



# Industrial Mechanics & Welding Syllabus

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## Course Description:

This course will expose students to a wide range of topics designed to instill general fabrication skills combined with technical subjects. The course prepares students for a wide range of occupations such as welding, electrical, machining, and mechanical trades. Students routinely use math and science skills and interact with STEM, Automotive Technology, Natural Resources and Collision Repair and Refinishing programs while working on projects. Students are prepared for a career or college with technical skills, a positive attitude and a strong work ethic.

## Classroom Expectations and Goals:

To have students arrive at class with a “hands on and MINDS on” attitude.

To develop safe work habits as the primary objective, while learning classic techniques along with emerging fabrication skills.

To instill a superior work ethic that students can take with them into the workforce.

To instill HACTC core values: Respect. Engage. Learn. Work. Serve. Grow.

**Embedded Credit:** Science

## Assignment Policy:

Instructor will issue a weekly plan to all students with project due date and expectations.

## Concurrent Enrollments Offered:

None at this time

## Industry Recognized Credentials:

- SP2 Environmental and Safety Training
- WorkKeys National Career Readiness Certification (NCRC)

## Articulation Agreements:

- University of Northwestern Ohio
- Lincoln Technical Institute
- Keene State College

## Common Standards Assessed in Every Program:

**Communication:** ESS02.01 Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.

**Leadership and Teamwork:** ESS07.03 Employ teamwork skills to achieve collective goals and use team members’ talents effectively.

**Technical Skill:** ESS10.01 Employ information management techniques and strategies in the workplace to assist in decision-making.

**Problem Solving/Critical Thinking:** ESS03.01 Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize and evaluate).

## Units of Study:

### Shop Safety

- General shop safety, general tool and machine safety, SDS, Right to know, PPE, Fire extinguisher

### Employability Skills

- Digital Assessment Tool (DAT), Resume, Mock interviews with Hypertherm

### Information Technology

- Google platform, BendTech EZ bend, Auto CAD

### Fabrication Math

- Surface area, volume, weights, pressure, flow, heat transfer, simple algebra, Ohm’s law, machining feeds and speeds

### Measurement

- Fractional, metric, decimal, weight, pressure

### Fasteners

- SAE & Metric

### Print reading and technical drawing skills

### Hand tools

### Handheld power tools

### Welding

- Oxy-acetylene, welding and cutting
- GTAW Aluminum and Ferrous
- GMAW
- SMAW
- Plasma cutting

### Machining

- Manual mill, CNC mill manual lathe, CNC lathe, surface grinder
- Sheet metal fabrication
- Shear, brake, slip roll, bead roller, shrinker, stretcher

### Electrical

- DC, AC

## Grading Categories and Weights:

Technical Skill	30%
Communication	20%
Problem Solving and Critical Thinking	40%
Leadership and Teamwork	10%
Total	100%

## Standards Unique to Industrial Mechanics and Welding:

ESS01.03.04 Apply data and measurements to solve a problem.

ESS02.01.02 Demonstrate use of content, technical concepts and vocabulary when analyzing information and following directions.

ESS03.01.02 Analyze elements of a problem to develop creative solutions.

ESS03.01.03 Describe the value of using problem-solving and critical thinking skills to improve a situation or process.

ESS03.01.04 Create ideas, proposals and solutions to problems.

ESS06.01.07 Use personal protective equipment according to manufacturer rules and regulations.

ESS09.01.01 Demonstrate self-discipline, self-worth, positive attitude and integrity in a work situation.

ESS09.01.02 Demonstrate flexibility and willingness to learn new knowledge and skills.