Master of Biotechnology (LS86)

Year offered: 2011
Admissions: Yes
CRICOS code: 018479B
Course duration (full-time): 3 semesters (1.5 years)
Course duration (part-time): 6 semesters (3 years)
Domestic Fees (indicative): 2011: Full fee tuition $9,750 (indicative) per semester
International Fees (indicative): 2011: $12,000 (indicative) per semester
Domestic Entry: July (Note: Students commencing in July, enrol in Semester 2 units first) *Also see "ENTRY REQUIREMENTS" below
International Entry: July (Note: Students commencing in July, enrol in Semester 2 units first) *Also see "ENTRY REQUIREMENTS" below
Total credit points: 144
Standard credit points per full-time semester: 48
Standard credit points per part-time semester: 24
Course coordinator: Dr Mark O'Brien
Campus: Gardens Point

Overview
The postgraduate coursework programs in Biotechnology will suit anyone who has a recent undergraduate degree (preferably, however not necessarily, in science) and who wishes to gain training and advanced specialisation in general, medical and/or plant biotechnology. The programs also cater for working scientists, support staff or students involved in commercial aspects of biotechnology, who wish to update their theoretical and practical biotechnology skills. Science-based biotechnology units emphasising laboratory skills and hands-on laboratory experimentation feature prominently in the programs, which cover contemporary techniques in biotechnology. New technology is incorporated as it becomes available. The programs also offer students opportunities to pursue studies related to the business of biotechnology, marketing, commercialisation, as well as the legal and ethical aspects of biotechnological applications.

Course Design
The Master of Biotechnology is designed to give students further training and specialisation in general medical and/or plant biotechnology. This program follows successful completion of core and optional units offered in both the Graduate Certificate in Biotechnology and Graduate Diploma in Biotechnology.

Further Information
For further information about this course, please contact:

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Course structure - Full-time

Year 1, Semester 2 (MODULE 1)
LSN101 Molecular Biosciences
LSN102 Cellular Biosciences
LSN103 Postgraduate Learning and Research Skills
LSN483 Molecular Biology Techniques

Year 2, Semester 1 (MODULE 2)
LSP127 Business Aspects of Biotechnology
Either
LSN583 Genetic Research Technology
Or
LSN585 Plant Genetic Manipulation
In consultation with the course coordinator, choose 24 credit points from the following units:
LQB582 Biomedical Research Technologies
LSN583 Genetic Research Technology
LSN584 Medical Cell Biology
LSN585 Plant Genetic Manipulation
LWN135 Law, Justice and New Genetic Technologies

Year 2, Semester 2 (MODULE 3)
BSB311 Innovation Commercialisation Strategies
Either
LSN684 Medical Biotechnology 2
Or
LQB685 Plant Microbe Interactions
In consultation with the course coordinator, choose 24 credit points from the following units:
LQB484 Introduction to Genomics and Bioinformatics
LQB681 Biochemical Research Skills
LQB682 Protein Biochemistry and Bioengineering
LQB685 Plant Microbe Interactions
LSN684 Medical Biotechnology 2
MGN409 Introduction to Management

Course structure - Part-time
UNIT SYNOPTSES

BSB311 INNOVATION COMMERCIALISATION STRATEGIES

Students study strategies and approaches used in industry and government organisations for the research, development and commercialisation of biotechnology innovations. The unit offers the opportunity to read widely as well as in depth about the commercialisation of molecular biology and biotechnology research. Theoretical concepts are integrated with prepared case studies prior to guest speaker seminars.

Prerequisites: MGB223 or LSP127
Contact hours: 3 per week
Campus: Gardens Point
Teaching period: 2011 SEM-2

LQB484 INTRODUCTION TO GENOMICS AND BIOINFORMATICS

The completion of the Human Genome project, along with similar projects on other organisms of a prokaryote and eukaryote nature, marked the beginning of a major revolution in fundamental biology that changed our understanding of the natural world. To understand how information on genome structure-function relationships (ie bioinformatics) is being used in areas such as gene discovery, disease diagnosis and drug development, students need to understand how the information content of DNA and proteins is extracted and analysed. This unit introduces students to the approaches to database mining and genome exploration.

Prerequisites: LQB383 or LSB338 or LSN101 and LSN102
Antirequisites: LSB537, LSB619, LSB469
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2011 SEM-2

LQB582 BIOMEDICAL RESEARCH TECHNOLOGIES

This unit will study the technical principles and practical techniques that are essential for advancing research and development in biochemistry and biotechnology.

Prerequisites: LQB381 or LSB308
Antirequisites: LSB527
Credit points: 12
Contact hours: 4 per week
Campus: Gardens Point
Teaching period: 2011 SEM-1

LQB681 BIOCHEMICAL RESEARCH SKILLS

In the real world, the design and completion of successful research and/or business projects demand that individuals gather information, solve problems, work effectively as a part of a team and analyse and communicate results in a critical manner. This unit offers opportunities for you to develop these skills that are valued highly by potential employers and research project leaders. The aim of this unit is to assist you to demonstrate and strengthen a number of generic research skills in a mentored problem-based
learning environment that mirrors a real-world research team and the challenges that they face.

**Prerequisites:** LQB381 or LS308. Students with equivalent study can apply for a requisite waiver

**Equivalents:** LSN607  **Credit points:** 12  **Contact hours:** 5 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-2

**LQB682 PROTEIN BIOCHEMISTRY AND BIOENGINEERING**
This unit is designed to give you the essential concepts and techniques driving research and industrial biotechnology so that you will be equipped for multiple careers in the biological sciences. The skills you develop will allow you to enter a practical laboratory environment or to apply your knowledge in related areas of evaluations of technologies and intellectual property.

**Prerequisites:** LQB381 or LS308 or LSB325 or (LSN101and LSN102)  **Antirequisites:** LSB605, LSB608  **Credit points:** 12  **Contact hours:** 5 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-2

**LQB685 PLANT MICROBE INTERACTIONS**
Microorganisms, including viruses, bacteria and fungi, cause many devastating diseases in plants and are responsible for significant losses to crops in Australia and Internationally. Diagnosis and control of these organisms, which vary considerably in their biology and infection strategies, is an ongoing challenge. However, plant genetic engineering approaches are now offering new and novel solutions to these problems. These approaches are of widespread scientific, commercial and humanitarian interest. The application of current technologies and development of new, novel technologies relies on an understanding of the biology of the organism, of the way in which these organisms cause disease in plants and the mechanism by which many plants are resistant.

**Prerequisites:** LQB483 or LSN483  **Antirequisites:** LSB578  **Assumed knowledge:** LQB386 recommended  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-2

**LSN101 MOLECULAR BIOSCIENCES**
For you to be successful in the more advanced units offered in the coursework programs in biotechnology you must have a sound knowledge and understanding in the key areas of molecular biology, cell biology, biochemistry and microbiology and be able to demonstrate your learning in a practical way in the laboratory. This unit, in conjunction with LSN102 Cellular Biosciences and LQB483 Molecular Biology Techniques, will help you to achieve those goals. This unit aims to facilitate your active learning (knowledge, understanding and application) of cell and molecular biology appropriate for a postgraduate degree in biotechnology.

**Corequisites:** LSN102, LSN483  **Assumed knowledge:**

Students should enrol in either LSN102 or LSN483 in the same semester if not already completed  **Credit points:** 12  **Contact hours:** 5 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-2

**LSN102 CELLULAR BIOSCIENCES**
Central to your understanding of the fundamental theory underlying medical and plant biotechnology is an understanding of normal and disease processes, and the events and changes that occur in structure and function at the cellular level. This unit gives you the opportunity to explore these key aspects before proceeding to more advanced concepts in biotechnology. This unit aims to provide high level understanding of cellular processes and responses, as a fundamental basis for further postgraduate studies in cellular and molecular biosciences.

**Corequisites:** LSN101, LSN483  **Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-2

**LSN103 POSTGRADUATE LEARNING AND RESEARCH SKILLS**
This unit assists you in developing of a range of generic and specific skills and attributes to be a successful postgraduate student. On completion of the unit, you will: (i) know how to manage information tools and resources effectively in order to advance your university study and become an independent and competent learner (ii) build and increase your knowledge and competence in using basic software applications and general knowledge of information communication technologies and (iii) develop key skills in project design and management. This unit consists of a series of workshops, seminars and on-line tutorials presented by a team of teaching and learning support staff from across the university.

**Credit points:** 12  **Contact hours:** 4 per week  **Campus:** Gardens Point  **Teaching period:** 2011 SEM-2

**LSN483 MOLECULAR BIOLOGY TECHNIQUES**
Fundamental and advanced skills in molecular biology are essential prerequisites for biotechnology. Through close alignment of theoretical concepts and practical skills, this strongly lab-oriented postgraduate unit allows you to develop expertise in modern recombinant DNA techniques and an understanding of strategies used to identify and manipulate genes. Integration between theory and practice in this unit is designed to develop competence, independence and high-order critical thinking skills so as to fully prepare you for the suite of advanced units in the Postgraduate Coursework Biotechnology programs. The overall aim of this unit is to develop concepts and laboratory skills in the characterisation and analysis of nucleic acids and recombinant DNA technologies and to extend these technologies into the understanding and application of the
different strategies for gene discovery.

Corequisites: LSN101, LSN102  Assumed knowledge:
Students should enrol in either LSN101 or LSN102 in the same semester if not already completed.  Equivalents: LQB483, LSB468  Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LSN583 GENETIC RESEARCH TECHNOLOGY
The tools available for the discovery and manipulation of new genes are increasing exponentially and, in turn, this is having a significant impact in many areas of the life sciences. The true potential for this ultimately relies on the ability to link genes and their function. There are many strategies, both targeted and global, which facilitate an understanding of gene and genome structure function relationships. These strategies rely on integrated technologies based on molecular genetics, molecular biology and genetic engineering. The identification of function leads then to unlimited potential for detection and manipulation of these genes in human, animal and plant systems.

Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LSN584 MEDICAL CELL BIOLOGY
This unit builds and extends the understanding of basic theoretical and practical aspects of molecular cell biology developed in previous cell and molecular biology units. Medical Cell Biology develops and extends the context of the cellular environment and its central role within the organism providing all of the biological functions required by the organism to survive, defend and protect itself from disease and trauma. An understanding of cell biology theory and molecular mechanisms of animal development and disease is essential for introduction to higher level units in medical biotechnology.

Prerequisites: LSN101 and LSN102  Antirequisites: LSB503, LSB449, LQB584  Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LSN585 PLANT GENETIC MANIPULATION
The potential of plant biotechnology can only be recognised as a result of the significant advances being made in technologies enabling the genetic manipulation of plants. Familiarity with the strategies, techniques and breadth of applications is essential as a basis for anyone planning a career in plant biotechnology. The unit is designed with a significant emphasis on achieving technical expertise in plant genetic manipulation and control of gene expression.

Credit points: 12  Contact hours: 4 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LSN684 MEDICAL BIOTECHNOLOGY 2
Students undertaking Medical Biotechnology 2 should have a thorough understanding of diagnostics and therapeutics in the commercial environment of biotechnology. A comprehension of approaches and the applications used as therapeutic interventions in medicine is necessary for this understanding. This unit focuses on current state-of-the-art applications within therapeutic biotechnology as directed to novel drug discovery and drug optimisation and to the development of novel therapeutic strategies, such as gene therapy, transplantation and immunotherapy. It will prepare you for subsequent involvement in medical research and/or employment in medical laboratories. The aim of this unit is to enable you to acquire a thorough understanding of current and emerging strategies for therapeutic interventions in the treatment of disease.

Prerequisites: LSN101 and LSN102  Antirequisites: LQB684  Assumed knowledge: A background understanding of Cell and Molecular Biology as provided in LQB383, LQB483 and LQB584 is assumed knowledge  Equivalents: LSN609  Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LSP127 BUSINESS ASPECTS OF BIOTECHNOLOGY
Supporting a successful biotechnology industry in Australia requires an entrepreneurial framework to be developed which assists the efforts of both researchers and innovators. This unit integrates those essential entrepreneurial techniques of launching a biotechnology business. The unit focus is on the research and development of industrial products and commercialising innovations developed in this industry. On completion of this unit the student will be able to identify and analyse entrepreneurial opportunities and evaluate these opportunities within biotechnology together with the ability to identify and comprehend the steps involved in setting up a new biotechnology enterprise.

Credit points: 12  Contact hours: 5 per week  Campus: Gardens Point  Teaching period: 2011 SEM-1

LWN135 LAW, JUSTICE AND NEW GENETIC TECHNOLOGIES
Our ability to test, screen and manipulate the human genome is made possible by recent technological breakthroughs in science. The science of genetics is not new, but its public profile has never been higher. Current initiatives in genetic knowledge have been described as an international voyage of scientific discovery. The scientific findings are prompting major rethinking of concepts of law and justice. The legal community faces a perpetual challenge in keeping pace with the revolution in genetics. This unit looks at some legal implications of this revolution and charts the major responses of our legal system to modern genetics and biotechnology.

Credit points: 12  Contact hours: 26 hrs in total
MGN409 INTRODUCTION TO MANAGEMENT
This unit examines the following: the functions and roles of managers; concepts and principles and their practical applications; the key management functions; areas of planning, organising, staffing, directing and controlling; production/operations management and the management of quality; entrepreneurship and business planning; and important problems, opportunities and trends facing managers in Australia analysed from the viewpoint of relevant academic disciplines.

Antirequisites: GSN401 and GSZ401    Credit points: 12
Contact hours: 3 per week    Campus: Gardens Point
Teaching period: 2011 SEM-1 and 2011 SEM-2