

Montgomery County Community College
BIT 220
Biotechnology Research
4-3-3

COURSE DESCRIPTION:

This course provides a foundation for the principles of molecular genetics as they apply to research performed in the biot1

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
3. Compare and contrast the processes of replication, transcription and translation between prokaryotes and eukaryotes.	Lecture Guest Lecturers from Industry Laboratory Experiments Small Group Discussions Reading Assignments	Section Examinations Final Comprehensive Examination Written Assignment
4. Discuss molecular biology techniques such as DNA cloning, polymerase chain reaction, DNA sequencing and site directed mutagenesis.	Lecture Guest Lecturers from Industry Laboratory Experiments Small Group Discussions Reading Assignments	Section Examinations Final Comprehensive Examination Written Assignment Lab. Reports
5. Perform several molecular biology techniques used in biotechnology laboratories.	Lecture Videos Laboratory Experiments	Section Examinations Final Comprehensive Examination Written Assignment Lab. Reports
6. Discuss strategies for protein purification. and perform column chromatography experiments for protein purification.	Lecture Videos Guest Lecturers from Industry Laboratory Experiments Virtual training module Small Group Discussions Reading Assignments	Section Examinations Final Comprehensive Examination Written Assignment Lab. Reports
7. Perform column chromatography experiments for protein purification.	Lecture Laboratory Experiments Virtual Training module Small Group Discussions Reading Assignments	Section Examinations Final Comprehensive Examination Written Assignment Lab. Reports

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
8. Discuss vaccines, biologics,		

3. Importance of cultured cells in research and emerging therapies
4. Polymerase Chain Reaction
5. Mutagenesis
6. Characteristics of Proteins
7. Protein purification techniques and schemes
8. DNA and Protein Synthesis in Prokaryotes and Eukaryotes
9. Isolation of and characterization of Genes
10. Cloning and expression of genes in bacteria
11. Vaccines and Biologics

B. LABORATORY

1. Preparation for Recombinant DNA Techniques (Pipetting, Solution Preparation, etc.) (1 Experiment)
2. Basic Recombinant DNA Techniques (Restriction Digests, Agarose Gel Electrophoresis, Analysis of Gels) (2 Experiments)
3. Cloning Laboratory (Plasmid and fragment isolation, Ligation, Transfection into Bacterial Host, Identification of Cloned Gene) (2 Experiments)
4. Polymerase Chain Reaction (PCR) (1 Experiment)
5. Maintenance and Propagation of Bacterial Cells (1 Experiment)
6. Culture of mammalian cells, CHOs and mESC (2-3 experiments)
7. Column chromatography for protein separation and analysis on SDS PAGE and Western blot(2 experiments)
8. Fluorescent microscopy
9. Computer Based Genome Database Manipulation (1 Experiment)
10. Oral Presentation on Biotechnology Research paper

LEARNING MATERIALS:

There is no required textbook assigned to this course.

Learning materials such as laboratory protocols, standard operating procedures and research articles will be made available directly to the student and/or via the College's Libraries and/or course management system.

Revised by: Margaret Bryans, Ph.D.
VPAA/Provost or designee Compliance Verification:

Date: 12/22/2017
Date: 1/8/2018



This course is consistent with Montgome . It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.