



**Columbus State Community College
Design, Construction & Trades Department
Skilled Trades Technology**

COURSE NUMBER: SKTR 1380

**COURSE TITLE: Welding: Intro to MIG
INSTRUCTOR: Scott Laslo, MS., CWI|CWE
CONTACT: slaslo1@csc.edu**

**CREDITS: 2
CLASS HOURS PER WEEK: 1 Lecture 2 Lab
PREREQUISITES: MATH 1024**

DESCRIPTION OF COURSE

This course introduces the learner to additional welding symbols and drawings, all aspects of Gas Metal Arc Welding (GMAW) and Flux Cored Arc Welding (FCAW), including equipment set-up, gas selection, usage of both solid core and flux core welding wire, using both fillet and multiple-pass welds. Through this course the learner will be able to assess what other welding skills and knowledge they desire and need for the various trades in the work force. The learner will engage in lab projects joining metals in Lap, Tee, Butt, and V-groove configurations using gas-shielded (GMAW) and flux core (FCAW) methods and materials.

COURSE STUDENT LEARNING OUTCOMES

Upon completion of this course, the student will be able to:

- Identify and describe proper personal protective equipment (PPE) and clothing. Identify, and describe and demonstrate proper use of general safety equipment in the lab or shop environment.
- Set up GMAW equipment for plate, tee joint, lap joint, outside corner joint, square butt and vee groove welds in the 1F and 1G welding positions with GMAW as assigned.
- Set up FCAW equipment for plate, tee joint, lap joint, outside corner joint, square butt and vee groove welds in the 1F and 1G welding positions with FCAW as assigned.
- Define basic terminology associated with welding metallurgy such as preheat, post heat and cooling rate. A grasp of the basic concepts of how the heat affected zone affects the mechanical properties of metal and a respect for the need for compliance with welding procedures and specifications.
- Describe the affect carbon and alloy content (carbon equivalent) has on the weldability of steel.

- List the various steps included in common procedures and specifications to accommodate the ease or difficulty with which various metals can be welded.
- Interpret basic welding and nondestructive testing symbols.
- Explain the importance of testing and inspection of welds.
- Explain the personal accountability by the welder for the welds that he/she deposits. Compare/contrast Mechanical and nondestructive testing.
- Explain the difference between a discontinuity and a defect and the description of various discontinuities and defects as well as ways to correct and prevent them.

PROGRAM OUTCOMES

- Understand the role and function of the skilled trades in the construction industry
- Discriminate the work they perform and how it interrelates with the other trades in the overall scope of a construction project
- Apply underlying theories and principles that are foundational to the trade that they have chosen
- Read, interpret, and follow construction drawings.
- Apply current industry-specific building codes in the planning and execution of work
- Demonstrate the use of proper safety procedures in all activities

OUTCOMES BASED ASSESSMENT OF STUDENT LEARNING

For this course, students are expected to demonstrate the skills associated with the Institutional Learning Goals (ILG) identified below:

- Critical Thinking
- Ethical Reasoning
- Quantitative Skills
- Scientific Literacy
- Technological Competence
- Communication Competence
- Cultural and Social Awareness
- Professional & Life Skills

In class students are assessed on their achievement of these outcomes. Names will not be used when reporting results. Outcomes-based assessment is used to improve instructional planning and design and the quality of student learning throughout the college.

COURSE MATERIALS REQUIRED

- Blue jeans or work pant
 - No holes or frayed cuffs
- Work shoe
 - Leather uppers and hard sole
 - Steel toed (preferred)
- Long sleeve shirt
 - 100% cotton
 - Welders Jacket

- Hat
 - Baseball cap
 - Welders cap
- OSHA approved safety glasses
- Leather work gloves
 - Welders glove
 - Drivers Glove

TEXTBOOK(S), MANUALS, REFERENCES, AND OTHER READINGS

ULINC (Online Textbook and course resource)

GENERAL INSTRUCTIONAL METHODS

Lecture, Demonstration, Practical Exercise, Technical Video

STANDARDS AND METHODS FOR EVALUATION

Attendance 10%

Quizzes 30%

Homework 10%

Lab exercises 10%

Final Lab Project 10%

Final Lab and Written Exam 30%

GRADING SCALE

A: 91% – 100%

B: 81% – 90%

C: 71% – 80%

D: 61% – 70%

E: 00% – 60%

SPECIAL COURSE REQUIREMENTS

Lab

Backpacks or book bags are **not** allowed in the lab area. All students are required to follow proper safety procedures in the lab. Proper safety procedures require students to demonstrate at all times proper individual safety and group safety. Students must understand and follow the concept of safety first when using the Welding lab. All students must wear proper garments and protective gear when using the Welding lab. The student must wear long pants (**no shorts, skirts, or dresses**) and a long-sleeve shirt. The protective gear includes but is not limited to the following safety goggles, welding gloves, welding apron, leather boots or shoes. Sandals are NOT Permitted. If a student does not have the proper safety gear, he/she will not be allowed to use the lab that class session, resulting in a grade of Zero for that session.

ATTENDANCE POLICY

Your instructor determines attendance policy, as follows: Due to the nature of this course, it is in your best interest to attend every class. If an absence is unavoidable, students are

responsible for obtaining any materials or information given out in their absence from another student or if available from Black board. If you are absent on the day of a quiz or test, you may not make up the quiz or test without official, written documentation. Coming in late to lecture or lab will result in your attendance/safety grade being reduced by **50%**. In the event it is a scheduled test or quiz, the quiz or test grade will be **reduced 5%** for every **15minute** increment you are late in conjunction with a **50% reduction** of your attendance/safety grade.

COLLEGE SYLLABUS STATEMENTS

Columbus State Community College required College Syllabus Statements on College Policies and Student Support Services can be found at www.csc.edu/syllabus or on the College website Quick Links “Syllabus Statements”.

WEEK	UNIT OF INSTRUCTION	ASSESSMENT METHODS	ASSIGNMENTS	ASSIGNMENT DUE DATE
Week 1	Industrial Safety Shop Equipment Safe Working Conditions Personal Protective Equipment Fire Safety Electrical Safety First Aid AWS/ANSI Z49.1:2012 Standard Arc Welding and Cutting Equipment Safety The SDS Sheet GMAW Safety GMAW Bead on Plate	Tests Quizzes Assignments Lab Practical Record RealWeld Status	<u>Blackboard/ULINC</u> Power Equipment Safety Test Pedestal Grinder Safety Test Safe Working Conditions Assessment Personal Protective Equipment Assessment Fire Safety Assessment Electrical Safety Assessment First Aid Assessment AWS/ANSI Z49.1:2012 Standard Assessment Arc Welding and Cutting Equipment Safety Assessment The SDS Sheet Assessment GMAW Safety Assessment <u>Lab</u> GMAW Bead on plate 10GA and ¼ in. (X-Assembly)	<u>Blackboard/ULINC</u> Due on 10/30 Power Equipment Safety Test Due on 10/30- Pedestal Grinder Safety Test Due on 10/30-Safe Working Conditions Assessment Due on 10/30 -Personal Protective Equipment Assessment Due on 10/30 -Fire Safety Assessment Due on 10/30-Electrical Safety Assessment Due on 10/30-First Aid Assessment Due on 10/30- AWS/ANSI Z49.1:2012 Standard Assessment Due on 10/30-Arc Welding and Cutting Equipment Due on 10/30- The SDS Sheet Assessment Due on 10/30- GMAW Safety Assessment <u>Lab:</u> Due on 10/23- GMAW Bead on Plate 10ga. And ¼ in. (X-Assembly)
Week 2	Vision and Body Position in Welding Inspection and Troubleshooting Principles of GMA Welding GMAW Shielding Gases GMAW Electrodes GMAW Equipment and Accessories GMAW Maintenance, Repair, and Troubleshooting GMAW Modes of Metal Transfer Advanced GMAW Process Controls GMAW Advanced Waveform and Modes of Transfer GMAW Bead on Plate	Tests Quizzes Assignments Lab Practical Record RealWeld Status	GMAW Bead on Plate 10ga. And ¼ in. (X-Assembly) Inspection and Troubleshooting Assessment Principles of GMA Welding GMAW Shielding Gases GMAW Electrodes GMAW Equipment and Accessories GMAW Maintenance, Repair, and Troubleshooting GMAW Modes of Metal Transfer Advanced GMAW Process Controls GMAW Advanced Waveform and Modes of Transfer GMAW Bead on Plate 10ga. And ¼ in. (X-Assembly)	<u>Blackboard/ULINC</u> Due on 11/06- Welding Safety Quiz #1 Due on 11/06- Vision and Body Position in Welding Due on 11/06- Inspection and Troubleshooting Due on 11/06- Principles of GMA Welding Due on 11/06- GMAW Shielding Gases Due on 11/06- GMAW Electrodes Due on 11/06- GMAW Equipment and Accessories Due on 11/06- GMAW Maintenance, Repair, and Troubleshooting Due on 11/06- GMAW Modes of Metal Transfer Due on 11/06-Advanced GMAW Process Controls Due on 11/06- GMAW Advanced Waveform and Modes of Transfer <u>Lab:</u> Due on 10/30- GMAW Bead on Plate 10ga. And ¼ in. (X-Assembly)

WEEK	UNIT OF INSTRUCTION	ASSESSMENT METHODS	ASSIGNMENTS	ASSIGNMENT DUE DATE
Week 3	Welding Ferrous Metals Welding Non- Ferrous Metals GMAW 2F T-Joint GMAW 1F Lap Joint	Tests Quizzes Assignments Lab Practical Record RealWeld Status	<u>Blackboard/ULINC</u> Welding Ferrous Metals Welding Non- Ferrous Metals <u>Lab:</u> GMAW 2F T-Joint GMAW 1F Lap Joint	<u>Blackboard/ULINC</u> Due on 11/13- GMAW Quiz Due on 11/13 Welding Ferrous Metals Due on 11/13 Welding Non- Ferrous Metals <u>Lab:</u> Due on 11 /06- GMAW 2F T-Joint Due on 11/06 GMAW 1F Lap Joint
Week 4	Fabrication Process Math Fundamentals for Welding GMAW 2F T-Joint GMAW 1F Lap Joint	Tests Quizzes Assignments Lab Practical Record RealWeld Status	<u>Blackboard/ULINC</u> Fabrication Process <u>Lab:</u> GMAW 2F T Joint GMAW 1F Lap Joint	<u>Blackboard/ULINC</u> Due on 11/20 Fabrication Process Due on 11/20 Math Fundamentals for Welding <u>Lab:</u> Due on 11/13-2F T Joint Due on 11/13-1F Lap Joint
Week 5	FCAW Bead on Plate FCAW 2F T-Joint FCAW 2F Lap Joint Principles of FCAW FCAW Electrodes and Shielding Gases FCAW Evaluation and Troubleshooting	Tests Quizzes Assignments Lab Practical Record RealWeld Status	FCAW Bead on Plate ¼ in. FCAW 2F T-Joint FCAW 2F Lap Joint Principles of FCAW Assessment FCAW Electrodes and Shielding Gases Assessment FCAW Evaluation and Troubleshooting Assessment	<u>Blackboard/ULINC</u> Due on 11/27-Principles of FCAW Assessment Due on 11/27-FCAW Electrodes and Shielding Gases Assessment Due on 11/27- FCAW Equipment and Accessories Assessment <u>Lab:</u> Due on 11/20-FCAW Bead on Plate ¼ in. Due on 11/20-FCAW 2F T-Joint Due on 11/20-FCAW 2F Lap Joint
Week 6	FCAW 2F T-Joint FCAW 2F Lap Joint FCAW Equipment FCAW Maintenance and Repair FCAW Welding on Plate	Tests Quizzes Assignments Lab Practical Record RealWeld Status	FCAW Bead on Plate ¼ in. FCAW 2F T-Joint FCAW 2F Lap Joint FCAW Equipment and Accessories Assessment FCAW Maintenance and Repair Assessment FCAW Welding on Plate Assessment FCAW Quiz	<u>Blackboard/ULINC</u> Due on 12/4- FCAW Evaluation and Troubleshooting Assessment Due on 12/4- FCAW Maintenance and Repair Assessment Due on 12/4- FCAW Welding on Plate Assessment Due on 12/4- FCAW Quiz <u>Lab:</u> Due on 11/27-FCAW 2F T-Joint Due on 11/27-FCAW 2F Lap Joint
Week 7	Lab Final Written Final Exam Review	Lab Final Exam	GMAW/FCAW Final lab exam	Due on 12/4Final lab exam
Week 8	Written Final Exam (Online Only)	Online Written Exam	Written Exam (Online Only)	Due on 12/16- Online Final Exam



This workforce product was funded by a grant awarded by the U.S. Department of Labor's Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership.



This work is licensed under the Creative Commons Attribution 4.0 International License. It is attributed to Ohio TechNet. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.