Administrative Unit: Science Department

Course Prefix and Number: BIOL 410L

Course Title: Methods in Molecular Biotechnology

Number of: Credit Hours: 2 Lecture Hours: 0 Laboratory Hours: 2

Catalog Description: Laboratory experiences to complement BIOL 410. Prerequisites: BIOL 110L; BIOL 410 or concurrent enrollment. $20 lab fee. Offered even Spring.

Prerequisite(s)/Corequisite(s): BIOL 110L; BIOL 410 or concurrent enrollment.

Text(s): Experimental procedures may be taken from texts such as:

- Practical Skills in Biomolecular Sciences (Reed et al., Prentice Hall, 1998)
- Fundamental Laboratory Approaches for Biochemistry and Biotechnology (Ninfa & Ballou, Fitzgerald Scientific Press, 1998)
- Exercises for the Molecular Biology Laboratory (Guilfoile, Morton Publishing, 2000)
- Biotechnology: Proteins to PCR, Burden & Whitney (Birkhauser, 1995)

Course Objectives:
- To perform broadly applicable lab techniques in molecular biology.

Measurable Learning Outcomes:
- Effectively employ laboratory equipment used in molecular biology techniques.
- Use the scientific method to design and conduct experiments.
- Perform and evaluate experiments in the manipulation and analysis of DNA, RNA, and proteins.
- Use critical analysis skills to interpret data and draw conclusions.
- Write lab reports.

Topical Outline (major areas of coverage):
This course will address the following topics, time and equipment permitting:

- Basic lab techniques and equipment use
Methods in DNA isolation and analysis such as restriction enzyme digests; electrophoresis; restriction fragment length polymorphism (RFLP) analysis; Southern blotting; DNA probe preparation, hybridization, and detection

Polymerase chain reaction

Methods in RNA expression, isolation, and analysis, such as in vitro transcription and Northern blotting

DNA cloning: preparation of competent cells, plasmid DNA preparation, generating, isolating, and analyzing recombinant clones

Methods in protein isolation and analysis, such as in vitro translation; fractionation; electrophoretic separation; Western blot analysis

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: 10-12

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.

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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.

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