

REQUIREMENTS FOR THE MASTER OF SCIENCE DEGREE IN BIOTECHNOLOGY & BIOINFORMATICS (33-34 UNITS)

(Pending approval from the Chancellor's Office and offered through California State University Channel Islands Extended Education Program)

PROGRAM DESCRIPTION

The Master of Science in Biotechnology and Bioinformatics is a professional degree program designed to meet the needs of biotechnology industry and related public and private agencies and organizations. The program combines rigorous scientific training in interdisciplinary areas in biotechnology and bioinformatics with course work and experience in business management and regulatory affairs. The program includes a set of core courses with two emphases to choose from: biotechnology and bioinformatics.

Biotechnology is centered in the laboratory and employs sophisticated molecular biology techniques for applications in human and animal health, agriculture, environment, and specialty biochemical manufacturing. In the next century, the major driving force for biotechnology will be the strategic use of the data derived from large-scale genome sequencing projects. Bioinformatics turns raw data from genome

sequencing and new experimental methodologies such as microarrays and proteomics into useful and accessible information about gene function, protein structure, molecular evolution, drug targets and disease mechanisms using computational analyses, statistics, and pattern recognition. Our approach also includes team projects drawn from biotechnology industries to focus on real-world problems and applications of biological and computational sciences and to inculcate interpersonal as well as problem-solving skills using multiple perspectives.

Graduates from this program will develop analytical, managerial and interpersonal skills along with sophisticated expertise in biotechnology and bioinformatics. They will be ready to make immediate contributions to scientific research and development, management in biotechnological, biomedical and pharmaceutical industries, biotechnology law and regulations, governmental or environmental agencies, research institutes, consulting firms, research and clinical laboratories, private and public health organizations, or education.

ADMISSION REQUIREMENTS

1. Applicants must have a BS/BA degree in Biology, Computer Science, Chemistry, Biochemistry, or Mathematics. Alternatively, applicants with a BA/BS degree in any field and equivalent work experiences in one of the above fields may be granted conditional admission, and they must fulfill all conditional requirements before they can be fully classified.
2. Applicants seeking admission to the professional MS in Biotechnology and Bioinformatics program must be officially accepted into the CSUCI academic program.
3. Applicants must declare themselves as graduate students in the professional MS degree program in Biotechnology and Bioinformatics.
4. Applicants will be evaluated by the program admissions committee which will consider the applicants in the context of the total applicant pool using our general admission standards. The following materials are required for our evaluation and admission process:
 - Applicants must submit to the program their transcript from their undergraduate institution, Graduate Record Examinations (GRE) General Test scores or the Medical College Admission Test (MCAT) scores.
 - Applicants who have received their undergraduate degrees from a university where English is not the language of instruction, or have studied fewer than two years at a university where instruction is in English, must submit to the program their Test of English as a Foreign Language (TOEFL) scores for evaluation.
 - A one page "Statement of Purpose" from the applicant and two letters of recommendations from people who are able to judge the applicant's capacity for both academic and professional success should be submitted to the program for evaluation.

DEGREE REQUIREMENTS

Common Core Courses (16 units)

BINF	500	DNA & Protein Sequence Analysis (3)
BIOL	502	Techniques in Genomics & Proteomics (2)
BIOL	503	Biotechnology Law and Regulation (3)
MGT	471	Project Management (3)
BIOL	600	Team Project (4)
BIOL	601	Seminar Series in Biotechnology and Bioinformatics (1)

FOR BIOTECHNOLOGY EMPHASIS (17 UNITS)

Required Courses (7 units)

BIOL	504	Molecular Cell Biology (3)
BIOL	505	Molecular Structure (4)

Electives (10 units)

A minimum of 10 units chosen from the following courses and/or from the elective courses under the Bioinformatics Emphasis:

BIOL	506	Molecular Evolution (4)
BIOL	507	Pharmacogenomics and Pharmacoproteomics (3)
BIOL	508	Advanced Immunology (4)
BIOL	509	Plant Biotechnology (4)
MGT	421	Human Resource Management (3)

FOR BIOINFORMATICS EMPHASIS (18 UNITS)

Required Courses (12 units)

BINF	501	Biological Informatics (3)
BINF	510	Database Systems for Bioinformatics (3)
BINF	511	Computational Genomics (3)
BINF	513	Programming for Bioinformatics (3)

Electives (6 units)

A minimum of two courses chosen from the following and/or from the elective courses under the Biotechnology Emphasis, with at least one course in the BINF category:

BINF	512	Algorithms for Bioinformatics (3)
BINF	514	Statistical Methods in Computational Biology (3)
PHYS	445	Image Analysis & Pattern Recognition (3)
MGT	421	Human Resource Management (3)

PROPOSED COURSE OF STUDY

For Biotechnology Emphasis

FIRST YEAR (13 UNITS)

First Semester

MGT	471	Project Management (3)
BIOL	504	Molecular Cell Biology (3)

Second Semester

BINF	500	DNA and Protein Sequence Analysis (3)
BIOL	503	Biotechnology Law and Regulation (3)
BIOL	601	Seminar Series in Biotechnology and Bioinformatics (1)

SECOND YEAR (20 UNITS)

First Semester

BIOL	502	Techniques in Genomics and Proteomics (2)
BIOL	505	Molecular Structure (4)
Electives (3)		

Second Semester

BIOL	600	Team Project (4)
Electives (7)		

For Bioinformatics Emphasis

FIRST YEAR (13 UNITS)

First Semester

MGT	471	Project Management (3)
BINF	501	Biological Informatics (3)

Second Semester

BINF	500	DNA and Protein Sequence Analysis (3)
BIOL	503	Biotechnology Law and Regulation (3)
BIOL	601	Seminar Series in Biotechnology and Bioinformatics (1)

SECOND YEAR (21 UNITS)

First Semester

BIOL	502	Techniques in Genomics and Proteomics (2)
BINF	510	Database Systems for Bioinformatics (3)
BINF	511	Computational Genomics (3)

Second Semester

BINF	513	Programming for Bioinformatics (3)
BIOL	600	Team Project (4)
Electives (6)		