Administrative Unit: Science Department

Course Prefix and Number: BIOL 410

Course Title: Molecular Biotechnology

Number of Credit Hours: 3 Lecture Hours: 3 Laboratory Hours: 0

Catalog Description: Methodology and applications in molecular biology, with a special emphasis on biotechnology. Designed to prepare preprofessional students for later studies. Prerequisites: BIOL 110, CHEM 210 and BIOL 342 (with a grade of C or better). Concurrent enrollment in BIOL 410L is strongly recommended. Offered even spring.

Prerequisite(s)/Corequisite(s): BIOL 110, CHEM 210 and BIOL 342 (with a grade of C or better). Concurrent enrollment in BIOL 410L is strongly recommended.

Text(s): Molecular biotechnology books designed to introduce to a wide range of applications are suitable; text should be supplemented with current peer-reviewed journal articles.

Grace, E. Biotechnology Unzipped: Promises and Realities. National Academy Press


Course Objectives:
- To examine basic techniques used in molecular biotechnology.
- To apply molecular and biotechnology techniques to experimental situations.
- To assess the benefits and hazards of molecular biotechnology.

Measurable Learning Outcomes:
- Describe the different techniques used in recombinant DNA technology.
- Determine which technique(s) are appropriate in solving a specific experimental problem.
- Delineate the steps used in gene manipulation, gene expression techniques, and recombinant protein development, and relate these processes to current commercial and research applications.
- Describe the applications of molecular biology in areas such as transgenic plants and animals, vaccines and therapeutic agents.
- Assess the realized and/or potential benefits and risks associated with molecular biotechnology.
Explain the processes used to sequence entire genomes, and give examples of the uses and implications of the Human Genome Project.

Topical Outline (major areas of coverage):

- History of molecular biotechnology
- Recombinant DNA technology
- Manipulation of gene expression in prokaryotes
- Recombinant protein production in eukaryotic cells
- Production of therapeutic agents, vaccines, commercial products by recombinant microorganisms
- Bioremediation
- Microbial insecticides
- Methodology and applications of genetic engineering of plants
- Transgenic animals
- Human molecular genetics, gene therapy
- Legal and patent issues in biotechnology

Material from this course may be tested on the Major Field Test (MFT) administered during the Culminating Experience course for the degree.

Recommended maximum class size for this course: 20

Library Resources:
Online databases are available at http://www.ccis.edu/offices/library/resources.asp. You may access them from off-campus using your eServices login and password when prompted.

Prepared by: Julie Estabrooks

Name

Signature

Date: October 14, 2005

NOTE: The intention of the master syllabus is to provide an outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught or where it is taught. Faculty members teaching this course for Columbia College are expected to facilitate learning pursuant to the course objectives and cover the subjects listed in the topical outline. However, instructors are also encouraged to cover additional topics of interest so long as those topics are relevant to the course’s subject. The master syllabus is, therefore, prescriptive in nature but also allows for a diversity of individual approaches to course material.