Engineering Endorsement

Specifications, Competencies & Requirements

PURPOSE

This endorsement is meant for certified teachers interested in teaching **Engineering** courses. It is attached to a current Utah Educator License with a license area of concentration in **Secondary and CTE** Education.

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

Engineering Technology
Manufacturing Principles 1
Manufacturing Principles 2
Materials Science
Engineering Principles 1
Engineering Principles 2
CAM Automated Manufacturing
Aerospace Engineering
Engineering Capstone
Electronics 1
Electronics 2
Electronics 3
Robotics 1
Robotics 2
Robotics Technology

ENDORSEMENT TYPES

Prerequisite

Demonstrate an understanding of Career and Technical Education basics

CTE Knowledge

Associate Level Requirements

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

CAD/3D Modeling
Engineering Design
Electrical Theory & Digital Electronics
Electronic Components & Testing
C-Based Programming
Industrial Robotics & Automation
LAB Safety
CTSO Knowledge

Professional Level Requirements

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

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 future of the program, 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. CAD/3D Modeling

Demonstrate skills in creating full 3D models using 3D modeling software.

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

- Bachelor's degree in engineering/technology and engineering education
- NOCTI #5915 Pre-Engineering Exam
- OnShape CAD Basics Learning Pathway

3. Engineering Design

Demonstrate skills in identifying problems, developing and refining innovative solutions, and applying a strong foundation in fundamental mathematical concepts to solve real-world engineering problems.

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

- Bachelor's degree in engineering/technology and engineering education
- NOCTI #5915 Pre-Engineering Exam
- iCev Engineering Design & Problem Solving

4. Electrical Theory & Digital Electronics

Demonstrate a basic understanding of electrical theory (circuits, AC/DC, magnetism, etc.), digital electronics (logic gates, microcontrollers), and proficiency in creating and troubleshooting electrical circuits.

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

- Bachelor's degree in engineering/technology and engineering education
- SACA Certified Industry 4.0 Control Systems Specialist
- Skill Share Arduino Intro Course

5. Electronic Components & Testing

Identify and understand electrical components. Demonstrate skill in using testing equipment (Digital Multimeter, Oscilloscope, etc.).

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

- Bachelor's degree in engineering/technology and engineering education
- SACA Certified Industry 4.0 Control Systems Specialist
- Skill Share Arduino Intro Course

6. C-Based Programming

Demonstrate basic skills in a C-based programming language for microcontrollers and control systems.

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

- Bachelor's Degree in Robotics or Mechatronics/Technology and Engineering Education
- Automated Manufacturing Program from a Technical College
- SACA Certification Mtech
- Skillshare Introduction to Arduino: Creating Interactive Projects certificate
- Arduino for Makers: Intro to Microcontrollers

7. Industrial Robotics & Automation

Have a general knowledge and understanding of industrial robotic arms, workcells, conveyor systems, and general automation.

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

- Bachelor's Degree in Robotics or Mechatronics/Technology and Engineering Education
- Automated Manufacturing Program from a Technical College
- SACA Certification Mtech
- Skillshare Introduction to Arduino: Creating Interactive Projects certificate
- Arduino for Makers: Intro to Microcontrollers

8. Lab Safety

Demonstrate and implement comprehensive laboratory and shop safety procedures across all technical domains (construction, manufacturing, electronics, etc.) to ensure a safe learning and working environment.

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

- Bachelor's degree in engineering, computer science, or manufacturing (ex, USU BS Technology & Engineering Education or BYU BS Technology & Engineering Studies)
- PRAXIS #5051 Technology Education
- OSHA Safety Certification
- Technology & Engineering Lab Safety Microcredential (Coming 2026)

9. CTSO Knowledge

Demonstrate Career and Technical Student Organization (CTSO) knowledge:

- **Help students lead:** Give students opportunities to build their leadership abilities and take charge.
- **Mentor students:** Offer guidance to help students set goals and overcome difficulties as they grow.
- **Manage the organization:** Coordinate meetings, events, and budgets, and handle administrative tasks smoothly.
- **Create helpful programs:** Develop activities that match the CTSO's goals of building leadership, exploring careers, and developing skills.
- **Communicate effectively:** Clearly talk with students, school leaders, and community members, and promote the CTSO.
- **Work with others:** Partner with teachers, businesses, and other organizations to create opportunities like internships and community service.
- **Advocate for CTE:** Promote Career and Technical Education and work to get the resources and recognition it needs.
- **Keep learning:** Stay up-to-date on CTSO management and trends in CTE.
- **Focus on student success:** Support students' interests and celebrate their accomplishments.

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

- **Attend a CTSO Fall Leadership Conference:** Reflected on MIDAS transcripts.
- **USBE Course:** SkillsUSA Utah Advisor Training
- **USBE Microcredential:** Career & Technical Student Organizations (under development)