# Master of Biotechnology

by coursework or coursework and dissertation



Faculty of Science

## The Master of Biotechnology with specialisations in:

- Biochemistry and Molecular Biology
- Environmental Biotechnology
- Genetics and Breeding
- Genetics and Genomics

## Course description, features and facilities

Unique in Australia, this course offers a thorough grounding in state-of-the-art biotechnology in combination with training in enterprise, commercialisation and intellectual property (IP) protection.

Biotechnology is rapidly becoming central to our lives. The use of plants, animals and bacteria, enhanced by areas such as genetics and genomics, gives rise to new food, fibre and chemical production routes, and new strategies for environmental protection and stewardship, all central requirements as the global population increases over the coming decades.

You will train in the theory of genetics and molecular biology and receive comprehensive skills training in 'next generation' practical techniques such as proteomics, metabolomics, genomics and recombinant DNA methods. These core skills will be complemented by both basic and advanced bioinformatics practices.

#### **Key features:**

- Offers a thorough grounding in state-of-the-art biotechnology in combination with training in enterprise and commercialisation.
- Utilises the expertise of worldleading research staff in the Faculty of Science and in the UWA Business School – along with



Business 'Angels' and mentors in biotechnology spin-outs.

- Unique set of specialisations.
- Close working links with industry, both public and private.

### Specialisations:

#### Biochemistry and Molecular Biology

Advanced studies and training in state-of-the-art biochemistry and molecular biology technologies to understand cellular content, structure, organisation, function and interactions.

- Allows us to understand how the natural world works. These disciplines give us insights into the mechanisms of evolution, growth, development, reproduction, disease, and senescence.
- Offers humankind the tools to improve our quality of life – this may be through the development of a novel drug, the generation of a drought resistant crop plant, or the understanding of what controls an individual's health. It's empowering and exciting!

#### **Environmental Biotechnology:**

The application of biotechnology to the environmental arena. Biotechnological applications for environmental monitoring, protection and food security in a changing world.

- The environment is facing unprecedented pressures through population expansion, increased pollution inputs and the need to feed the next 1 billion inhabitants. Environmental Biotechnology is central to diagnosing the health of the environment and generating novel solutions to the pressures we face.
- Uncover the vast array of organisms that are mostly unseen but act as planetary engineers and sustain the main nutrient cycles which sustain all other life on Earth and how we can harness this hidden diversity to enhance our environment.

#### **Genetics and Breeding:**

The application of biotechnology at core and advanced level to the breeding of animals and plants. Using genes as a basis, the units explore evolutionary genetics and the use of genetics to generate and monitor new traits.

- Genetics and breeding directly applies our understanding of genome evolution and structure in domesticated plants and animals to solve world-wide issues of malnutrition, climate change, disease and loss of arable land.
- Learn how to apply biotechnology to enhance food security in Australia



and developing countries and the benefits of a broad integrated approach to plant breeding linking field, laboratory and plate.

#### **Genetics and Genomics**

Advanced studies in next generation technologies used in genetics and genomics to understand inheritance, including the development and application of high throughput systems for analysing omic studies and other large data sets and databases.

- Routine technologies are now readily available to sequence entire genomes, giving insights into the numbers and categories of genes that characterise particular species, and the elegant fine-tuning of genome function.
- Genes responsible for desirable traits and medical conditions are being identified more quickly with the new technologies, offering major advances in fields such as medicine, veterinary science, plant breeding, and conservation biology.
- Genetics and genomics underpins the rapidly expanding field of synthetic biology.

#### **Career opportunities**

The Master of Biotechnology is a cross-disciplinary degree, providing graduates with a unique combination of state-of-the-art science and business skills to meet the global challenges we face.

Graduates will be skilled for roles within a range of sectors, from international research laboratories, through NGO organisations and onto private sector positions ranging from start-ups to multi-nationals. You'll even have the skills to start companies of your own! With core training in state-of-the-art biotechnology, a range of career paths are possible, from plant and livestock production linked to food security and feeding the next billion people, environmental diagnostics and cleanup to protect our planet, through to research and developing the new tools and technologies the biotechnology arena will use in the future.

#### **Admission requirements**

You must have a bachelor's degree that aligns with one of the specialisations of this course, or an equivalent qualification, as recognised by UWA.

#### English Language Competence

You must demonstrate a minimum level of English Language Competence. See **studyat.uwa.edu.au/ undergraduate/admission/english** 

#### **Key Information**

While the standard time fame for completion of this degree is two years (full time), if you have previously completed an undergraduate degree in a cognate (related area) it may be possible to complete within 1.5 years.

Example cognate areas are: Agricultural Science, Biochemistry and Molecular Biology; Botany; Conservation Biology; Environmental Science; Genetics; Marine Science, Zoology.

### Intake Periods: February and July each year

#### **Course Structure**

You will study the core units of:

- MKTG5503 Innovation and Enterprise
- MKTG5604 Biotechnology
  Commercialisation
- SCIE4001 The Objectives and Applications of Genomics

• SCIE4002 Bioinformatics and Data Analysis for Genomics

Each specialisation has core units in addition to those listed above, with other units selected as options. Visit handbooks.uwa.edu.au/ courses/coursedetails?id=c389

You may apply to replace the equivalent of half a year's units with a research project.

#### **International Masters Scholarships** are available for high achieving

students. See studyat.uwa.edu.au/ international/masters-scholarships

#### **Domestic students:**

This courses qualifies for a Commonwealth supported place.

Visit the Future Students website for more information, including fees, refund policy and support services: studyat.uwa.edu.au/courses

How to apply: Visit: studyat.uwa.edu.au/applynow

Course enquiries: ask@uwa.edu.au



#### Faculty of Science

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