

# Biotechnology

Biotechnology is the application of biological knowledge to useful ends. It includes the use of living things in industrial or commercial processes and accordingly draws upon many life sciences disciplines. Recent breakthroughs in biotechnology offer exciting prospects such as more effective pharmaceuticals (drugs), new disease treatments, higher yielding crops, improved foods and novel ways to fight pollution. As well as providing a strong background in life sciences, the biotechnology co-major teaches practical skills relevant to the Australian biotechnology industry including applications of biotechnology, regulatory, safety and ethical issues, and steps involved in taking a product from the research laboratory to the marketplace.

The biotechnology major offers a high degree of flexibility in terms of combinations of subjects. This major must be undertaken in conjunction with an approved life sciences major. The core subject 600-205 Biotechnology in Practice (*p.1*) must be taken as part of the biotechnology major.

## Career opportunities

Training in biotechnology provides skills for jobs in many fields including drug discovery and production, health work, food technology, forensic science, agriculture and waste management.

## Structure of the biotechnology major

### 100-level

Life sciences package.

### 200-level

Students must choose a life sciences major in anatomy, biochemistry and molecular biology, botany, cell biology, chemistry, genetics, immunology, microbiology, neuroscience, pathology, pharmacology, physiology or zoology. Students must also take 600-205 Biotechnology in Practice (*p.1*).

### 300-level

Students will have taken 600-205 Biotechnology in Practice (*p.1*) and will be completing an approved life sciences major. In addition, students must take at least 37.5 points of elective 300-level biotechnology subjects from the lists below. At least 25 points of these 37.5 points must be from a department different to that responsible for teaching the student's other major. Practical subjects totaling 25 points must be included, either within the life sciences major or the biotechnology major.

<b>300-level biotechnology elective subjects</b>	Points
521-301 Protein Structure, Design & Engineering ( <i>p.2</i> )	12.5
521-302 Functional Genomics ( <i>p.3</i> )	12.5
521-303 Molecular Aspects of Cell Biology ( <i>p.3</i> )	12.5
521-306 Plant Biochemistry & Biotechnology ( <i>p.4</i> )	12.5
521-307 Biomolecular Structure & Bioinformatics ( <i>p.4</i> )	12.5
606-309 Frontiers of Cell Biology ( <i>p.3</i> )	12.5
610-332 Bio-organic Chemistry ( <i>p.6</i> )	12.5
610-333 Molecular Technology ( <i>p.7</i> )	12.5
652-301 Genomes and Evolution ( <i>p.2</i> )	12.5
652-302 Molecular Genetics ( <i>p.2</i> )	12.5
652-303 Developmental and Cellular Genetics ( <i>p.2</i> )	12.5
652-305 Human Genetics ( <i>p.2</i> )	12.5
526-301 Microbial Cells and Genomes ( <i>p.2</i> )	12.5
526-302 Microbial Biotechnology ( <i>p.2</i> )	12.5
526-304 Principles of Immunology ( <i>p.2</i> )	12.5
531-303 Molecular/Genetic Basis of Disease-Lect ( <i>p.2</i> )	12.5
136-337 Biotechnology in Modern Society (Sci.3) ( <i>p.8</i> )	12.5
654-314 Lectures in Reproduction ( <i>p.4</i> )	12.5
<b>300-level biotechnology elective practical subjects</b>	Points
521-321 Gene Technology & Protein Expression ( <i>p.4</i> )	12.5
521-322 Protein Biochemistry and Proteomics ( <i>p.4</i> )	12.5
606-314 Experimental Techniques in Plant Science ( <i>p.4</i> )	12.5
610-399 Chemical Research Project ( <i>p.7</i> )	12.5
652-304 Genetic Analysis ( <i>p.2</i> )	12.5
652-306 Experimental Genetics ( <i>p.2</i> )	12.5
526-321 Molecular Microbiology Techniques ( <i>p.3</i> )	12.5
526-324 Immunological Techniques ( <i>p.3</i> )	12.5
526-326 Projects: Immunology ( <i>p.4</i> )	12.5
526-327 Projects: Microbiology ( <i>p.4</i> )	12.5
534-306 Drug Discovery ( <i>p.2</i> )	12.5
516-302 Developmental Biology ( <i>p.2</i> )	12.5
654-304 Reproduction ( <i>p.2</i> )	12.5

## Core biotechnology subject

### 600-205 Biotechnology in Practice

**Credit points:** 12.5

**HECS-band:** 2

**Coordinator:** Dr E Newbigin

**Prerequisites:** Biochemistry 521-211; and one of genetics 652-214, microbiology 526-201 or biochemistry 521-220.

**Corequisites:** Biochemistry 521-212 or botany 606-205.

**Contact:** 24 lectures and 24 hours of other activities and assignments, eg. researching intellectual property protection for a product, computer searches of patent databases, developing a business plan, preparing case studies (*Semester 2*).

**Description:** This subject will enable students to develop skills relevant to the Australian biotechnology industry. It will enhance students' understanding of the processes involved in the commercialisation of biotechnology research and is a core subject for students taking the biotechnology co-major. Topics include what biotechnology is; the history of, and recent developments in, biotechnology; Australia's place in biotechnology; research in an industry setting; intellectual property protection and management; commercialisation of research; company structures and funding; regulatory issues; and public perceptions of biotechnology. The steps involved in taking a product from the research laboratory to the marketplace will be illustrated by case studies presented by participants in Australian biotechnology development. Participants in this subject include contributors from industry, research development consultants, intellectual property lawyers, members of regulatory bodies and staff from a number of University departments.

**Assessment:** End-of-semester 2-hour exam; up to three written assignments.

