

# Biotechnology Endorsement

## *Specifications, Competencies & Requirements*

### PURPOSE

This endorsement is meant for certified teachers interested in teaching **Biotechnology** courses. It is attached to a current Utah Educator License with a license area of concentration in **Secondary** or **Career Technical Education (CTE)** Education.

Upon attachment of this endorsement to a Utah educator license, educators will be approved to teach the following USBE courses:

Biotechnology  
Health Science Capstone

### ENDORSEMENT REQUIREMENTS

#### *Prerequisite*

Demonstrate an understanding of Career and Technical Education (CTE) basics.  
CTE Knowledge

#### *Associate Level Requirements*

Applicants must complete **TWO** of the following competency requirements. The associate-level endorsement is valid for up to 3 school years before it expires. Associate-level endorsements are non-renewable.

Biotechnology  
Lab Safety  
Biochemistry  
Microbiology

#### *Professional Level Requirements*

The applicant must meet **ALL** the competency areas listed above.

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### COMPETENCY DETAILS & DESCRIPTIONS

#### *Prerequisite*

#### 1. CTE Knowledge

Demonstrate an understanding of CTE basics:

- Explain how CTE links learning to specific Utah industries and what its main goals are.
- Know the licenses and endorsements needed to teach specific CTE courses.
- Describe how CTE is organized into clusters and pathways at the state, district (LEA), and school levels, and how this helps students succeed after graduation.
- Locate and use the state's strands and standards in lesson plans.

- Explore CTE student organizations (CTSOs) and professional groups and explain how they support students and teachers.
- Explain how advisory boards, with industry members, make sure programs meet job market needs and maintain safe learning environments.
- Understand the basics of securing funding, planning for the program's future, and participating in the state Program of Quality Review (PQR) to ensure program excellence.

Select **one** of the following options:

- **USBE Course:** [CTE Orientation](#)
- **Complete THREE years of full-time CTE Teaching in Utah**
- **Currently hold a professional-level CTE endorsement**

## Endorsement Competencies

### 2. Biotechnology

Knowledge of the Central Dogma as it relates to DNA replication, transcription, and translation. Protein folding, gene expression, mutations, evolution, and plasmid manipulation. Biotechnical applications and associated bioethics. Ability to perform biotechnical applications in a laboratory. Laws and regulations for creating, testing, and manufacturing biotech products.

Select **one** of the following options:

- **Bachelor's Degree:** in Biology, Chemistry, or Biochemistry
- **Science Endorsement:** Have an active Secondary Biology 2 OR Secondary Chemistry 2 endorsement
- **College Course:** Transcripts showing a passing grade in a biotechnology course (ex, Utah Valley University (UVU) BTEC 1010)
- **NOCTI Exam:** Pass [NOCTI Exam #5189 Biotechnology](#) with a written score of 62.1 or higher AND a performance score of 87.9 or higher.
- **CE Instructor Approval:** Current, documented approval from a participating Concurrent Enrollment institution aligned with a Biotechnology course.

### 3. Lab Safety

Knowledge of general safety precautions in a biotechnology lab includes the use of proper personal protective equipment, safe use of lab equipment, fire extinguishers, safety showers, and eyewash stations. Proper cleaning of laboratory items is also essential. Appropriate disposal of waste, including biohazardous materials, biologically contaminated materials, chemicals, and glass, is also essential.

Select **one** of the following options:

- **Bachelor's Degree:** in Biology, Chemistry, or Biochemistry
- **Science Endorsement:** Have an active Secondary Biology 2 OR Secondary Chemistry 2 endorsement.
- **College Course:** A Laboratory Safety or Lab Safety for Teachers course. A certificate from an online laboratory safety training program will also be accepted for this requirement. (ex.: BIOL 1625 or BTECH 1015).

- **Online Certificate:** Certificate from an online laboratory safety training course.
- **NOCTI Exam:** Pass [NOCTI Exam #5189 Biotechnology](#) with a written score of 62.1 or higher AND a performance score of 87.9 or higher.
- **CE Instructor Approval:** Current, documented approval from a participating Concurrent Enrollment institution aligned with a Biotechnology course.

## 4. Biochemistry

Knowledge of core concepts of matter and energy transformation, including enzyme catalysis and the coupling of exergonic and endergonic reactions. The structures, bonding, functions, and interactions of biological macromolecules, including proteins, nucleic acids, carbohydrates, and lipids. Core concepts of biological information encoding, transcription, and translation.

Select ***one*** of the following options:

- **Bachelor's Degree:** in Biology, Chemistry, or Biochemistry
- **Science Endorsement:** Have an active Secondary Biology 2 OR Secondary Chemistry 2 endorsement.
- **College Course:** Transcripts showing a passing grade in a biochemistry course (ex, Weber State University (WSU) CHEM 3510 Biochemistry).
- **NOCTI Exam:** Pass [NOCTI Exam #5189 Biotechnology](#) with a written score of 62.1 or higher AND a performance score of 87.9 or higher.
- **CE Instructor Approval:** Current, documented approval from a participating Concurrent Enrollment institution aligned with a Biotechnology course.

## 5. Microbiology

Knowledge of structural and functional differences among all microbes. Fundamentals of the chemistry of life to microbial metabolism and physiology. Microbial interactions with hosts in health and disease. Underlying principles of the methods used to control microbial growth. The flow and control of genetic information.

Select ***one*** of the following options:

- **Bachelor's Degree:** in Biology, Chemistry, or Biochemistry
- **Science Endorsement:** Have an active Secondary Biology 2 OR Secondary Chemistry 2 endorsement
- **College Course:** Transcripts showing a passing grade in a microbiology course (ex, WSU MICR 2054 Principles of Microbiology)
- **NOCTI Exam:** Pass [NOCTI Exam #5189 Biotechnology](#) with a written score of 62.1 or higher AND a performance score of 87.9 or higher.
- **CE Instructor Approval:** Current, documented approval from a participating Concurrent Enrollment institution aligned with a Biotechnology course.