

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 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

200-level science subjects satisfying prerequisites for 300-level subjects forming a life sciences major in anatomy, biochemistry and molecular biology, botany, cell biology, chemistry, genetics, immunology, microbiology, neuroscience, pathology, pharmacology, physiology, reproduction and development, or zoology.

Students must also take 600-205 Biotechnology in Practice (*p.1*). This subject has 200-level prerequisites and corequisites.

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 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 laboratory subjects totaling 25 points must be included, either within the life sciences major or the biotechnology major.

Core biotechnology subject

600-205 Biotechnology in Practice

Credit points: 12.5

Coordinator: Dr E Newbigin

Prerequisites: Biochemistry 521-211.

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

Pre or Corequisites: One of genetics 652-214, microbiology 526-201 or biochemistry 521-220.

BBiomedSc students: 521-213 (prerequisite), 536-250 (corequisite).

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 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: Two written assignments totalling 3000 words due during the semester (30%); a 45-minute written class test held mid-semester (10%); a 2-hour written examination in the examination period (60%).

300-level biotechnology subjects

521-301 Protein Structure, Design & Engineering

See full subject details on page 2.

521-302 Functional Genomics

See full subject details on page 3.

521-303 Molecular Aspects of Cell Biology

See full subject details on page 3.

521-307 Biomolecular Structure & Bioinformatics

See full subject details on page 4.

606-306 Plant Molecular Biology & Biotechnology

See full subject details on page 3.

606-309 Frontiers of Cell Biology

See full subject details on page 3.

610-332 Bio-organic Chemistry

See full subject details on page 6.

610-333 Molecular Technology

See full subject details on page 6.

652-301 Genomes and Evolution

See full subject details on page 2.

652-302 Molecular Genetics

See full subject details on page 2.

652-303 Developmental and Cellular Genetics

See full subject details on page 2.

652-305 Human Genetics

See full subject details on page 2.

526-301 Microbial Cells and Genomes

See full subject details on page 2.

526-302 Microbial Biotechnology

See full subject details on page 2.

526-304 Principles of Immunology

See full subject details on page 2.

531-303 Molecular/Genetic Basis of Disease-Lect

See full subject details on page 2.

136-337 Biotechnology in Modern Society (Sci.3)

See full subject details on page 8.

300-level biotechnology practical laboratory subjects

521-321 Gene Technology & Protein Expression

See full subject details on page 4.

521-322 Protein Biochemistry and Proteomics

See full subject details on page 4.

610-399 Chemical Research Project

See full subject details on page 7.

652-304 Genetic Analysis

See full subject details on page 2.

652-306 Experimental Genetics

See full subject details on page 3.

526-321 Molecular Microbiology Techniques

See full subject details on page 3.

526-324 Immunological Techniques

See full subject details on page 3.

526-326 Projects: Immunology

See full subject details on page 4.

526-327 Projects: Microbiology

See full subject details on page 4.

534-306 Drug Discovery

See full subject details on page 2.

516-302 Developmental Biology

See full subject details on page 2.

654-304 Reproduction

See full subject details on page 3.