



---

## CIMWD-120 Syllabus

### *Gas Tungsten Arc Welding – Safety and Technology*

---

#### Recommended Textbook:

Welding: Principles and Applications 8<sup>th</sup> Edition

#### Course Description:

Covers theory and operation of gas tungsten arc welding equipment. Emphasizes safety protocols, machine settings, and filler metals.

#### Course Topics

1. Safety
2. GTAW welding machine
3. Filler metals

#### Learning Objectives

1. Demonstrate proper safety practices for the Gas Tungsten Arc Welding process.
2. \*Prepare the Gas Tungsten Arc Welding machine for a given metal type and thickness.
3. Select the proper filler metal for a given weldment using the Gas Tungsten Arc Welding process.

#### Competency-Based Education

The Welding Program at Henry Ford College uses a system of learning called Competency-Based Education (CBE). This competency-based welding program is centered on teaching specific job skills required in industry and mastery of these skills.

CBE is a very personalized teaching system that has the following characteristics:

- Ongoing Program
- Open entry - flexible schedule
- Credit granted for work completed
- Evaluation (grades) based on performance
- Fixed content in each course
- Variety of student levels served in each class
- Work at your own pace
- Live or taped lectures and demonstrations





---

## CIMWD-120 Syllabus

### *Gas Tungsten Arc Welding – Safety and Technology*

---

This competency-based program has several very important benefits for you:

- You will be given a list of the skills and knowledge needed to complete the program successfully.
- Your performance will not be compared to that of other students, but to a fixed standard, which has been set for the program.
- If you have already acquired certain skills required for this program, you may simply demonstrate this and begin focusing your attention on new skills.
- You will be able to review learning materials several times in order to attain the skill or knowledge.
- If you are able to attain the skills easily, you may progress through the program faster than the average person. If you progress through the program faster than average, you can graduate in a shorter time frame.

#### **What's Required of You:**

For this system to work, you will be expected to:

1. Assume the responsibility for your own learning. Your instructor will give you assistance, but the actual responsibility for learning rests with you, the student.
2. Utilize the materials provided for you. The program's resources have been carefully chosen and developed to help you learn.
3. Devote your energy to attaining the skills and knowledge required for your program.

#### **The Instructor's Role:**

The instructors in HFC's Welding Program work with students individually and guide them through the learning process with the help of many different learning resources. In CBE, instructors are often referred to as learning managers because they manage the activities in the program and facilitate the learning process. If you are having difficulty, you should go to your instructor with your problem. The instructor's goal is to find the most effective way to help you learn the tasks in the program.

#### **How your grade is computed in this program:**

If your class is a designated lecture module, your grade will be based off of an exit quiz. When a passing grade is complete, you will be able to move on to the next module.

If this class is a designated lab module, your grade will be based off of a grading matrix. You will evaluate your competencies along with the instructor. You will need a 3-ring binder to keep the finished and signed grading sheets. Those will be turned in when all projects are finished for the module your taking. The final grade will be entered when these are reviewed.





## CIMWD-120 Syllabus

### *Gas Tungsten Arc Welding – Safety and Technology*

#### ***Welding Technology Grading Checklist***

Check	Criteria	Points
	Safety (10 points)	
	PPE	
	Equipment in working order	
	Lab rules followed	
	Work areas cleaned and tools returned	
	Welding, Cutting, & Fabrication Set-Up (10 points)	
	Welding machine set correctly	
	Cutting machines set correctly	
	Fabrication machines set correctly	
	Followed Instructions (10 points)	
	Parts cut to correct size	
	Joints assembled correctly	
	Position of weld was correct	
	Correct filler metal was used	
	Visual Inspection of weld (20 points)	
	Bead width	
	Welding angle	
	Arc gap if applicable	
	Porosity	
	Fillet weld size if applicable	
	Groove weld under fill	
	Joint penetration	
	Incomplete fusion	
	Cracks	
	Cold lap	
	Undercut	
	Arc strikes	
	Fillet weld contour if applicable	
	Inclusions	
	Groove weld height (overfill)	





---

## CIMWD-120 Syllabus

### *Gas Tungsten Arc Welding – Safety and Technology*

---

#### Corrective Action Taken:

---

---

---

---

---

---

---

---

---

---

Student: \_\_\_\_\_

Instructor: \_\_\_\_\_

#### Grading Scale:

- A+ = 100-98
- A = 97-93
- A- = 92-90
- B+ = 89-87
- B = 86-83
- B- = 82-80
- C+ = 79-77
- C = 76-73
- C- = 72-70
- D+ = 69-67
- D = 66-63
- D- = 62-60
- E = 59-below

#### Lectures:

1. Gas Tungsten Arc Welding
2. Set-up
3. Tungsten electrodes and Filler metals
4. Techniques

#### Chapters:

16

#### Welding Projects:

Pad Build-up on plate





## CIMWD-120 Syllabus

### *Gas Tungsten Arc Welding – Safety and Technology*

#### ***Welding Procedure Specification***

WPS Name	CIMWD-120 Project 1
----------	---------------------

Weld Type	
Welding Process	GTAW
Position	Flat
Material	1/8" Steel
Joint Type	
Backing Option	
Backing Material	

Polarity	DC+
Electrode	ER70s-6
Transfer Mode	
Tungsten Electrode	2% Ceriated
Shielding Gas	100% Argon
Flow Rate	25 cfh
Cup Size	

#### ***Welding Procedure***

Weld Layers	Pass No.	Process	Filler Metal Classification	Filler Metal Diameter in (mm)	Current Amps	Current Type and Polarity	Wire Feed Speed	Volts	Remarks
Pad		GTAW	ER70s-6	1/16"	130a	DC+			

Technique:  
Practice a pad build up using stringer beads. Practice bead quality and bead placement.





---

## **CIMWD-120 Syllabus**

### *Gas Tungsten Arc Welding – Safety and Technology*

---

Heat Treatment:

Preheat Temperature-

Post Heat Temperature-

Interpass Temperature-

Stress Relieving-

Additional Notes:

Show the instructor progress every 30 minutes minimum.





---

## CIMWD-120 Syllabus

### *Gas Tungsten Arc Welding – Safety and Technology*

---

#### **SAFETY DISCLAIMER:**

M-SAMC educational resources are in no way meant to be a substitute for occupational safety and health standards. No guarantee is made to resource thoroughness, statutory or regulatory compliance, and related media may depict situations that are not in compliance with OSHA and other safety requirements. It is the responsibility of educators/employers and their students/employees, or anybody using our resources, to comply fully with all pertinent OSHA, and any other, rules and regulations in any jurisdiction in which they learn/work. M-SAMC will not be liable for any damages or other claims and demands arising out of the use of these educational resources. By using these resources, the user releases the Multi-State Advanced Manufacturing Consortium and participating educational institutions and their respective Boards, individual trustees, employees, contractors, and sub-contractors from any liability for injuries resulting from the use of the educational resources.

#### **DOL DISCLAIMER:**

This 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 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.

#### **RELEVANCY REMINDER:**

M-SAMC resources reflect a shared understanding of grant partners at the time of development. In keeping with our industry and college partner requirements, our products are continuously improved. Updated versions of our work can be found here: <http://www.msamc.org/resources.html>.

