

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 Tungsten Arc Welding (GTAW)

Course Description:

SUBJECT	TITLE	CONTACT HOURS	COURSE DESCRIPTION
WELD 202	GAS TUNGSTEN ARC WELDING (GTAW)	45	Includes study and operation of primarily gas tungsten arc welding on some mild steel, with the majority of work on stainless steel and aluminum. Students will learn about the different types of electrodes and shielding gases used in these processes. Students will be able to weld in all positions, read some basic weld symbols and have a basic 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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GTAW Welding COURSE SYLLABUS

I. COURSE IDENTIFICATION

A.	Discipline	Welding
B.	Title & Number	Gas Tungsten Arc Welding (GTAW) WELD 202
C.	Credit Hours	2
D.	Contact Hours	3
E.	Instructor	
F.	Office Number	
G.	Telephone	
H.	Email address	
I.	Prerequisite(s)	None
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

Is a study and operation of primarily gas tungsten arc welding on some mild steel, with the majority of work on stainless steel and aluminum. The student will learn about the different types of electrodes and shielding gases used in these processes. Students will be able to weld in all positions, read some basic weld symbols, and have a basic 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:

1. Demonstrate knowledge of safe and proper set-up and operation of advanced Tungsten Metal Arc Welding equipment.

2. Properly select consumable tungsten and shielding gas for a job, as well as the correct parameters to coincide with their selection, and be able to explain the advantages and disadvantages of each.
3. List the advantages and theory of the advanced GTAW process.
4. Identify, diagnose, and solve weld defects and problems in the advanced GTAW process.
5. Demonstrate working knowledge of the advanced GTAW process by welding on carbon steel of various thicknesses in the flat, horizontal, vertical, and overhead positions.
6. Successfully complete advanced AWS GTAW 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. ACADEMIC HONESTY POLICY

The principles of truth and honesty are recognized as fundamental to a community of teachers and scholars. Lake Michigan College expects that both faculty and students will honor these principles and in doing so protect the integrity of College grades. This means that all academic work will be done by the student to whom it is assigned without giving or receiving unauthorized aide of any kind. Instructors will exercise care in the planning and supervision of academic work so that honest effort will be positively encouraged. Cheating and plagiarism are the two most obvious violations of academic honesty. In brief, plagiarism is borrowing ideas, words, organization, etc. from another source or person and claiming them as original.

Any dishonest activity may result in failure of specific assignments or an entire course. Flagrant and/or repeated violations of Academic Honesty will result in disciplinary action up to and including expulsion from Lake Michigan College.

XIV. DISABILITY STATEMENT

Students with a documented disability may wish to consult with the Student Resource Center. They can be reached at 269-927-8866. A counselor can

work with you to develop an accommodation plan that will be shared with your instructors. See me if you need further information.

XV. 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 202 GTAW Welding 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"> • GTAW Equipment Setup • Demo Stringer Bead • Labs – Stringer Bead pad of beads (carbon steel) 		<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 for GTAW 	<ul style="list-style-type: none"> • Labs – Stringer Bead (carbon steel), 1F T-Joint (carbon steel) 		<ul style="list-style-type: none"> -Respiration Safety 195 -Noise Reduction & Hearing Conservation 170
Week 3	<ul style="list-style-type: none"> • Quiz – GTAW Basics 	<ul style="list-style-type: none"> • Labs – 1F T-Joint (carbon steel), 2F T-Joint (carbon steel) 		<ul style="list-style-type: none"> -What is Arc Welding 110
Week 4	<ul style="list-style-type: none"> • GTAW Advantages/Disadvantages • Weave Patterns 	<ul style="list-style-type: none"> • Labs – 2F T-Joint (carbon steel), 3F Up T-Joint (carbon steel), 4F T-Joint (carbon steel) 		<ul style="list-style-type: none"> -Arc Welding Processes 120
Week 5	<ul style="list-style-type: none"> • GTAW Electrodes & Shielding Gases • Filler Metal Classification 	<ul style="list-style-type: none"> • Labs – 4F T-Joint (carbon steel), 1G Groove Joint (carbon steel) 		<ul style="list-style-type: none"> -Electrode Selection 270
Week 6	<ul style="list-style-type: none"> • GTAW Pulsed Current • Aluminum GTAW Welding Theory 	<ul style="list-style-type: none"> • 1G Groove Joint (carbon steel), 2G Groove Joint (carbon steel) 		<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"> • 3G Groove Joint (carbon steel), 4G Groove Joint (carbon steel) 		<ul style="list-style-type: none"> -Arc Welding Aluminum Alloys 310 -SDS & Hazard Communication 160

* Assignment schedule may change without notice

Week 9	<ul style="list-style-type: none"> Procedures & Qualification (cont.) 	<ul style="list-style-type: none"> 2F T-Joint Multipass (carbon steel), 		-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"> 1G pad of beads (aluminum) 	Visual Inspection	-Arc Welding Power Sources 260 -GTAW Applications 240
Week 11	<ul style="list-style-type: none"> Weld Discontinuities & Defects (cont.) Weld Testing Methods 	<ul style="list-style-type: none"> 1G butt joint (aluminum) 	Visual Inspection	-Visual Inspection of Welds 280
Week 12	<ul style="list-style-type: none"> Introduction to Welding Symbols 	<ul style="list-style-type: none"> 1F T-Joint (aluminum) 1G Groove Joint (aluminum) 	Visual Inspection	-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"> 2F T-Joint (aluminum), 3F T-Joint Up (aluminum) 	Visual Inspection	-Nonferrous Metals for Welding 205
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 Tungsten Arc Welding (GTAW)

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 Tungsten Arc Welding (GTAW) introduces students to tig welding. The college aligns the coursework with to AWS SENSE standards which helps students prepare for AWS skills assessments.

Reviewers Signature

Date:

6/22/17



Bay de Noc | Grand Rapids | Kellogg | Lake Michigan | Lansing | Macomb | Mott | Schoolcraft

**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 AWS SENSE 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