

Muskegon Area CAREER TECHNICAL CENTER

COURSE SYLLABUS

WELDING / METAL FABRICATION

Dates: September 3, 2013 – June 9, 2014
AM Session 8:05am – 10:35am
PM Session 11:45pm – 2:15pm

INSTRUCTOR: Mr. Rodney Bulthouse (1-231-767-3681)

COURSE

DISCRIPTION: **The goal of the course is to develop skills necessary to continue career awareness within the welding / metal fabrication field which is required by industry for school to work transition.**

COURSE

- GOALS:
1. Students will be able to turn on, adjust, and shut down an electric arc welding machine. They will also know and practice all safety rules and regulations as recommended by the American Welding Society.
 2. Students will learn to recognize and prepare various types of welding joints, and will also be able to select (as well as identify) a recommended electrode for a particular joint.
 3. Students will learn various terms used in the Arc welding industry, and be able to tell the meaning of each.
 4. Students will be able to weld in the flat position using various mild steel electrodes.
 5. Students will be able to weld in all positions using various common mild steel electrodes.
 6. Students will be able to **safely adjust light up, and shut down** an Oxy-Acetylene torch, and also set up an Oxy-Acetylene portable unit.
 7. Students will be able to make straight line, bevel, circular and irregular cuts using a hand held Oxy-Acetylene torch.
 8. Students will be introduced to basic gas welding practices such as brazing, Oxy-Acetylene welding, hard surfacing, and common silver soldering.
 9. Students will be able to turn on, adjust, and shut down a Gas Metal Arc Welding machine.

10. Students will be able to turn on, adjust, and shut down various types of Gas Tungsten Arc Welding machines.
11. Students will learn to weld mild steel, stainless steel, and aluminum in all positions with both Gas Metal Arc Welding and Gas Tungsten Arc Welding.
12. Students will measure to an accuracy of 1/16 of an inch.
13. Students will learn the basic geometric principles needed to successfully complete the metal fabrication course.
14. Teach students various types of drilling, tapping, and threading techniques, as they would be used in fabricating metal objects.
15. Using the workbooks; **Welding Principles** and Math for welder's students will learn methods of dimensioning, various views, types of lines, welding symbols, and applied mathematics as it may be used in industry.
16. Students will learn structural shapes of mild steel, how to describe them, how to figure out a bill of material weight cost, and how to apply them to a project given.
17. Students will learn how to **safely operate saws, press breaks, shears, hand benders, and various grinding equipment.**
18. Students will learn the necessary skills to apply for and receive a job in the welding industry with extensive training on resume, applications, cover letters, interviews, and follow up inquires.
19. Students will learn the importance of **WORK ETHICS** in the class and lab setting as it applies to industry.
20. Student will learn many other employable skills such as; discipline, attendance, work ethics, attitude, correct grammar, and manors.

LEARNING OBJECTIVES:

1. Develop a better understanding of all the welding processes involved within the course description and goals set.
2. Demonstrate knowledge of general fabrication skills in the lab setting using various shop equipment.
3. Demonstrate a good understanding of textbooks used: Mathematics for welders and Welding Principles.
4. Demonstrate the knowledge and ability of employability skills to obtain a job in the welding industrial workforce of today.

COURSE
OUTLINE:

WELDING / METAL FABRICATION

Instructor: ***Rodney Bulthouse***

First year student syllabus will be as follows:

Introduction / General Welding Exploration	1 st week
<i>AWS SENCE PRE TESTING</i>	<i>1st week</i>
Safety rules / issues lecture & video <i>Segment 1 – Occupational Orientation</i>	1 st week
Safety operations lab equipment / hand tools <i>Segment 2 – Safety and Health for Welders</i>	2 nd week
Electrical Safety unit Video / lecture on equip repair	2 nd week
Speakers from industry	2 nd week
SMAW (ARC) introduction info lab exercises <i>Segment 3 - Shielding Metal Arc Welding</i>	3-5 th week
Math / Tape measure (fractions) exercise units 1-6 (classroom) / Lab exercises	4-5 th week
SMAW (ARC) information prep for written test / Lab exercises	6-7 th week
Speaker from industry / Colleges	7 th week
<i>Segment 2 – Safety and Health for Welders</i>	7 th week
Prep SMAW (ARC) exercises Performance Test	8 th week
SMAW (ARC) Performance Test basic entry level	8 th week
Finish all Arc exercises see check off sheet in lab	9 th week

Oxy-Acetylene Safety	
Torch operation / Gas welding	10 th week
Segment 4 - Manual Oxyfuel Gas Cutting	
Segment 5 – Mechanized Oxyfuel Gas Cutting	11 th week
Carbon Arc review	11 th week
Plasma Cam introduction / demo	
Segment 12 – Air Carbon Arc Cutting	
Segment 10 – Plasma Arc Cutting	11 th week
Advanced SMAW (ARC) welding (V-groove plates 3/8”)	12 th week
Math / decimal units 1-3 prep for Welding Principles / or <i>Math text</i>	13 th week
Work Exploration / Field trip to local Industry / College visitation (additional speakers from colleges)	14 th week
Welding Principles / or <i>Math Book for Welders</i> <i>every day</i> (60 minutes)	14-18 th week
Welding Principles reading <i>Math test #1</i>	17 th week
SEMESTER END TEST	18 WEEK
<i>Prep for project performance project test</i>	
Advanced SMAW welding lab exercises 3/8 V groove AWS D1.1 specifications	18-23 rd week
Finish Welding Principles / <i>Math test #2</i>	19 th week
Structural shapes introduction and testing	20 th week
Resumes / Employability / Cover letter Life skills units 1-6 / Job shadowing (all material must be saved on thumb drive)	20 th week
Bill of Material introduction and testing	21 st week
Drilling and tapping section	22 nd week
Sheet metal exercises Plasma Cam exercises	23 rd week
Philosophy / creative thinking unit	23 rd week

GMAW (M.I.G) introduction	24-25 th week
<i>Segment 6 – Gas Metal Arc Welding</i>	25 th week
GMAW (M.I.G) exercises equipment maintenance / written test	26 th week
GMAW (M.I.G) Performance test (Entry level)	27 th week
<i>Segment 7 – Drawing and Welding Symbols</i>	27 th week
FCAW Flux Cored Arc Welding intro	28 th week
<i>Segment 8 – Flux Cored Arc Welding</i>	
Gas welding feeder section for GTAW Advanced AWS D1.1 certification testing	29 th week
<i>Segment 11 – Welding Inspection and Testing</i>	
GTAW (T.I.G) welding introduction	30 th week
<i>Segment 9 – Gas Tungsten Arc Welding</i>	
GTAW (T.I.G) welding exercises	31 st week
GTAW (T.I.G) Performance Test (entry level)	32 nd week
In House Welding Competition	32 nd week
Project Performance Test / Fabrication project	33-34 th week
Lab Prep / Make up welding exercises / Review all welding components to (Mastery level) Plasma Cam units	33-35 th week
College prep documentation review / Career research / Employability documentation	36 th week
SEMESTER END	36th week

Second year student syllabus will be as follows:

Introduction / General Welding Exploration General Shop Safety/ Electrical Safety	1 st week
Hand Tool / Lab Equip Safety Check off sheets	2 nd week
Speakers from industry	2 nd week
GMAW (MIG) review Review check off sheet (Lab)	3-4 th week
Measurement / Project introduction Lab restriction	5 th week
Math / Tape measure (fractions) exercise units 1-6 (classroom) / Lab exercises	5 th week
Fabrication Lay out / Projects	6- 7 th week
Speaker from Industry / Colleges	7 th week
Resume up-dates / Employability Documents	8 th week
Job Shadowing / Work Exploration Plasma Cam introduction	8 th week
Finish all GMAW exercises Lab performance test	9-10 th week
Oxy-Acetylene Safety (review) Torch operation / Gas welding Plasma Cam exercises	10-12 th week
Carbon Arc review	12 th week
GTAW (TIG) welding intro Math review / decimal units 1-3	13-18 th week
Work Exploration / Field trip to local Industry / College visitation (Additional speakers from colleges)	14 th week
Welding Principles	14-18 th week

<i>Welding Principles / Math test #1</i> (semester) <i>Prep for project performance project test</i>	17 th week
GTAW Performance test	18 th week
SEMESTER END TEST	18 WEEK
Structural shapes / Fabrication Projects	19-20 th week
Bill of Material introduction and testing	21 st week
Drilling and tapping section	22 nd week
Sheet metal exercises	23 rd week
Philosophy / creative thinking unit	23 rd week
SMAW review / AWS D1.1 testing	24-25 th week
SMAW Performance test (Advanced level)	27 th week
Advanced AWS D1.1 certification testing	27-28 th week
Project performance testing	29-30 th week
	30 th week
GTAW welding exercises	31-36 th week
In House Welding Competition	32 nd week
Project Performance Test / Fabrication project	33-34 th week
Lab Prep / Make up welding exercises / Review all welding components to (Mastery level)	33-34 th week
<i>AWS SENCE POST TESTING</i>	<i>35th week</i>
College prep documentation review / Career research / Employability documentation	36 th week
SEMESTER END	36th week

METHODOLOGY:

The format of this course will include:

- Class discussions
- Essay writings (x2)
- Computer research integration project
- Welding / Blueprint reading / Math skills text book exercises
- Hands-on training in lab setting
- Career pathway development
- Work Ethics for School-to-work practice
- Employability / Life Skills

EVALUATION:

Class participation/activities

Work Ethics 33%

Shop Skills (Lab) /testing 34%

Classroom Text / testing 33%

Work Base Learning / Cooperative Education Job Placement:

A student must obtain and illustrate Triple A status through out the class curriculum to be considered for job placement.

AAA top status is when a student illustrates:

- Above average *attendance*
- Above average *ability* at shop skills
- Above average *attitude* with working well with others and supervision.

Job placement depends on availability tied to industrial needs and student scheduling issues for academics. For any reason such as student drop in grades, attendance, or decline in appropriate attitude a student may be pulled from job placement and returned to regular school schedules.