

Mecosta - Osceola Career Center
Welding and Fabrication
Course Syllabus
2024-2025

Instructors

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Program Goals

To provide instruction, training, and opportunities which result in student competence and preparation for employment as an entry level welding fabricator and/or acceptance to a post-secondary institution to pursue a welding certificate or degree.

CIP Code

48.0508

Course Description

Welding is a process of joining metals. Metals are heated to their melting point by electric arc or gas flame and fused together with or without a filler metal. Welding is the most efficient method of permanently joining metal. Students will be exposed to twelve of the most commonly used welding and cutting processes in the 1st year. Second year students will further enhance their welding skills by spending additional time with these processes: G.M.A.W., G.T.A.W., and F.C.A.W. welding processes.

Course Objectives

- **Occupational Orientation 1 week**
 - Prepare time or job cards, reports, or records.
 - Perform housekeeping duties (shop maintenance).
 - Follow verbal instructions to complete work assignments.
 - Follow written details to complete work assignments.
 - Receive exposure to welding and/or cutting automation theory.
- **Safety and Health 8-10 days**
 - Demonstrate proper use and inspection of equipment used for protection of personnel.
 - Demonstrate proper work area operation.
 - Demonstrate proper Hot Zone operation.
 - Demonstrate proper working in confined spaces (at a low level) (Understand what is a confined space).
 - Understand precautionary labeling.
 - Demonstrate proper use and inspection of equipment used for each required welding or thermal cutting process.
- **Shielded Metal Arc Welding (SMAW) Principles and Practices 8-10 weeks**
 - Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment and accessories.
 - Set up for shielded metal arc welding operations on plain carbon steel.
 - Operate shielded metal arc welding equipment.
 - Make fillet welds, all positions, on plain carbon steel.
 - Make groove welds, all positions, on plain carbon steel.
 - Perform 2G and 3G, uphill, limited thickness qualification tests on plain carbon steel plate.
- **Manual OxyFuel Gas Cutting (OFC) 2-3 weeks**
 - Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment and accessories.
 - Set up for manual oxyfuel gas cutting operations on plain carbon steel.
 - Operate manual oxyfuel gas cutting equipment.
 - Perform straight cutting operations on plain carbon steel.
 - Perform shape cutting operations on plain carbon steel.
 - Perform bevel cutting operations on plain carbon steel.
 - Remove weld metal from plain carbon steel using weld washing techniques.
 - Identify various alternative fuels used in welding and cutting.
- **Flux Cored Arc Welding (FCAW-G/GM) Principles and Practices 2-3 week**
 - Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment and accessories.
 - Set up for flux cored arc welding operations on plain carbon steel.

- Operate flux cored arc welding equipment.
 - Make fillet welds, all positions, on plain carbon steel.
 - Make groove welds, all positions, on plain carbon steel.
- **Drawing and Welding Symbol Interpretation 3 weeks**
- Interpret basic elements of a drawing or sketch.
 - Interpret welding symbol information.
 - Fabricate parts of blueprint specification (i.e. layout, cut and fit along with joint preparation).
- **Gas Metal Arc Welding (GMAW, GMAW-S, GMAW-P) Principles and Practices 6-8 weeks**
- Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment and accessories.
 - Set up for gas metal arc welding operations on plain carbon steel.
 - Operate gas metal arc welding equipment.
 - Short circuit transfer.
 - Make fillet welds, all positions, on plain carbon steel.
 - Make groove welds, all positions, on plain carbon steel.
 - Spray transfer.
 - Make 1F and 2F welds on plain carbon steel.
 - Make 1G welds on plain carbon steel.
 - Describe gas metal arc welding-pulse theory.
- **Mechanized Oxy Fuel Gas Cutting 1week**
- Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment and accessories.
 - Set up for machine oxyfuel gas cutting (track burner) operations on plain carbon steel.
 - Operate machine oxyfuel gas cutting (track burner) equipment.
 - Perform straight cutting operations on plain carbon steel.
 - Perform bevel cutting operations on plain carbon steel.
- **Gas Tungsten Welding (GTAW) Principles and Practices 4-6 weeks**
- Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment and accessories.
 - Set up for gas tungsten arc welding operations on plain carbon steel, aluminum, and stainless steel.
 - Operate gas tungsten arc welding equipment.
 - Make fillet welds, all positions, on carbon steel.
 - Make 1F and 2F welds on aluminum.
 - Make 1G welds on aluminum
 - Make 1F, 2F, and 3F welds on stainless steel.
 - Identify various tungsten and their uses/applications.
- **Plasma Arc Cutting 1-2 weeks**
- Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment and accessories.

- Set up for manual plasma arc cutting operations on plain carbon steel, aluminum, and stainless steel.
 - Operate manual plasma arc cutting equipment.
 - Perform shape cutting operations on plain carbon steel, aluminum, and stainless steel (gouging).
- **Welding Inspection and Testing Principles and Practices 2 weeks**
- Examine cut surfaces and edges of prepared base metal parts.
 - Examine tack, intermediate layers, and completed welds.
- **Air Carbon Arc Cutting 1 week**
- Perform safety inspections of equipment and accessories.
 - Make minor external repairs to equipment accessories.
 - Set up for manual air carbon arc gouging and cutting operations on plain carbon steel.
 - Operate manual air carbon arc cutting equipment.
 - Perform metal removal operations on plain carbon steel.

Course Requirements

In order to assure the student a “reasonable probability of success” in this program of study it is highly recommended that the student possess a level of academic skills and attitudes that will result in successful completion of the program. If you feel that you may need help with any of the items listed below let one of the instructors know (confidentially, of course). Help may be available.-

- Good reading and comprehension skills
- Good general math skills
- Good communication skills - the ability to write a *complete* sentence
- The ability and desire to learn
- A positive attitude
- Good work ethics
- A good attendance record
- Critical Thinking and Problem-Solving Skills

2024-2025 MOCC Academic Calendar Terms

- Term 1 August 24 - October 4
- Term 2 October 7 - November 14
- Term 3 November 18 - December 20
- Term 4 January 6 - February 13
- Term 5 February 18 - April 11
- Term 6 April 14 - June 3

Two terms will equal one trimester, three terms will equal a semester.

Grading Procedures & Components

Seventy percent of your grade is composed of class work, lab activities, and career exploration (if applicable). The weight of each in the final assessment depends upon the term being assessed. The remaining thirty - percent is based upon your Career Readiness Grade. All are explained in greater detail below.

Class Work may include any or all of the following:

- * study guides
- * Article review's
- * Tests
- * applied math, science, and English assignments
- * quizzes

Lab Work may include any or all of the following:

- Demonstrations
- Lab assignments
- Performance tests
- Welding exercises

Career Readiness Grade is composed of three components:

- **Personal Management**
 - Attendance
 - Respect and Ethics
 - Organization
 - Productivity
 - Appearance
 - Stewardship
- **Problem Solving**
 - Perseverance
 - Critical Thinking
 - Technology, Creativity and Innovation
 - Research, academic and technical skills
- **Teamwork**
 - Participation
 - Emotional Intelligence

Communication
Leadership

Note: Career Readiness and how it affects your grade will be covered in much greater detail later in the syllabus.

Grading Scale:

A	94%-100%	C-	70%-73%
A-	90%-93%	D+	67%-69%
B+	87%-89%	D	64%-66%
B	84%-86%	D-	60%-63%
B-	80%-83%	F	59% and Below
C+	77%-79%		
C	74%-76%		

Textbook

Welding Principles and Applications Seventh Edition 2012

Articulation & Direct Credit

MOCC Welding Technology currently has an articulation agreement with a number of post-secondary institutions. This means you can earn not only high school credit for completing this course, but you can also earn *college credit* at participating colleges and technical colleges!

Articulated College Credit:

Mid-Michigan Community College
West Shore Community College
Ferris State University

Class Operation & Procedures

First, there will be an introduction and discussion to new material and concepts. Next, there will be a demonstration on procedures and practices. And finally you will have the opportunity to practice the procedure.

The first part will involve a lecture and a study guide, the second will have you watching a demonstration, and the third will have you performing the job yourself.

The class will go on if you choose not to show up. Some lab assignments may be made up upon your return after an absence if it does not interfere with the day's activity. Class work will be made up on your time.

Reasonable deadlines are imposed throughout the school year. Failure to meet these deadlines will result in a lower Career Readiness grade.

The *curriculum*, which is based on AWS Sense program, recommendations and guidelines, is what you are going to study.

Make-up Policy

Class work (study guides, paper/pencil assignments) can be made up after an absence on your own time. Other arrangements will be made for quizzes and tests if the absence was legitimate.

Some **lab assignments** may be made up upon your return after an absence if it does not interfere with the day's activity and/or the shop is still set-up for you to perform the lab assignment. Demonstrations *cannot* be made up. If a procedure is demonstrated to the class on Tuesday and you're absent we are not going to put the class on hold Wednesday just to get you caught up, (time is precious!). If the absence is school related you will not lose points, if it is *not* school related it will cost you! It is important for you to be here!

Career Readiness

Introduction

The Career Readiness program was developed by members of the teaching staff at MOCC and is used in all programs. Although it is school policy that Career Readiness accounts for 30% of your grade, each teacher has a different interpretation of the Career Readiness terminology, and therefore, a different approach to determining your Career Readiness grade. This section of the syllabus will describe how the Career Readiness program is applied to the Welding & Fabrication program.

Career Readiness Rating Scale

Daily Career Readiness scores are based on the following components:

- Attendance
- Respect and Ethics
- Organization
- Productivity
- Appearance
- Stewardship
- Perseverance
- Critical Thinking
- Technology, Creativity and Innovation
- Research, academic and technical skills
- Participation

- Emotional Intelligence
- Communication
- Leadership

Application

Students are rated on the MOCC Career Readiness Rubric which has four levels; Beginning-1 (well below standard), developing-2 (below standard), proficient-3 (at standard), and advanced-4 (above standard).

Each week the Student will receive an average score in: Attendance, Productivity, and Lead/Follow. The score will be given to them through work with their peer-on-peer leader and the instructor.

Points are subtracted for any noticeable and obvious infractions. The last two pages contain the "Career Readiness Terminology" as developed by the Career Readiness committee, and the interpretation of the terminology as it will be used in this class.

Personal Management & Attendance Policy

The "Personal Management" category is where attendance, punctuality, and safety are listed and therefore, a greater emphasis is placed on these behaviors. (Please note that this is the Welding & Fabrication attendance policy. For information on the MOCC attendance policies refer to the student handbook).

Attendance is a **MUST!** You have to be here to complete the program, activities and work will **NOT** stop just because you aren't here! If you are going to be absent, you **MUST** call in! This is **MANDATORY!**

The dependability category is the only **objective** Career Readiness category. (The remaining two, attitude and initiative are **subjective**). This means that you are here or you're not, you're on time or you're not, you're wearing your safety glasses or you're not. *Get the picture?*

Absent

Every time you are absent your Career Readiness grade goes down (unless it is a school related absence), which is 30% of your grade! When you return from an absence you must fill out a "Leave Request/Record of Leave Taken" form. All missed learning and missed work is **YOUR** responsibility, not mine, you need to contact your instructor to find out what you missed and when it needs to be turned in. If you do not call in when absent, we will be contacting your parent(s) or guardian(s). Every time there is a **NO** call Absents, students must write Four (4) article reviews for every

day missed with NO call. Students that call in will have to write One (1) article review for each day they called in on. Students that call in Late after class started, will have to write Two (2) article review for each day they called in on. Article reviews have to be done before student can re-enter Welding Lab. On the third absent students will get a -100 for missing 3 days in a term. Also each day after counts as a -100 for each absents pass 3. Points can be made up by students by doing one of two things.

Option #1 is to do a 4-5 minute Speech in front of the classroom and their peers. Speech has to be about Welding, rubric will be provided.

Option #2 is to write a report that is at least 8-10 pages, about welding. I am a reasonable teacher and will look at missed days if in groups and being sick or having to miss school because of medical reasons. Will have to have Dr. note.

Tardy

A tardy is defined as not being in your seat at the start of class. For example, if you are not in your seat at 8:30 a.m., 12:40pm and attendance is taken, you are tardy; being in the lab does not count as being at "class" on time. After 3 Tardies will be the same as 1 missed day in class, and will be added towards your 3 days absent for the -100 points.

Being late at work would eventually cost you your job! Your Career Readiness grade will be affected. If you are late or absent it is very unlikely you will pass this class and may eventually be dropped from the program.

Signing Out

If you need to sign out you must fill out a "sign-out permission slip". It will make things a lot easier if you bring a note from your parent or a phone number where they can be contacted (MOCC school policy). If you are 18 years of age, you must have a filled out "Age of Majority" form on file!

Left Classroom/Shop

If you are "missing in action" and someone has to go looking for you, you will lose **all** of your Career Readiness points for the day. Other consequences may also apply.

Safety

Every item under the safety category is of major importance. If you display any of the behaviors listed, you will be written up promptly and your parent(s)/guardian(s) will be contacted. If the problem becomes persistent

you might not be allowed in the shop and you could be removed from the program.

Cell Phones

***Cell Phones and Laser Pointers**

Districtwide, students are prohibited from using or possessing active (i.e., turned on) electronic communication devices (Cell Phones) in restrooms, locker rooms, offices, and other locations where students and staff have a reasonable expectation of privacy. ****Some programs may allow students to use a cell phone for school purposes only. Students should see their individual program syllabus to clearly understand program expectations regarding the use of cell phones at MOCC.** Separately, all students are prohibited from possessing or using laser pointers on school premises and at school-related activities without the express permission of school administration. Students are expected to use good judgment when using or possessing active electronic communication devices in hallways during passing time, in the parking lot, cafeteria during lunch, and extracurricular activities. Students may not use or possess active electronic communication devices without explicit staff permission in class or on buses.

Comes Prepared to Work

You will lose points if you didn't bring something to class that you were responsible for. No writing utensil, left your work boots home, didn't bring an assignment that was due, anything that was your responsibility that causes an inconvenience, or disruption to the class is fair game. You will lose ALL of your Career Readiness points for the day if you show up to class wearing shorts and/or open toed shoes and you have nothing in your locker to change into!

Completes Work on Time

You will lose 1 dependability point for late assignments. This means that if an assignment is due on a particular day, you will lose a total of 2 dependability points - one, as stated above, for not coming to class prepared, and another for not completing the work on time. If you are granted more time to complete the assignment, you will lose more dependability points if

you again fail to meet the deadline. You could also lose these points until the assignment is completed.

Off task means not doing what you're supposed to be doing. If you have to be reminded of what your job, or task, is you will lose 1 personal management point.

The **Daily Work Report** must be completed at the end of each class session. About ten minutes before dismissal we will meet back in the classroom and you will complete your work report for that day. The report is just a few sentences stating what you did and/or accomplished for that class period (there is a copy attached to this syllabus). You will lose 1 point if you don't write something on the work report.

Note: these points cannot be made up. If you forget to write something today, (say its Monday), it won't do you any good to fill out Monday's work report on Tuesday.

Attitude & Initiative

As stated above attitude and initiative are subjective. This means that your performance or behavior in these categories is basically a matter of opinion and therefore depends upon the opinion of the individual doing the rating. You will be rated in these categories as fairly as possible.

CTSOs

- **Boilermakers Welding Invitation**
- **Ferris State University**
- **Northern Michigan Welding Educators' Competition**

Clothing & Safety Equipment

Safety glasses will be provided, and must be worn at all times in the shop. However, you can provide your own if you wish. If you lose your safety glasses, **YOU** are responsible for replacing them; a pair can be purchased at the main office. **Students will NOT be allowed in lab without glasses on!** Each student will be provided with locker and a lock. You are encouraged to bring clothes to work in (coveralls or overalls) and a pair of leather work boots. You will not do any work in the shop if you are wearing any type of open toed shoes, (sandals & flip-flops). Not working in the shop because you don't want to get your clothes dirty will not be an option! **Wear, or bring, clothes you can work in.** Your clothing must be in good condition, without holes, tears or frays. You can use duct tape for minor holes, if necessary. **If student do not have clothes or leather work boots that are safe to**

be in the lab. The student will not be able to work and will have to do classroom work. (Article Reviews or Research paper)

Student Requirements for Lab Work

- Leather work boots. (NO tennis shoes)
- Sound clothing and Jean pants. (With no holes or tears)

Syllabus/Contact sheet

Parents please make sure students have leather work boots and sound clothing and Jean pants for lab work. (With no holes or tears)

Welding & Fabrication students reviewed the syllabus together. Syllabus is available on Google Classroom. If you would like a hard copy of the syllabus, please let Mr. Schmidt know. By signing and returning this portion of the syllabus, the student agrees that they have received, read, and understand the above statements.

 Student Signature

 Date

 Parent Signature

 Date

Student achievement is a priority at the Mecosta Osceola Career Center. It is important for the teacher and parents to work together for the success of the Students. In order to communicate with you effectively, I need to know how and when to reach you. Please fill out the form below and together we will increase Student achievement.

Student Name: _____

Student cell Number: _____

Name of Parent/Guardian: _____

What is the best way and time to contact Parent/Guardian when needed?

Phone number Text YES or NO	Home Cell	Best Time to be reached
E-Mail address		

Name of Parent/Guardian: _____

What is the best way and time to contact Parent/Guardian when needed?

Phone number Text YES or NO	Home Cell	Best Time to be reached
E-mail address		

***Disclaimer: The Welding and Fabrication syllabus is subject to changed. The Instructor will notify the Students of any changes in a writing.**

****Accommodations: Accommodations will be made for the Students to the best of our ability. Examples of accommodations are: tests read to you, extended time for the tests, modified test, ect.**