

Northwest Arkansas Community College
(Science and Mathematics Division)

Discipline Code

BIOL

Course Number

2204

Course Title

Biotechnology II

Catalog Description

The third course in a three-part series, stresses the theory and practice of current techniques used in DNA science, protein isolation, immunology and introduces selected biotechnology protocols. An emphasis is placed on the use of laboratory tools and equipment to familiarize the student with current molecular biology techniques. Three hours lecture and three hours lab weekly.

Prerequisites

BIOL 1103 Introduction to Biotechnology (or its equivalent) with a grade of C or better.

Credit Hours

4 credit hours

Contact hours

45 lecture contact hours. 45 laboratory hours

Load hours

5 load hours

Semesters Offered

Fall

ACTS Equivalent

None

Grade Mode

A-F

Learning Outcomes

Students completing this course will:

- Demonstrate proper scientific laboratory record keeping.
- Describe the process of genetically modifying an organism and the applications.
- Demonstrate proper handling of genetically engineered organisms and utilize all necessary safeguards.
- Create a genetically modified organism designed to produce a product.

- Identify which sample contains modified DNA or a specific protein.
- Apply the principles learned to comprehend, evaluate and solve problems observed in isolation and purification of specific proteins.

General Education Outcomes Supported

None

Standard Practices

Topics list

- Lab safety
- Basic calculations for preparing solutions
- Genetic modification techniques
- Isolation of DNA
- PCR
- Agarose gel electrophoresis
- Plasmid engineering
- Restriction enzyme digestion and purification
- Cell transformation and screening for clones
- Protein induction and expression
- Polyacrylamide gel electrophoresis
- Protein purification
- Antigen/antibody assays
- Cell culture
- Applications of identification and purification

Learning activities

- Courses must, at a minimum, cover the core learning outcomes for each topic.
- Laboratory exercises should include DNA digestions, DNA ligations, Agarose electrophoresis, PCR, clonal selection, Protein purification, polyacrylamide electrophoresis, antibody/antigen assays, and cell culturing.

Assessments

Minimum requirements:

- Written exams that include higher order thinking questions
- Lab notebooks/write-ups
- Final exam that includes some comprehensive questions.

Grading guidelines

- A minimum of 70% of the grade must be proctored, supervised, or otherwise verified.
- Approximately 25% of the grade must come from lab work since the lab and lecture credits for this course are combined.

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