

Tompkins Cortland Community College
Master Course Syllabus

Course Discipline and Number: BIOT 295

Year: 2023-2024

Course Title: Biotechnology Seminar

Credit hours: 3

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for accommodations. All course materials are available in alternate formats upon request.*

Course Description

Designed as a capstone event for the second-year student completing requirements for an A.S. degree or certificate in Biotechnology. The course is also appropriate for natural science, health, forensic, and agricultural science majors who wish to perform independent research. The experience provides the opportunity for the student to assimilate the knowledge and understanding gained from his/her program, and to demonstrate his/her mastery of the subject area. Each student will select a topic, research and assemble background information, delineate a current problem issues, implement a solution, and present his/her findings at the conclusion of the seminar. Prerequisites: RDNG 116 if required by placement testing; ENGL 101; MATH 120 or higher; BIOL 206 or 221; two 200 level biology courses selected from other than BIOL 206 or 221; and permission of the instructor. 3 Cr. (9 Lab) Spring semester.

Course Context/Audience

The Biotechnology Seminar is designed to bridge the fundamental principles and concepts of modern biology to their application in the real world. Students seeking an A.S. degree in Biotechnology are required to demonstrate mastery of the subject matter using acquired learning and technical skills, and an understanding of the biotechnology industry by their capacity to formulate a business/research plan in pursuit of their career objectives. Students pursuing a Certificate in Biotechnology must research and present a topic on biotechnology applicable to their educational/career goals.

This course is designed specifically for students completing requirements for the Biotechnology degree. In addition, it is intended for students pursuing advanced *graduate* studies in the natural, life, and health sciences, requiring advanced bachelor level degrees.

Basic Skills/Entry Level Expectations

Writing: WC College level writing skills are required. See course co-requisites or pre-requisites.

Math: M4 Completed MATH 095(if needed) - Course requires the use of basic mathematical skills plus basic algebra skills.

Reading: R4 Before taking this course, students must satisfactorily complete RDNG 116 or have assessment indicating that no reading course was required.

Other: Ability to plan, design, and compose PowerPoint presentation material

Course Goals

The Biotechnology Seminar will provide a forum for the student to

1. Develop and demonstrate his/her understanding of the driving forces behind biotechnology.
2. Use necessary skills for independent research.
3. Demonstrate his/her ability to formulate long-term objectives.
4. Develop and demonstrate his/her presentation and communication skills.
5. Develop and demonstrate his/her abilities to work with others and accept constructive criticism.

Course Objectives/Topics

Objective/Topic	% Course
Discussions on current topics in Biotechnology	20%
Methods to research selected topics	30%
Formulating and writing a business/research proposal	30%
Presentation of a business/research plan	20%

General Education Goals - Critical Thinking & Social/Global Awareness

CRITICAL THINKING OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<p>Students will be able to</p> <ul style="list-style-type: none">➤ develop meaningful questions to address problems or issues.➤ gather, interpret, and evaluate relevant sources of information.➤ reach informed conclusions and solutions.➤ consider analytically the viewpoints of self and others.	<p>The course is designed as a scientific methods course. Students devise an experimental plan to develop a technology relevant in the field. Students are presented a status report on several ongoing 'core' biotech projects. They must choose one aspect of the project to investigate and formulate a hypothesis to test.</p> <p>Review of primary reference material is required to find previous scientific work relevant to the current problem. Students must seek primary reference material that addresses the problem they choose and develop a method to solve their problem. A method must be approved before embarking on experimentation.</p> <p>Students must adapt current technologies/methods to the task at hand and delineated measurable outcomes. Based on experimental results students must evaluate the utility of their methods and whether or not to continue.</p> <p>Students must write a comprehensive report and present their work to the group; open to discussion and critique. Students present progress reports during weekly group discussion and critically evaluate each other's work. A final report on their work is presented for peer evaluation.</p>

SOCIAL/GLOBAL AWARENESS OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<ul style="list-style-type: none"> ➤ Students will begin to understand how their lives are shaped by the complex world in which they live. ➤ Students will understand that their actions have social, economic and environmental consequences. 	<p>Students actively contribute toward creating new knowledge/technology that builds off the work of previous graduates. The research projects revolve around existing problems, therefore they start where others left off, hoping to make progress on the project so others can continue to build on their work.</p> <p>The process of science is usually altruistic and the student projects revolve around helping explain the ramifications of some 'controversial' technology. Stem Cell project: education about where stem cells originate. Biofuel project: how to develop a sustainable independence from fossil fuels. Game Fowl project: using pedigree analysis to demonstrate evolutionary connections among species.</p> <p>Biotechnology is the business (application) of science. The long-term objective for each student project is to reduce the technology to marketable form. The Stem Cell project builds on a Licensing Agreement with WARDs Natural Science to develop a lab kit. The Biofuel project hopes to design and sell a small scale Et-OH production unit for home use. The Game Fowl project hopes to offer pedigree analysis of show birds for fee.</p> <p>All scientific laboratories (education, research and industry) must abide by regulatory guidelines covering waste, biohazards and safety. Inherent to each project the students must be incorporate efficient use of resources for' economy of scale.</p>

Instructional Methods

The Biotechnology Seminar should begin with class discussions investigating current topics in the field. Students should be encouraged to research issues that may be relevant to their career objectives. This will help the student to begin thinking about long-term objectives based on the acquired knowledge and skills developed over his/her course of study in Biotechnology.

Students should be instructed on several types of presentation; either as a business plan, research proposal, or dissertation on a bio-ethical issue. The seminar should be structured to accommodate open discussion of each student's progress on his/her project, novel information resources, impediments to data mining, and the organization of student presentations. Students should be required to provide feedback on other students' projects, including brainstorming to overcome hurdles or contributing ideas that could take the project in another direction. These exercises should be intended to instruct and direct the student on methods of independent research, and to encourage the student to seek outside help in this type of endeavor.

Students should be required to include in their final presentation the broader ramifications of their proposal; how it may impact the individual, society, and the biotechnology industry itself. As a result, students will evaluate the prospects of their proposals and put them in perspective with other developments in the field.

The course should culminate with the students presenting their proposals to their peers. This exercise provides a sense of accomplishment and helps students develop the essential communication skill of persuasion necessary in all careers.

Methods of Assessment/Evaluation

Method	% Course Grade
Presentation of topic/research	20%
Formulation of proposal	20%
Active participation in classroom discussions and seminar proceedings	20%
Continual updates (verbal & written) on research progress	20%
Written Final Project Report	20%

Text(s)

Successful Scientific Writing, J. Matthews, J. Bowen, and R.W. Matthews, 2nd Edition, © 2000 Cambridge University Press.

Bibliography

Accumulated materials from previous student projects (reference lists, lab reports, and power point presentations).

Other Learning Resources**Audiovisual**

No resources specified

Electronic

BIOLINK <http://www.bio-link.org/index.htm>

MEDSCAPE's Infectious Diseases MedPulse(R) medscape.com/infectiousdiseaseshome

PubMed Central (PMC) is the U.S. National Institutes of Health (NIH) free digital archive of biomedical and life sciences journal literature.

MedPulse, a weekly index of key news and features on Medscape's specialty sites compiled by Medscape's editors.

Other

Students will need access to PowerPoint presentation materials.

A course management site such as ANGEL should be used to post course material including information about current topics being covered and discussed in the seminar.