

**Northwest Arkansas Community College**  
(Science and Mathematics Division)

**Discipline Code**

BIOL

**Course Number**

1103

**Course Title**

Introduction to Biotechnology

**Catalog Description**

The first course in a three-part series in the biotechnology program. This course stresses an introduction to current concepts and progress in modern molecular biotechnology with emphasis on DNA science and genetic engineering and their relationship to biopharmaceutical and biochemical production and organismal biology. Three hours lecture weekly.

**Prerequisites**

BIOL 1544 Principles of Biology I (or its equivalent) with a grade of C or better.

**Credit Hours**

3 credit hours

**Contact hours**

45 lecture contact hours

**Load hours**

3 load hours

**Semesters Offered**

Fall

**ACTS Equivalent**

None

**Grade Mode**

A-F

**Learning Outcomes**

Students completing this course will:

- Explain the central dogma cellular mechanisms and characterize its role in biotechnology including DNA's structure and function as a genetic code.
- Determine the potential impacts resulting from changes to the genetic code on a cell, organism, and population.

- Explain the process of genetically modifying an organism and the applications.
- Document the process of proper handling of genetically engineered organisms and utilize all necessary safeguards.
- Design a plasmid construct using synthetic biology.
- Demonstrate proper scientific laboratory record keeping.
- Evaluate information from genomic, transcriptomic, and proteomic databases as it applies to biotechnology.

## General Education Outcomes Supported

None

## Standard Practices

### Topics list

- Central dogma
- History of biotechnology
- Biochemistry
- Cellular structure
- Identification and isolation of genes.
- Construction of vectors and libraries.
- Synthetic biology
- Electrophoresis and blotting
- PCR
- Product purification
- Sequencing and sequence analysis
- Monoclonal antibodies – use and production
- Microarrays
- Bioinformatics
- Animal and plant cell Culturing
- Bioremediation
- Applications of Biotechnology

### Learning activities

- Courses must, at a minimum, cover the core learning outcomes for each topic.

### Assessments

Minimum requirements:

- Written exams that include higher order thinking questions
- 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.

**Revision Date** October 31, 2022