

WELDING & FABRICATION SYLLABUS

SCHOOL:	Tuscola Technology Center	Instructor:	Tim Loney
ADDRESS:	1401 Cleaver Road Caro MI 48723	Phone:	989.673.5300 ext. 30331
URL:	www.tuscolaisd.org	Email:	tloney@tuscolaisd.org

COURSE DESCRIPTION: Welding is a leader of today's high tech approach to manufacturing. Students will learn several different welding processes including: arc, mig, tig, gas and plastic welding along with learning plasma cutting and oxy fuel cutting. This class is highly project oriented and predominately a hands-on class. The student will learn many welding related skills in the program.

COURSE GOALS & OBJECTIVES: This course will attempt to prepare students for an entry level position as a welder/fabricator along with articulation of credit to approve post-secondary institutions. This course is a two-year program with core welding techniques taught during the first year. The second year advances to more opportunities to perfect welding skills which includes the promotion of projects such as go-carts, trailers, hydraulics presses, and art/craft projects. During the 2nd year, students can obtain AWS certification.

Students will work toward assigned competencies to find employment, receive college articulation credit, and/or receive certification in a welding career. The student is expected to act in a professional and ethical manner at all times.

The following are the ten units contained in the AWS certification exam. By completing unit 1 with a 100% minimum score and 75% minimum score on the balance of the exam, you will be eligible to participate in the practical welding exam to complete the requirements needed to obtain the national AWS certification.

I. Safety

- Safety in Welding, Cutting, and Allied Processes (Filter Plate)
- Lens Shade Selector (Filter Plate)
- Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping
- Arc Welding and Cutting Noise
- Arc Welding and Cutting Safety
- Fire Safety in Welding and Cutting
- Oxyfuel Gas Welding, Cutting, and Heating Safety
- Preparing Containers for Welding or Cutting: 2001
- The independent shop's guide to welding safety and health
- Safety and Health Fact Sheets, 3rd Edition
- Welding Handbook Volume Two, Welding Science and Technology

II. Welding Symbols

- Welding Symbols Charts (Wall & Desk Chart)
- Standard Symbols for Welding, Brazing, and Nondestructive Examination

III. Terms & Definitions

- Standard Welding Terms and Definitions

IV. Filler Metals and Electrodes

- Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding
- Specification for Bare Stainless Welding Electrodes and Rods
- Specification for Bare Aluminum and Aluminum – Alloy Welding electrodes and Rods
- Specification for Tungsten and Tungsten-Alloy Electrodes for Arc Welding and Cutting
- Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding
- Specification for Carbon Steel Electrodes for Flux Cored Arc Welding

V. Welding Procedures and Performance Qualifications

- Standard for Welding Procedure and Performance Qualification
- Standard Methods for Mechanical Testing of Welds
- Standard Welding Procedure Specification for Co2 Shielded Flux Cored Arc Welding on carbon Steel, (M-1 or P-1, Group 1 or 2), 1/8 through 1 ½ inch thick, E70T-1 and E71T-1, as welded condition
- Standard Welding Procedure Specification for 75% AR/25%CO2 Shielded Flux Cored Arc Welding on carbon steel, (M-1 or P-1, Group 1 or 2), 1/8 through 1 ½ inch thick, E70T-1 and E71T-1, as welded condition
- Standard Welding procedure specification for self shielded Flux Cored Arc Welding on carbon steel, (M-1 or P-1, Group 1 or 2), 1/8 through ¼ inch thick, E71T-11, as welded condition
- Standard Welding Procedure Specification for Gas Metal Arc Welding Spry on carbon steel, (M-1/P-1, Group 1 or 2), 3/16 through ¼ inch thick, as welded condition
- Standard Welding procedure specification for Gas Tungsten Arc Welding on carbon steel, (M-1/P01, Group 1 or 2), 10 through 18 gauge, as welded condition, with or without backing
- Standard Welding procedure specification for gas tungsten Arc Welding of Austenitic Stainless Steel, (M-8/P-8), 10 through 18 Gauge, as welded condition, with or without backing
- Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Aluminum, (M-22/P-22), 10 through 18 gauge, as welded condition, with or without backing
- Standard Welding Procedure Specification for Gas Tungsten Arc Welding of Aluminum, (M-23/P-23), 10 through 18 gauge, as welded condition, with or without backing
- Standard Welding Procedure Specification for Shielded Metal Arc Welding on carbon steel, (M-1/P-1, Group 1 or 2), 3/16 through ¼ inch thick, position 2G, as welded condition, with backing
- Standard Welding Procedure Specification for Shielded Metal Arc Welding on carbon steel, (M-1/P-1, Group 1 or 2), 3/16 through 3/4 inch thick, position 3G, Uphill, as welded condition, with backing

VI. Visual Examination

- Guide for the Visual Inspection of Welds

VII. Oxyfuel Gas Cutting Process

- Set criteria for describing oxygen-cut surfaces (wall chart), and oxygen cutting surface roughness gauge
- Recommended practices for safe oxyfuel gas cutting torch operation
- Recommended practices for safe oxyfuel gas heating torch operation
- Recommended practices for heat shaping and straightening with oxyfuel gas heating torches
- Uniform designation system for oxyfuel nozzles

VIII. Arc Welding and Cutting Processes

- Recommended practices for plasma arc cutting and gouging
- Recommended practices for air carbon arc gouging and cutting
- Recommended practices for gas tungsten arc welding
- Recommended Practices for gas metal arc welding
- Welding handbook volume two, Welding Processes Part 1
- Welding handbook volume three, Welding Processes Part 2

IX. Base Metals

- Welding handbook volume four, Materials and Applications – Part 1
- Welding handbook volume five, Materials and Applications – Part 2

X. Program Implementation and Development

- Specification for Qualification and Certification of Level 1 – Entry Welder

ATTENDANCE POLICY AND GRADE REDUCTION

The Tuscola Technology Center places a high priority on attendance because the attendance pattern established by the student in school often sets an attendance pattern for employment. To benefit from the primary purpose of the school experience, it is essential that each student maintain regular and punctual attendance. Class attendance is necessary for learning and academic achievement as well as for developing the habits of **punctuality, dependability, and self-discipline demanded by business and**

industry. Regular attendance in the Technology Center's labs is essential to allow students to fully participate in class instruction, discussion and skill development. Absences beyond eight days per semester are considered excessive. Both excused and unexcused absences are charged in the student total.

Absences beyond eight (8) per semester are considered excessive. At nine (9) absences, excused or unexcused, the student's grad will drop 1 full letter grade. At absence 11, 13, and 15, grades will drop one full letter grade for each of those absences. Any grade reduction may be appealed to the Tech Center Administration in writing **within two weeks** of the end of the semester. The student may have an opportunity to make up the work, with credit, at the convenience of the instructor with the approval of administration.

STUDENT ASSESSMENT

Grading is based on testing and the evaluations of welds/cut to the following criteria: Neatness, Completeness, Accuracy and Speed

A	100	93
A-	92.9	90
B+	89.99	87
B	86.99	83
B-	82.99	80
C+	79.99	77
C	76.99	73
C-	72.99	70
D+	69.99	67
D	66.99	63
D-	62.99	60
E	59.99	0

CERTIFICATE / COURSE REQUIREMENTS

Attendance and Class Participation
 Completion of ALL Assignments
 Completion of Assigned Readings and Worksheet
 Following Safety and Clean-up Duties

CERTIFICATIONS

- ❖ AWS State of Michigan
- ❖ AWS (SENSE)
- ❖ I-CAR

ARTICULATED CREDIT PROGRAM SUPPLIES

Articulated credits are available through Delta College

 Leather Boots (students responsibility)
 \$5.00 (cost of welding gloves) payable to TTC

COURSE CALENDAR (Optional)	<p>1st Marking Period</p> <p><u>1st Year</u></p> <p>Reading & Math Assessments Safety & Health Testing AWS Certification Review KeyTrain Assessments Introduction to Welding Employability Skills Class Projects</p> <p>2nd Marking Period</p> <p><u>1st Year</u></p> <p>AWS Certification Review KeyTrain Assessments Introduction to Welding Class Projects</p> <p>3rd Marking Period</p> <p><u>1st Year</u></p> <p>Safety Review KeyTrain Assessments SCAT Testing Practice Intro to Advanced Welding Individual Projects Job Shadows P D Day Career Expo</p> <p>4th Marking Period</p> <p><u>1st Year</u></p> <p>KeyTrain Assessment Intro to Other Welding Positions Intro to Other Welding Equipment Individual Projects</p>	<p><u>2nd Year</u></p> <p>Reading & Math Assessments Safety & Health Testing AWS Certification Review KeyTrain Assessments Advanced Welding TIG (out of pos. welds) Employability Skills Class Projects</p> <p><u>2nd Year</u></p> <p>AWS Certification Review KeyTrain Assessments SkillsUSA Competition Prep AWS Certification Weld Prep</p> <p><u>2nd Year</u></p> <p>Safety Review KeyTrain Assessments SCAT Testing Practice Prep. For SENSE/AWS Certifications Individual Projects Job Shadows P D Day Career Expo</p> <p><u>2nd Year</u></p> <p>KeyTrain Assessment Practical Weld Testing AWS Certification Testing Individual Projects</p>
INSTRUCTOR INFORMATION (Optional)	<p>Mr. Loney has worked in the Welding and Fabricating field for the past 25 years. During this time, Mr. Loney has acquired vast knowledge and expertise in this area. Mr. Loney is American Welding Services (AWS) Certified, AWS Sense Instructor Certified, I-CAR National Certified, and has achieved Journeyman status in the areas of Operating Engineers, as well as, Welding Repair. For many years Tim has owned and operated a welding & fabricating business out of his home. Mr. Loney is currently attending Ferris State University for the completion of his Bachelors Degree and his Vocational Education Certificate.</p>	
LETTER TO THE STUDENT (Optional)	<p><i>Welding & Fabricating Student:</i></p> <p><i>Welcome to the field of Welding & Fabrication. In this program you will be introduced to many of the welding & fabricating techniques being used in the industry today. This is a hands-on program where most of the instruction is based around class projects and practicing different welding techniques.</i></p> <p><i>You will also be exposed to national certifications that will allow you to go immediately into the workforce with acquired credentials. The Welding & Fabrication fields have many yearly openings in this and the surrounding area; giving accredited students career options without leaving the local area. Welding & Fabricating can be a very lucrative and rewarding career for the dedicated student. I look forward to teaching you the skills needed to obtain a career in the Welding & Fabricating field.</i></p> <p><i>Sincerely,</i></p> <p><i>Tim Loney</i> <i>Welding & Fabricating Instructor</i></p>	

**RESOURCES &
READINGS
(Optional)**

Textbooks:

- ❖ Welding Technology Fundamentals
- ❖ Welding Technology Fundamentals Lab Manual
- ❖ Welding Print Reading

Worksheets:

- ❖ Overhead Drawings of all AWS Units
- ❖ Handouts Covering Terms of all AWS Units

Videos:

- ❖ The History Channel – Welding
- ❖ Torch Cutting – FCA W
- ❖ Oxy-Acetylene Welding
- ❖ Arc Welding 1
- ❖ Arc Welding 2
- ❖ GMAW/MIG
- ❖ Assorted Fabrication videos from Mythbusters & American Chopper series (Discovery Channel)

The instructor reserves the right to make adjustments to this syllabus as needed.