



Course Syllabus 2026 - 2027

Program Title

Welding Technology I

Instructor

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Course Description

In the Welding Technology course, you will be introduced to the world of welding. This hands-on course will focus on the various welding processes used in today's industries. You will learn to weld carbon steels, stainless steels, and alloy steels in various positions. GOOD SAFETY practices are stressed in lab situations as required in the welding industry. You will also learn welding terminology that is essential in any welding career. You will develop and learn the importance of working together, thus promoting teamwork in the welding workplace. You will participate in career exploration and investigation activities and develop a better understanding of all aspects of the welding industry. You will have the opportunity to demonstrate your welding skills by completing individual and group projects (*Student is responsible for individual project costs and safety equipment*). Students will use state of the art welding equipment and be introduced to CAD software, CNC Plasma Cutting, and an introduction to Robotics. While working towards completing CTE Certification the students' skills and knowledge will be challenged and tested thoroughly.

Textbook & Classroom Resources

Jeffus, Larry. *Welding Principles and Applications - 9th Edition*. Boston, MA: Cengage (2021)

Bennett, A.E. *Blueprint Reading For Welders - 9th Edition*. Boston, MA: Cengage (2015)

Chasan, Matlock & Schell. *Practical Problems in Mathematics - 5th Edition*. Clifton Park, NY: Delmar Publishers (2008)

Course Goals

This program will enable a student to:

1. Comprehend and apply technical information through technical blueprint reading.
2. Ensure that safety aspects of welding processes and practices are understood and followed.
3. Complete welding projects assigned by the instructor in various positions using various welding processes by industry standards
4. Research, fabricate and test a new or improved product using welding skills learned in the program.
5. Demonstrate leadership and workplace readiness skills.
6. Explore a variety of welding career clusters to make a well informed career decision.

Course Outline & Topics

- Shop Safety
 - Personal Safety Equipment
 - Safe Operation of Shop Equipment
- Oxy-Acetylene Welding
 - Basic course in oxy-fuel welding
- Cutting Process
 - Oxy-Fuel Cutting torch
 - Plasma Cutting
 - CNC Plasma
- SMAW Welding
 - E6013
 - Flat Position – Stringer, Weirpad, Corner, Lap, Tee & Butt
 - E6010 & E7018
 - Multi Position – Stringer, Weirpad, Corner, Lap, Tee & Butt
- GMAW Welding
 - Multi Position – Stringer, Pipe to plate, Corner, Lap, Tee & Butt
 - Multiple wire feed processes include: short circuit, Fluxcore and spray transfer
- GTAW Welding
 - Multi Position – Stringer, Pipe to plate, Corner, Lap, Tee & Butt
 - Introduction to Aluminum & Stainless Steel
- Welding Metallurgy
- Welding Symbols
- Math for Welders
- Welding Fabrication Projects
- Career Exploration
- Weld Quality
- Layout equipment

Skills Needed

To be successful in this program, you should have the following skills:

- Strong Math and Science skills
- Strong Technical Writing skills
- Must be able to work independently
- Great eyesight or corrective lenses
- Mechanical aptitude
- Manual dexterity
- Great Hand-Eye coordination
- Detail oriented
- Ability to problem solve
- Willingness to learn and improve

Classroom Supplies & Shop/Lab Fees

It is recommended that each student have their own welding helmet (auto darkening), welding jacket and gloves. We will provide the PPE (safety glasses, ear plugs, etc..). There will be a tool list for each student going home at the beginning of the year. Tooling is basic and usually runs around \$100.

** Limited safety equipment and tools are available to students, based upon individual economic need.*

Program Safety

Students will complete industry and shop specific safety training before being allowed to participate in shop activities or equipment operation.

- SP/2-Fusion Safety Training
- Hands on instructor safety training with each piece of equipment to ensure safe operations. Equipment is as follows: Grinders, Plate Shear, Ironworker, Bandsaw, Chopsaw, Bevelers, Plasma Cutter and welders.
- Students are required to have and use the appropriate PPE when in the shop. Long sleeves, pants (no shorts), closed toed shoes, eye/ear protection at all times when welding or grinding is going on.

Evaluation of Learning

Student performance will be evaluated using multiple assessments involving assigned program activities. Student's course grades will be based on the following:

Evaluation Criteria	Method of Evaluation	Weighted Grading
Effort & Participation	• Attendance • Class participation • Professionalism • Attitude/Behavior • Effort towards the tasks	40% of the grade
Performance	• Performance and observation checklists • Projects • Non-Destructive Testing • Destructive Testing • Metallurgical Assessment	30% of the grade
Knowledge of Course Content	• Written reflections • Chapter assignments and tests	30% of the grade

Grading Scale

Grade	Percentage
A+	100% – 98%
A	97% – 93%
A-	92% – 90%
B+	89% – 88%
B	87% – 83%
B-	82% – 80%

Grade	Percentage
C+	79% – 78%
C	77% – 73%
C-	72% – 70%
D+	69% – 68%
D	67% – 63%
D -	62% – 60%
F	59% - Below

Late Assignments

You may earn half credit for late assignments that have been turned in within a week of their due date. All assignments more than one week late will be zeros.

Career Information

MN Program of Study	
Career Field	Engineering, Manufacturing & Technology
Career Cluster	Manufacturing
Career Pathway	Production Manufacturing & Production Process Development
Related occupations requiring additional training or education: ● Welder, Cutter, Soldered or Brazer ● Welders Aide ● Welding Inspector ● Welding Sales Representative ● Pipefitter or SteamFitter ● Structural Metal Worker ● Metal Fabricator ● Boilermaker ● Assembler ● Foundry Worker ● Grinding, Lapping, and Buffing ● Millwright ● Welder ● Design Engineer ● Manufacturing / Welding Engineer ● CNC Operator ● Production Manager ● Welding / Manufacturing Supervisor	
Career Outlook	<i>information available @ careerwise.minnstate.edu</i>

College Credit Opportunities

College credits can also be earned if you maintain a “B” or above grade in the course. Credits are available from the following schools:

- Central Lakes College
- St. Cloud State University
- Ridgewater College
- Anoka Technical College
- Hennepin Technical College
- Minnesota West Community and Technical College
- Rochester Community and Technical College
- South Central College
- Minnesota State College Southeast

Visit the following website for specific articulated college courses – www.ctecreditmn.com

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