

Lake Michigan College

Course Cover Sheet



M-CAM Training Area:

CNC/Machining Multi-Skilled Mechatronics Production Operation Welding/Fabrications

Program(s): Welding Production Technology

Course: Gas Metal Arc Welding I

Course Description:

SUBJECT	TITLE	CONTACT HOURS	COURSE DESCRIPTION
WELD 103	GAS METAL ARC WELDING I	45	Demonstrates welding on steel sheet metals and plates. Emphasis is placed on axial spray, pulse spray and short circuit mode of transfer. Upon completion of this course, the student will be able to weld in all positions, read basic weld symbols and have an understanding of written welding procedures.

Date Created: Work completed on 08/18/15

Faculty Developer(s)/Instructional Designers(s): John & Heidi Closson, Nathan Kramb

Employer/Industry Partner: Miller Welding Supply (Steve Hollis)

College Contact: Kenneth W. Flowers, PhD.

Phone: (269) 927-4103

Email: flowers@lakemichigancollege.edu

Additional Information/Comments:

This course existed at Lake Michigan College prior to the involvement in the TAACCCT grant. The development done linked to the grant was to incorporate Tooling U., an online curriculum vendor. Course adaptation was completed in August, 2015. The college's Manufacturing Committee provided guidance regarding the adaptation of this course. Mach Mold, Liberty Steel, Custom Tool, Kelm Acubar, Shoreline Mold, M & I, JRR Automation, Hanson Mold, QME, K & M, Midwest Tool, West Michigan Tool, Maximum Mold, Michigan Mold, Griffin Tool, Accu Die, Eagle Technologies, and Standard Tool, are members of the Manufacturing Advisory Committee.

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GMAW (Gas Metal Arc Welding) I

COURSE SYLLABUS

I. COURSE IDENTIFICATION

A.	Discipline	Welding (WELD)
B.	Title & Number	GMAW(Gas Metal Arc Welding) I WELD 103
C.	Credit Hours	2
D.	Contact Hours	3
E.	Instructor	
F.	Office Number	
G.	Telephone	
H.	Email address	
I.	Prerequisite(s)	
J.	Semester & Academic Year	Fall, Spring

II. TEXTBOOKS AND/OR EQUIPMENT /SUPPLIES

1. Texts Tooling U
2. Equipment Safety Glasses

III. COURSE DESCRIPTION FROM CATALOG

Demonstrates welding on steel sheet metals and plates. Emphasis is placed on axial spray, pulse spray and short circuit mode of transfer. Upon completion of this course, the student will be able to weld in all positions, read basic weld symbols, and have an understanding of written welding procedures.

III. GENERAL EDUCATION AREA(S) MET

There are no General Education areas met by this course.

IV. GOALS AND OBJECTIVES

Upon completion the successful student is expected to:

Upon satisfactory completion of the tasks for the GMAW course the student will demonstrate competency in the basic understanding and practical application of the principles of;

1. GMAW and FCAW processes theory and safety.
2. GMAW welding equipment setup and maintenance.
3. MIG welding fillet and groove welds with “short circuit mode of metal transfer”.
4. MIG welding fillet and groove welds with “spray arc” mode of metal transfer.
5. MIG welding fillet and groove welds with “globular” mode of metal transfer.
6. MIG welding fillet and groove welds with the “pulsed arc” mode of metal transfer.
7. Successfully complete AWS GMAW welding certification.

V. EXPECTED STUDENT OUTCOME(S)

During the semester you may be asked to participate in Assessment of learning activities that will not be graded. Your instructor will use the information that you provide to better gauge your comprehension of course material: and, as appropriate, will modify how course material is presented in order to better prepare you to successfully complete graded assignments.

VII. INSTRUCTIONAL METHODOLOGY

The methods of instruction throughout this course include: lecture presentation, use of computer, written exercises, handouts, group discussions, question and answer sessions, and laboratory assignments.

VIII. WRITING ACROSS THE CURRICULUM STRATEGY (*which may or may not be graded*)

Students are responsible for correct spelling and punctuation on all written assignments. Tests and quizzes will contain some writing and word definition. Assigned writing projects will be relevant to all applied/specific subject materials taught in this class.

IX. GRADING CRITERIA AND REQUIREMENTS

Grading criteria is based on average points scored determined by labs, Tooling U assessments, and/or other assignments listed on assignment schedule. See grading scale below to identify averages.

X. GRADING SCALE

Grading Scale: 92 - 100 = A 84 - 91 = B 75 - 83 = C 69 - 74 = D 00 - 68 = E

XI. MAKE-UP POLICY

Make-up Policy will be at the discretion of the instructor.

XII. ATTENDANCE POLICY/WITHDRAWAL POLICY

Students are expected to attend all class sessions. If classes are missed, it is the student's responsibility to complete all assignments. A sign-in sheet will be used for attendance. Failure to sign-in may result in an absence. For withdrawal policy, see College catalog.

Mindful of the diverse student body that Lake Michigan College serves, and the varied belief systems that its students represent, the College will make a reasonable effort to accommodate students who need to be excused from classes for the observance of religious holidays. This policy does not apply to students who knowingly register for classes scheduled to meet on days that consistently conflict with their day of worship, e.g., a student who signs up for Saturday classes when the student normally worships on Saturday.

XIII. ASSIGNMENT SCHEDULE

The Assignment Schedule will be followed as closely as possible; however, changes may be made at the instructor's discretion.

NOTE: Additional information regarding the course may be added to the syllabus at the discretion of the faculty member prior to distribution



WELD 103 GMAW Welding I Weekly Schedule				
Date:	Lectures/Discussion	Machine Demo & Practice (Labs)	Peer Review Optional	Tooling U HW. Class ID Class Name
Week 1	<ul style="list-style-type: none"> Safety Weld Nomenclature Test Positions Weld joint types Basic Terminology 	<ul style="list-style-type: none"> GMAW Equipment Setup Demo Stringer Bead Labs – GMAW-S Stringer Bead 		<ul style="list-style-type: none"> - Arc Welding Safety 115 - Fire Safety & Prevention 110
Week 2	<ul style="list-style-type: none"> The 5 Essentials Polarities 	<ul style="list-style-type: none"> Labs – GMAW-S 2F Tee 		<ul style="list-style-type: none"> -Respiration Safety 195 -Noise Reduction & Hearing Conservation 170
Week 3	<ul style="list-style-type: none"> Quiz – GMAW Basics 	<ul style="list-style-type: none"> Labs – GMAW-S Finish 2F Tee, 3F Tee 		<ul style="list-style-type: none"> -What is Arc Welding 110
Week 4	<ul style="list-style-type: none"> Weave Patterns 	<ul style="list-style-type: none"> Labs – GMAW-S Finish 3F Tee, 4F Tee 		<ul style="list-style-type: none"> -Arc Welding Processes 120
Week 5	<ul style="list-style-type: none"> GMAW Advantages & Disadvantages Burnback & Bird's Nest 	<ul style="list-style-type: none"> Labs – GMAW-S Finish 4F Tee, 2G Multi 		<ul style="list-style-type: none"> -Electrode Selection 270
Week 6	<ul style="list-style-type: none"> GMAW Transfer Modes 	<ul style="list-style-type: none"> Labs – GMAW-S Finish 2G Multi, 3G Multi 		<ul style="list-style-type: none"> -Overview of Weld Types 130
Week 7	<ul style="list-style-type: none"> Midterm Exam 	<ul style="list-style-type: none"> Open Lab (catch up/practice) 		
Week 8	<ul style="list-style-type: none"> Procedures & Qualification 	<ul style="list-style-type: none"> Labs – GMAW-S Finish 3G Multi, 4G Multi 		<ul style="list-style-type: none"> -SDS & Hazard Communication 160
Week 9	<ul style="list-style-type: none"> Procedures & Qualification (cont.) 	<ul style="list-style-type: none"> Labs – GMAW-S Finish 4G Multi 		<ul style="list-style-type: none"> -Electrical Power for Arc Welding 140
Week 10	<ul style="list-style-type: none"> Procedures & Qualification Quiz Weld Discontinuities & Defects 	<ul style="list-style-type: none"> Labs –GMAW Axial Spray Stringer pad of beads 	Visual Inspection	<ul style="list-style-type: none"> -Arc Welding Power Sources 260 -GMAW Applications 220

* Assignment schedule may change without notice

Week 11	<ul style="list-style-type: none"> Weld Discontinuities & Defects (cont.) Weld Testing Methods 	<ul style="list-style-type: none"> GMAW Spray 1F Tee, 2F Tee 	Visual Inspection	<ul style="list-style-type: none"> -Visual Inspection of Welds 280 -FCAW Applications 230
Week 12	<ul style="list-style-type: none"> Introduction to Welding Symbols 	<ul style="list-style-type: none"> GMAW Spray 2F Tee 	Visual Inspection	<ul style="list-style-type: none"> -Ferrous Metals for Welding 200
Week 13	<ul style="list-style-type: none"> Continue Welding Symbols Review for Final Exam 	<ul style="list-style-type: none"> GMAW Spray 1G Multi 	Visual Inspection	<ul style="list-style-type: none"> -Nonferrous Metals for Welding 205 -Arc Welding Aluminum Alloys 310
Week 14	<ul style="list-style-type: none"> Final Exam 	<ul style="list-style-type: none"> Open Lab (catch up/practice) 		

Students are encouraged to come in and use the lab during off hours in order to complete lab projects.

* Assignment schedule may change without notice



Subject Matter Expert (SME) Course Review Summary

College: Lake Michigan College

M-CAM Training Area: CNC/Machining Multi-Skilled/Mechatronics Production Operation Welding/Fabrication

Degree Program Name: Welding Technology

Title of Course: Gas Metal Arc Welding I (GMAW)

Subject Matter Expert (SME) Reviewer Information

Name: Steve Hollis

Title: Sales Manager

Phone: 269 233 9419

Email: shollis@millerweldingsupply.com

Organization/Affiliation: Program Advisor

Attach Resume or provide credentials (showing years of experience and work experience that is relevant to course content):

See attached.

Synopsis of Findings:

LMC's Gas Metal Arc Welding I (GMAW) introduces students to mig welding. The college aligns the coursework with AWS SENSE standards which helps students prepare for AWS skills assessments.

Reviewers Signature



Date:



**Michigan Coalition for Advanced Manufacturing
Subject Matter Expert Course Review**

1. Course Overview and Objectives	Exceptional	Satisfactory	Ineffective
The goals and purpose of the course is clearly stated.	X		
Prerequisites and/or any required competencies are clearly stated.	X		
Learning objectives are specific and well-defined.	X		
Learning objectives describe outcomes that are measurable.	X		
Outcomes align to occupational focus (industry skills and standards).	X		
Comments or recommendations: No recommendations. The goals and objectives of the program are clearly detailed and connected to American Welding Society (AWS) D1.1 Structural Steel welding code along with AWSENSE standards.			
2. Material and Resources	Exceptional	Satisfactory	Ineffective
The instructional materials contribute to the achievement of the course learning objectives.	X		
The materials and resources meet/reflect current industry practices and standards.	X		
The instructional materials provide options for a variety of learning styles.	X		
Resources and materials are cited appropriately. If applicable, license information is provided.	X		
Comments or recommendations: No recommendations. The Welding program is using Tooling U, an online curriculum resource, to support the program content.			
3. Learning Activities	Exceptional	Satisfactory	Ineffective
Provide opportunities for interaction and active learning.	X		
Help understand fundamental concepts, and build skills useful outside of the learning object.	X		
Activities are linked to current industry practices and standards.	X		
Comments or recommendations: No recommendations			

**Michigan Coalition for Advanced Manufacturing
Subject Matter Expert Course Review**

4. Assessment Tools/Criteria for Evaluation	Exceptional	Satisfactory	Ineffective
The course evaluation criteria/course grading policy is stated clearly on syllabus.	X		
Measure stated learning objectives and link to industry standards.	X		
Align with course activities and resources.	X		
Include specific criteria for evaluation of student work and participation.	X		
Comments and recommendations: No additional recommendations. Course materials is linked to manufacturing and 3 rd party accreditation standards.			
5. Equipment/Technology	Exceptional	Satisfactory	Ineffective
Meets industry standards and needs.	X		
Supports the course learning objectives.	X		
Provides students with easy access to the technologies required in the course/module.	X		
Comments and recommendations: The grant provided the college the opportunity to replace outdated (over 17 years old) equipment. The current equipment meets and exceeds industry requirements.			

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**Michigan Coalition for Advanced Manufacturing
Subject Matter Expert Course Review**

Steven Hollis Resume

Miller Welding Supply

shollis@millerweldingsupply.com

Professional Experience

April 1996- Present Miller Welding Supply

Miller Welding Supply is a Leader in the welding supply and automation industry as well as industrial and specialty gases. Established in 1942, it is family owned and operated.

Education

Southwestern Michigan College Mechanical Engineering

Lincoln Electric Certifications

- Distributor Welding Fundamentals
- Intermediate Distributor Training
- Advanced Distributor Training
- Lincoln Filler Metals
- Weld Processes
- VRTEX Virtual Reality Weld System
- Real Weld System

Miller Electric/Hobart Welding School Certificates

- Hobart Filler Metals
- Weld Processes and power sources

Conoca Training

- Product Training (regulators and manifold systems)

Koike Aronson Inc

- Product Training
- General Sales School