University’s major research groupings. It is unique in combining expertise in environmental law and policy with a strong research group in ecology and environmental biology. The ICB has several interrelated aims to:
- conduct world-class research concerning the biology and conservation of Australia’s native biota;
- train research students to be highly competent researchers in this area
- foster interdisciplinary research and research training linking science with law, policy and management
- interact with other scientists as well as managers and policy personnel to achieve effective conservation of the Australian biota.

The Intelligent Polymer Research Institute (IPRI) is one of seven institutes at the University of Wollongong. The Institute comprises of approximately 38 personnel (full-time research staff and students) and is located in purpose-built laboratories on the University of Wollongong Innovation Campus. IPRI is recognised internationally as a pioneer in Intelligent Polymer Research. The Institute has strategic links and alliances with other research institutions in the USA, Japan, Korea, Italy, Ireland and the United Kingdom. Research and development programs cover nanoscience and nanotechnology, monomer and polymer processing, polymer characterisation and the application of these intelligent multifunctional materials in membrane technology, asymmetric synthesis, chromatography, sensors, biomaterials, advanced coatings, actuators, solid-state devices, solar cells and batteries.

The GeoQuEST Research Centre brings together researchers from the disciplines of geography, geology and environmental science with innovative and interdisciplinary research interests in earth processes, environmental change and human interactions. GeoQuEST has internationally renowned expertise in and facilities for Quaternary Science and Geochronology, providing fundamental temporal frameworks for the understanding of global environmental change. We bring expertise in environmental modelling, geographical information systems (GIS) and remote sensing to the study of both environment and society. Major research goals include identifying the causes of climate change at millennial to decadal time scales and separating natural variability from the impacts of human population growth and patterns of consumption.

The focus of this research centre is the measurement of atmospheric trace gas concentrations and the sources and sinks of key atmospheric trace gas species as they pertain to global climate change.

Terrestrial ecology; marine biology; animal physiology and systematics; plant physiology; cell and molecular biology; cancer biology; chaperone proteins and disease; biotechnology.

Targeted drug design and synthesis; understanding the molecular basis of diseases and drug action; protein chemistry; development of NMR spectroscopy and mass spectroscopy for studying biological processes; advanced materials and nanotechnology, atmospheric chemistry; food chemistry; analytical and environmental chemistry; and chemical education.

Quaternary environmental change; quaternary geochronology and stable-isotope studies; coral reef development; spatial image analysis; past and present interactions with the Australian environment; economy, culture and environment; estuarine and coastal processes; basin analysis; organic petrography and fuels; palaeozoic fold belts; environmental geology; and regional mapping.

For more information on the Faculty of Science: www.uow.edu.au/science
For information on specific courses and subjects in the Faculty of Science: www.uow.edu.au/handbook/current/pg/science

RESEARCH DEGREES

DOCTOR OF PHILOSOPHY (PHD)
CRICOS 001243F (laboratory) 020192K (non-laboratory)
Duration 3 years

MASTER OF SCIENCE – RESEARCH
CRICOS 042532B, 042534M (Human Geography & Environments)
Duration 1–1.5 years
Starting sessions Autumn/Spring
Entry requirements Listed on page 18.

- Biological Sciences
- Biotechnology
- Chemistry
- Environmental Science (PhD only)
- Geography
- Geology
- Medicinal Chemistry
- Physics*

* Physics is located in the Faculty of Engineering. See page 37 for more information.

MASTER OF ENVIRONMENTAL SCIENCE – RESEARCH
CRICOS 042533A
Duration 1–1.5 years
Starting sessions Autumn/Spring
Entry requirements Listed on page 18.

COURSEWORK DEGREES

Please refer to page 21 to find out how the qualifications and marks obtained in your country equate to the general entry requirements shown below.

The Faculty offers two pathways to a Master of Science. The Master of Science is a 1.5-year degree within which students have a large choice of majors (see below). The Master of Science and Management is a two-year degree which, in addition to a the choice of major, offers the bonus of a suite of postgraduate Management subjects which increase career opportunities.
LAIKINI WAQANISAU
FIJI
MASTER OF ENVIRONMENTAL SCIENCE

I work for NatureFiji-MareqetiViti. I am currently working on the Fiji Sago Palm Project, helping conserve the Fiji sago palm, an endangered species endemic to the Fiji islands. I have also worked for Greenpeace Australia Pacific as an Ocean Campaigner.

Many of my duties for the Fiji Sago Palm Project relate to working with users of sago palm products to develop sustainable practices. One of the interesting aspects is working with communities, as it is a different type of challenge. Not everything you learn at school can be applied here, and you need to have a good perception of the situation as well as having a sense of compassion for people.

I liked being involved in the extra-curricular activities after classes at UOW, since it gave a relaxed atmosphere to studies. UOW also provided professional training for enrolled students and included leadership training and opportunities to work with the Ilawa community.

I liked the way lecturers taught their modules at UOW, and that the postgraduate programs incorporated a holistic learning experience and interactions with fellow students. One of my best memories as an undergraduate student was the chance to work with Honours and PhD students, since they really helped me improve my written and oral communication skills.

**MAJOR STUDIES BIOTECHNOLOGY**

**Entry requirements** A recognised Bachelor of Science degree that includes subjects in the areas of biochemistry, cell biology, molecular biology, microbiology, or immunology.

The Biotechnology major is designed for graduates who seek knowledge and technological expertise in specific areas of cell and molecular biology, which are the basis for modern biotechnological research and development. Students will gain an understanding of DNA technology and genetic engineering of micro-organisms, plant and animal cells. The subjects provide an introduction to the basic elements of modern cell and molecular biology, before proceeding to intensive training in current biotechnology and its application to the fields of human therapeutics, agriculture and diagnostics.

Tutorials and laboratory-based practical work will be undertaken in each of the subjects, and students have the opportunity to explore new technology including genomics, transcriptomics and proteomics.

**COURSE STRUCTURE**

MSc core subjects plus four subjects as follows:

- Biotechnology
- Molecular Cell Biology
- Infection & Immunity
- Applied Bioinformatics

In consultation with the Masters Coordinator, students may be able substitute one or more of the above with the following subjects:

- Major Research Project
- Research Methods in Biotechnology
- Literature Review
- Research Project

**CHEMISTRY**

**Entry requirements** A recognised Bachelor of Science degree in chemistry, including at least 24cp (or equivalent) of third-year chemistry, with an equivalent average mark of 75%.

**COURSE STRUCTURE**

MSc core subjects plus four of the following subjects

- Advanced Analytical Chemistry
- Elucidating Molecular Structure
- Intelligent Materials and Their Applications
- Advanced Organic Synthesis and Reactivity
- Environmental Chemistry and Climate Change

In consultation with the Masters coordinator, students may be able to substitute one or more of these subjects with the following:

- Advanced Chemistry Laboratory Project
- Literature Report in Chemistry

**COASTAL PLANNING & MANAGEMENT**

**Entry requirements** A recognised Bachelor degree in Environmental Science, Science, Applied Science, Agriculture, Forestry, Social Science, Economics, Planning, Demography, Human Geography, Law, or Engineering, or equivalent tertiary qualifications and/or professional experience.

This course offers either physical/environmental or social/demographic expertise; additional elective subjects are selected from the related fields of planning, spatial technologies, environmental law, and resource and environmental policy. Students take advantage of the superb local marine life, coastal landscapes, rainforest escarpment and freshwater and terrestrial ecosystems.

**MBA**

**Entry requirements** A recognised Bachelor degree in a discipline related to business administration, or equivalent tertiary qualifications and/or professional experience.

This course provides the skills and knowledge required to become an effective manager in a wide range of industries and disciplines. Students will develop a broad understanding of business principles, including finance, marketing, human resources, and business strategy.

**COURSE STRUCTURE**

**MBA core subjects**

- Business Administration (MBA) core of 48cp
- Four core subjects
- Additional 24cp of subjects

Students must choose one of the available major specializations and complete 48cp as shown below in the structure for each major.

**Core subjects**

All students complete the following four subjects **each with a value of 6cp**.

- Fundamentals of Science Communication
- Fundamentals of Science Practice
- Fundamentals of Science Data and IT
- Current Questions in Science

**Major choices**

All students complete the following four subjects with the following:

- Advanced Chemistry Laboratory Project
- Literature Report in Chemistry
- Environmental Chemistry and Climate Change
- Environmental Policy and Planning

In consultation with the Masters Coordinator, students may be able substitute one or more of these subjects with the following:

- Advanced Chemistry Laboratory Project
- Literature Report in Chemistry

**COASTAL PLANNING & MANAGEMENT**

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**COURSE STRUCTURE**

MSc core subjects plus four subjects as follows:

- Biotechnology
- Molecular Cell Biology
- Infection & Immunity
- Applied Bioinformatics

In consultation with the Masters Coordinator, students may be able substitute one or more of the above with the following subjects:

- Major Research Project
- Research Methods in Biotechnology
- Literature Review
- Research Project
Environmental Biology

Entry requirements: A recognised Bachelor of Science degree that includes introductory-level subjects in the areas of general biology, ecology, genetics, evolution, physiology and statistics. This program is designed for students who seek further knowledge and skills in the biological sciences, or want to qualify for a postgraduate research degree. Areas covered include conservation biology, ecological and evolutionary physiology, marine and terrestrial ecology, and fisheries and aquaculture.

Course Structure:
MSc core subjects plus four subjects as follows:
- Advances in Conservation Biology
- Marine and Terrestrial Ecology
- Ecological and Evolutionary Biology
- Advanced Topics in Fisheries and Aquaculture

Research projects, and subjects in Mollusc Biology and other areas may be substituted with the approval of the Masters Coordinator.

Geology, Human Geography, or Physical Geography

Entry requirements: A recognised Bachelor degree in Environmental Science, Science, Applied Science, Agriculture, Forestry, Social Science, Economics, Planning, Demography, Human Geography, Law, or Engineering, or equivalent tertiary qualifications and/or professional experience.

Geology is the study of the earth, the materials of which it is made, the processes that act on these materials, the products formed and the history of the planet and its life forms.

Human Geography is the study of people, their environments and conflicts about their access to resources with applications in environmental management, urban planning, population studies and the management of social and economic change.

Physical Geography is the study of patterns and processes in the environment caused by the forces of nature. It examines the environmental and ecological problems facing the world, and provides the skills and knowledge to assist in managing them.

Course Structure:
MSc core subjects plus four subjects comprising:
- Introduction to Medicinal Chemistry
- Advanced Topics in Medicinal Chemistry
- and one of the following:
- Advanced Analytical Chemistry
- Elucidating Molecular Structure
- Bioinformatics and Biological Chemistry
- Advanced Organic Synthesis and Reactivity

In consultation with the Masters coordinator, students may be able to substitute one or more of these subjects with the following:
- Advanced Chemistry Laboratory Project
- Literature Report in Chemistry

Medicinal Chemistry

Entry requirements: A recognised Bachelor of Science degree in chemistry or medicinal chemistry, including at least 24cp (or equivalent) of third-year Chemistry and at least second-year biology and biochemistry with an equivalent average mark of 75%.

The program provides vocational training in medicinal chemistry, an area where there is currently a high demand for graduates, and consists of specialised coursework and a small research project. The program includes study of areas central to medicinal chemistry, including drug design and development, synthesis, pharmacology, computer modelling and structural studies.

Course Structure:
MSc core subjects plus four subjects comprising:
- Advanced Soils, Landscapes and Hydrology *
- Fundamentals of Spatial Science
- Coastal Population Studies ^
- Advanced Spaces, Places and Identities: Qualitative research design ^
- Advanced Environmental and Heritage Management ^
- Advanced Environmental Geology †
- Advanced Topic A

# Physical Geography and Geology degrees only
* Physical Geography degrees only
^ Human Geography degrees only
† Geology degrees only

Graduate Diploma in Science

Entry requirements: A recognised Bachelor degree in Environmental Science, Science, Applied Science, Agriculture, Forestry, Veterinary Science or Engineering, or equivalent tertiary qualifications and/or professional experience.

The Master of Environmental Science Advanced course consists of both coursework and research. The program is designed for science and engineering graduates or others with a limited undergraduate background in the environmental science area. It allows the tailoring of coursework to suit the individual requirements of candidates with differing undergraduate qualifications and employment experience.

The Master of Environmental Science is designed for applicants who wish to extend their knowledge of environmental science, including areas such as environmental policy, planning, and management.

Subjects studied in the two courses include Environmental Engineering, Studies in Resource & Environmental Policy, and a number of directed studies and advanced science topics.

Graduate Diploma in Science

Entry requirements: A recognised Bachelor degree in Environmental Science, Science, Applied Science, Agriculture, Forestry, Veterinary Science or Engineering, or equivalent tertiary qualifications and/or professional experience.

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