

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

100-level

Package in life sciences including 25 points in each of biology, chemistry, mathematics and statistics.

200-level

Students must choose a life sciences major in anatomy, biochemistry and molecular biology, cell biology, chemistry, genetics, immunology, microbiology, neuroscience, pathology, pharmacology, physiology, plant sciences 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 a selected life sciences major. Additionally students must take at least 37.5 points including three other elective 300-level biotechnology subjects from the following lists. At least two of these subjects must be from a department different to that responsible for teaching the major. Two practical subjects must be included, either within the co-major or the major.

300-level biotechnology elective subjects	Points
521-301 Protein Structure, Design & Engineering (<i>p.3</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 3D-Macromolecular Structure and Dynamics (<i>p.4</i>)	12.5
606-309 Cell Biology III (<i>p.3</i>)	12.5
610-332 Bio-organic Chemistry (<i>p.6</i>)	12.5
610-333 Molecular Technology and Processes (<i>p.6</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 Biotechnology 1: Microbial Genes & Cells (<i>p.2</i>)	12.5
526-302 Biotechnology 2: Processes & Innovations (<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.5</i>)	12.5
300-level biotechnology elective practical subjects	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.3</i>)	12.5
526-321 Molecular Microbiology Techniques (<i>p.3</i>)	12.5
526-322 Projects: Biotechnology (<i>p.3</i>)	12.5
526-323 Projects: Medical/Biomedical/Immunology (<i>p.3</i>)	12.5
526-324 Immunological Techniques (<i>p.4</i>)	12.5
534-303 Molecular Pharmacology (<i>p.2</i>)	12.5
534-306 Drug Discovery (<i>p.2</i>)	12.5

Core biotechnology subject

600-205 Biotechnology in Practice

Credit points: 12.5

HECS-band: 2

Coordinator: Assoc Prof C Cobbett

Prerequisites: Biochemistry 521-211; and one of genetics 652-214, microbiology 526-201, botany 606-205, or biochemistry 521-220.

Corequisites: Biochemistry 521-212.

Contact: 24 lectures and 24 hours of other activities (assignments, e.g. 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 is biotechnology?; 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.

