COURSE TITLE: **WELDING TECHNOLOGY**

INSTRUCTOR: Kyle Deal
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CLASS MEETING TIMES:

2022 - 2023 Class Schedule	8/22/2022 – 6/1/2023
Monday – Friday AM	8:00 AM – 10:30 AM
Monday – Friday PM	12:00 PM – 2:30 PM

TEXTBOOKS:

Fundamentals of Welding - AWS
Math for Welders - Nino Marion

OTHER RESOURCES: American Welding Society D1.1 Structural Code
American Welding Society SENSE QC10 Specification

REQUIRED MATERIALS: Textbook, Jeans/Work Pants, Work Boots, Writing Utensil

COURSE DESCRIPTION:
This course is designed for the student who is interested in welding and cutting processes as a possible career path. Prior experience or knowledge about welding is an asset but not mandatory. Basic theory and practice of various welding processes and procedures will be covered with an emphasis on safety.

Attendance:

Students who wish to be considered for admission into the second year program must have exemplary attendance of ***at least 90%.*** The instructor reserves the right to waive this rule due to extenuating circumstances, such as a severe illness, family emergency, or other circumstances beyond the student's control. Because The MACC operates on a calendar that may vary from the local district, students should expect that they may be absent for some school-related activities, academic testing, and local district scheduling conflicts; however, we are striving to prepare students for the career field and expect that they will be proactive in attempting to be in attendance as much as possible. The welding program is designed to be a hands on program, therefore attendance is a key element. Lab work makes up 75% or more of this class, the lab work cannot be sent home. We understand that being a part of a sports team or any other extracurricular activity is a valuable part of high school to many students, but those absences will not be excused, anyone who plays sports and will miss time due to this should heavily consider attending the ***AM session***.

OBJECTIVES:

I. **Occupational Orientation**
   a. Prepare time or job cards, reports, or records
   b. Perform housekeeping duties (shop maintenance)
   c. Follow verbal instructions to complete work assignments
   d. Follow written details to complete work assignments

e. Receive exposure to welding and/or cutting automation theory

II. **Safety and Health of Welders**
   a. Demonstrate proper use and inspection of equipment used for protection of personnel
   b. Demonstrate proper work area operation
   c. Demonstrate proper use and inspection of equipment used for ventilation
   d. Demonstrate proper Hot Zone operation
   e. Demonstrate proper working in confined spaces (at a low level) (Understand what is a confined space)
   f. Understand precautionary labeling
   g. Demonstrate proper use and inspection of equipment used for each required welding or thermal cutting process

III. **Drawing and Welding Symbol Interpretation**
   a. Interpret basic elements of a drawing or sketch
   b. Interpret welding symbol information
   c. Fabricate parts to blueprint specification (i.e., layout, cut and fit along with joint preparation)

IV. **Shielded Metal Arc Welding (SMAW) Principles and Practices**
   a. Perform safety inspections of equipment and accessories
   b. Make minor external repairs to equipment and accessories
   c. Set up for shielded metal arc welding operations on plain carbon steel
   d. Operate shielded metal arc welding equipment
   e. Make fillet welds, all positions, on plain carbon steel
   f. Make groove welds, all positions, on plain carbon steel
   g. Perform 2G and 3G, uphill, limited thickness qualification tests on plain carbon steel plate

V. **Gas Metal Arc Welding (GMAW, GMAW-S, GMAW-P) Principles and Practices**
   a. Perform safety inspections of equipment and accessories
   b. Make minor external repairs to equipment and accessories
   c. Set up for gas metal arc welding operations on plain carbon steel
   d. Operate gas metal arc welding equipment
   e. Short circuit transfer
   f. Make fillet welds, all positions, on plain carbon steel
   g. Make groove welds, all positions, on plain carbon steel
   h. Spray transfer
   i. Make 1F and 2F welds on plain carbon steel
   j. Make 1G welds on plain carbon steel
   k. Describe gas metal arc welding-pulse theory

VI. **Flux Cored Arc Welding (FCAW-G/GM) Principles and Practices**
   a. Perform safety inspections of equipment and accessories
   b. Make minor external repairs to equipment and accessories
   c. Set up for flux cored arc welding operations on plain carbon steel
   d. Operate flux cored arc welding equipment
   e. Make fillet welds, all positions, on plain carbon steel
   f. Make groove welds, all positions, on plain carbon steel

VII. **Gas Tungsten Welding (GTAW) Principles and Practices**
   a. Perform safety inspections of equipment and accessories
   b. Make minor external repairs to equipment and accessories
   c. Set up for gas tungsten arc welding operations on plain carbon steel, aluminum, and stainless steel
   d. Operate gas tungsten arc welding equipment
   e. Make fillet welds, all positions, on plain carbon steel
   f. Make groove welds, all positions, on carbon steel

g. Make 1F and 2F welds on aluminum
h. Make 1G welds on aluminum
i. Make 1F, 2F, and 3F welds on stainless steel
j. Identify various tungsten types and their uses/applications

VIII. **Thermal Cutting Principles and Practices**

a. Perform safety inspections of equipment and accessories
b. Make minor external repairs to equipment and accessories
c. Set up for manual oxy-fuel gas cutting operations on plain carbon steel
d. Operate manual oxy-fuel gas cutting equipment
e. Perform straight cutting operations on plain carbon steel
f. Perform shape cutting operations on plain carbon steel
g. Perform bevel cutting operations on plain carbon steel
h. Remove weld metal from plain carbon steel using weld washing techniques
i. Identify various alternative fuels used in welding and cutting
j. Set up for machine oxy-fuel gas cutting (track burner) operations on plain carbon steel
k. Operate machine oxy-fuel gas cutting (track burner) equipment
l. Perform straight cutting operations on plain carbon steel
m. Perform bevel cutting operations on plain carbon steel
n. Set up for manual plasma arc cutting operations on plain carbon steel, aluminum, and stainless steel
o. Operate manual plasma arc cutting equipment
p. Perform shape cutting operations on plain carbon steel, aluminum, and stainless steel (gouging)
q. Set up for manual air carbon arc gouging and cutting operations on plain carbon steel
r. Operate manual air carbon arc cutting equipment
s. Perform metal removal operations on plain carbon steel

IX. **Welding Inspection and Testing Principles and Practices**

a. Examine cut surfaces and edges of prepared metal base parts
b. Examine track, intermediate layers, and completed welds

GRADING CRITERIA:

Grading Scale

A	96 – 100%
A-	90 – 95%
B+	87 – 89%
B	84 – 86%
B-	80 – 83%
C+	77 – 79%

C	74 – 76%
C-	70 – 73%
D+	67 – 69%
D	64 – 66%
D-	60 – 63%
F	59% and below

	Category Weight	Grade Category Point Values	Notes
Lab Projects	50%	Skill Builders= **4.0** points each Qualifications= **100** points each	Highest grade is recorded in book. Student will be given as many opportunities as material is available to use for projects.
Classwork	25%		Classwork will consist of both online and in person work and instruction.

Participation	25%	5 points for each class session.	Should an assignment or lab time be refused five point will be lost, these cannot be made up. Also any day that is not an excused absence will also be a loss of five points.

** Grade category weights and points will be approximate percentages used to calculate final grades.*

**** Turning in late work is highly discouraged. See Handbook for details on late work.**

* Students will receive a daily participation grade, booth clean-up grade and an assigned job grade.
* Students will be responsible to continue lab work that was not completed from previous semesters.

Testing Policy: If a student should do poorly on or fail a test, they have the opportunity to retake the test. A student has five (5) school days to retake a test. It is then up to the discretion of the instructor how the scores will be used and recorded. The old score may be replaced with the new higher score or the two scores may be averaged together.

ACADEMIC INTEGRITY:

All students are expected to be honest in their studies. Dishonesty in completing assignments, examinations or other academic endeavors is considered an extremely serious violation of the rights of others and is subject to disciplinary action, ranging from a zero on an assignment up to a failing grade in the course. Plagiarism, the failure to give credit for ideas, thoughts or material taken from another, is cheating and will not be tolerated. Plagiarism includes using someone else's exact words, or even their ideas but not their exact words. It is a good rule of thumb that if you did not know the information before you started the assignment, you must cite your source.

ADA STATEMENT:

It is the policy of Montcalm Area Intermediate School District that no person shall be subjected to discrimination in any educational program, service, or activity that it provides, nor in any employment for which it is responsible. As such, MAISD and its Board of Education does not discriminate on the basis of race, color, national origin, gender (including orientation or transgender identity), disability, age, religion, height, weight, marital or family status, military status, ancestry, genetic information, or any other legally protected classes. Inquiries related to discrimination should be directed to the MAISD Superintendent.