University of Maryland University College

Master of Science in Biotechnology Studies (BIOT)
Information and Technology Systems Department

PROGRAM ASSESSMENT PLAN

Program Outcomes and Learning Assessment Criteria

Summer 2007

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PROGRAM OVERVIEW

The Master of Science in Biotechnology Studies Program provides a thorough grounding in science, business, and technology issues unique to the biotechnology industry. Graduates of the program, regardless of the level of prior technical education, obtain a greater grasp of the technologies currently in use in the biotechnology industry as well as a deeper understanding of the "business of biotechnology," through the core courses. They also develop an understanding and appreciation of the ethical and societal issues of biotechnology and some basic knowledge of bioinformatics. Subsequently, each specialization provides its own in-depth understanding of either the management of biotechnology, biodefense and biosecurity, or bioinformatics.

PROGRAM OF STUDY

INITIAL REQUIREMENTS: Students must complete these courses if deemed necessary

COMM 600	Academic Writing for Graduate Students	3 credit hours
BIOT 601	Molecular Biology for Business Managers	3 credit hours

CORE COURSES

UCSP 611	Introduction to Graduate Library Research Skills	0 credit hours
BIOT 640	Societal Issues in Biotechnology	3 credit hours
BIOT 610	Introduction to Bioinformatics	3 credit hours
BIOT 643	Techniques of Biotechnology	3 credit hours
BIOT 645	Business of Biotechnology	3 credit hours
PMAN 634	Project Management	3 credit hours

After completion of the core courses students can choose from any of the three specializations:

Bioinformatics

BIFS 613	Statistical Processes for Biotechnology	3 credit hours
CSMN 661	Relational Database Systems	3 credit hours
BIFS 614	Data Structures and Algorithms	3 credit hours
BIFS 617	Advanced Bioinformatics	3 credit hours
BIFS 618	JAVA Programming in Bioinformatics	3 credit hours
BIFS 619	Statistical Analysis of Gene Expression data	3 credit hours
BTMN 670	Capstone in Biotechnology	3 credit hours

or

Biotechnology Management

BTMN 641	Commercializing Biotechnology in Early-Stage Ventures	3 credit hours
BTMN 642	Selection and Evaluation of Biotechnology Projects	3 credit hours
BTMN 644	Biotechnology and the Regulatory Environment	3 credit hours
TMAN 611	Principles of Technology Management	3 credit hours
BTMN 646	Marketing of Biotechnology Products and Services	3 credit hours
BTMN 647	Technology Transfer and Legal Affairs in Biotechnology	3 credit hours
BTMN 670	Capstone in Biotechnology	3 credit hours

or

Biosecurity and Biodefense

BSBD 640	Agents of Bioterrorism	3 credit hours
BSBD 641	Bio-security and Bioterrorism	3 credit hours
BSBD 642	Advanced Bio-security & Bioterrorism	3 credit hours
BSBD 643	Infectious Diseases and their emergence	3 credit hours
BSBD 644	Epidemiology and detection of Infectious diseases	3 credit hours
BSBD 645	Bio-defense and Information Technology	3 credit hours
BTMN 670	Capstone in Biotechnology	3 credit hours

DEVELOPMENT OF PROGRAM OUTCOMES

The table below identifies the curricular influences that support the program outcomes specific to the Master of Science in Biotechnology Studies Program.

SOURCES/RESOURCES PROVIDING CURRICULAR FOUNDATION FOR PROGRAM OUTCOMES Master of Science in Biotechnology Studies Program		
SOURCE	DESCRIPTION	WEB ADDRESS OR DOCUMENT NAME (if applicable)
Core Learning Areas of the UMUC Graduate School of Management and Technology	UMUC degree programs are required to imbed identified institutional CLAs into each degree program. The CLAs for the Graduate School of Management and Technology are: • Written Communication (COMM) • Technology Fluency (TECH) • Information Literacy (INFO) • Quantitative Literacy (QUAN) • Critical Thinking (THIN) The expanded definition for each Core Learning Area was considered in creating the respective program outcome.	UMUC Institutional Plan for the Assessment of Student Learning
The Management of Technological Systems Department Advisory Board	Advisory board members identified skills and competencies necessary for the biotechnology professional.	
An informal survey of local biotech companies determined the needs, interests, and skills necessary for incoming employees.		

PROGRAM OUTCOMES

The program outcomes for the Master of Science in Biotechnology Studies Program are delineated below. The program outcomes describe the expectations for all graduates of the Master of Science in Biotechnology Studies Program.

PROGRAM OUTCOMES Master of Science in Biotechnology Studies Program	
CORE LEARNING AREA	PROGRAM OUTCOME
COMM	Use a variety of effective and efficient communication skills in the study of biotechnology.
TECH	Demonstrate understanding of the concepts and principles underlying the science and applications of biotechnology.
INFO	Investigate the application of science and business concepts to hypothetical situations.
QUAN	Derive logical conclusions based on the available biological data and acquired knowledge.
THIN	Develop critical thinking and problem solving skills pertinent to the field of biotechnology.

ALIGNMENT OF PROGRAM OUTCOMES WITH LEARNING OBJECTIVES AND ASSESSMENT METHODS

The following grid aligns the program outcomes of the Master of Science in Biotechnology Studies Program with: 1) learning objectives from the designated program coursework and 2) specific methods used to assess student learning within the degree program.

CURRICULAR ALIGNMENT Master of Science in Biotechnology Studies Program			
CORE LEARNING AREA	PROGRAM OUTCOME	LEARNING OBJECTIVE(S) AND CORRELATING COURSEWORK	METHOD(S) OF ASSESSMENT
COMM	Use a variety of effective and efficient communication skills in the study of biotechnology.	Identify corporate responsibilities and strategies towards approaching societal issues and responding to social concerns pertaining to biotechnology. (BIOT 640)	Individual Report/Paper
TECH	Demonstrate understanding of the concepts and principles underlying the science and applications of biotechnology.	Examine the potential technology platforms while reviewing the trend in today's biotechnological research and development.. (BIOT 643)	Other: Group Project
INFO	Investigate the application of science and business concepts to hypothetical situations.	Develop skills for research, critical reading and comprehension of a scientific paper, data analysis and scientific presentation that are used in the industry and academia. (BIOT 643)	Other: Group Project t
QUAN	Derive logical conclusions based on the available biological data and acquired knowledge.	Demonstrate conceptual understanding and proficiency in conducting research on a variety of biological problems using the theory and techniques of bioinformatics. (BIOT 610)	Other: Homework Assignment
THIN	Develop critical thinking and problem solving skills pertinent to the field of biotechnology.	To develop critical thinking skills in weighing the risks and benefits of biotechnological developments and in evaluating the rigor of testing and controls when new products are released. (BIOT 640)	Other: Group Project