MiraCosta College

BTEC 201 - ADVANCED CELL CULTURE

Units Lecture	0.50	**Units Lab**	0.50	**Units Total**	1.00
Total Hrs Lecture	8.00	**Total Hrs Lab**	25.00	**Total Course Hrs**	33.00

COURSE DESCRIPTION

This advanced course teaches skills in the proper handling of cells from higher organisms, such as plants, mammals, and insects, that are routinely maintained in culture in the biotechnology laboratory. Instruction focuses on growth and manipulation techniques and long-term maintenance of various laboratory cell cultures that may include anchorage-dependent and suspension cell lines as well as stem cell cultures.

ENROLLMENT RESTRICTIONS

PREREQUISITES	*COREQUISITES*	*ADVISORIES*
None	None	BTEC 110

OUTLINE OF COURSE CONTENT

The course will address the following topics:

Each of the following topics will be discussed in a lecture format and applied to the lab.

I. Lab notebook
A. Components
1. Purpose
2. Protocols
3. Raw data
4. Computations
5. Analysis.
B. Legal implications
1. Maintenance
2. Integrity
3. Traceability.

II. Safety
A. General safety in the workplace
B. Hazard awareness
1. Physical hazards
2. Chemical hazards
3. Biological hazards.
C. Material Safety Data Sheets (MSDS).

III. Preparation of tissue culture media
A. Basal media components
B. Media supplements
C. Formulation calculations.

IV. Aseptic technique
A. Equipment and tools for aseptic processing
B. Cleaning and sterilization
C. Contamination
1. Types
2. Detection
3. Control and prevention.

V. Quantification of cell numbers and growth rates
A. Cell counts, manual, and automated
B. Graphing and growth curve characteristics.

VI. Maintenance and manipulation of various cell cultures
A. Nutritional and environmental requirements
B. Primary cell culture
C. Cell line propagation
1. Proliferation
2. Differentiation.
D. Specialized cells
1. Characterization
2. Manipulation.
D. Cryopreservation and recovery.

PERFORMANCE OBJECTIVES

Upon successful completion of this course, students will be able to do the following:

1). Demonstrate the ability to follow procedures, including safety and hazard awareness
2). Document lab procedures, calculations, and results in a laboratory notebook
3). Distinguish between the nutritional and environmental requirements of complex cells grown in culture
4). Prepare media appropriate for the growth of cells in culture
5). Aseptically handle and maintain contamination-free cultures
6). Maintain, manipulate, and propagate a variety of cell types in culture that may include anchorage-dependent or suspension cells, primary or established cell lines, insect cells, mature or embryonic (stem) mammalian cells, or plant cells generated from explants or protoplasts
7). Quantify and describe the growth of cells in culture using terms such as confluency and generation time
8). Perform protocols to store (cryopreserve) and revive cells.