



**CREDIT COURSE OUTLINE**

**I. COVER PAGE**

(1) MFGT 60	(2) Introduction to Welding	(3) 6
Number	Title	Units

(4) Lecture / Lab Hours:	(8) Classification:	
Course Hours		
Weekly Lec hours: 4.00	Degree applicable:	X
Weekly Lab hours: 5.50	Non-degree applicable:	
Total Contact hours: 17.00	Basic skills:	
Lec will generate <u>144</u> hour(s) outside work.	(9)RC	Fulfills AS/AA degree requirement: (area)
Lab will generate <u>  </u> hour(s) outside work.		
(5) Grading Basis: Grading Scale Only	Major:	Machine Tool Technology
Pass/No Pass option X		Maintenance Mechanic
Pass/No Pass only	Certificate of:	Welding Technology
(6) Advisories:		Machinist
• Eligibility for English 126 and Mathematics 103		Maintenance Mechanic
(7) Pre-requisites (requires C grade or better):		Manufacturing 1
• Industrial Technology 205		Welder
Corequisites:	Certificate in:	
•	(10)CSU	Baccalaureate: X
	(11)Repeatable: (A course may be repeated three times)	0
	(12)C-ID:	
	Proposed Start Date:	Fall 2012

(12) Catalog Description:  
 This course is a combination of basic gas welding and basic arc welding. Topics used for class activities include safety procedures needed to work in school and industrial shops, oxyacetylene welding of steel sheet and pipe in various positions, brazing, flame cutting, shielded metal arc welding (stick) and gas metal arc welding (MIG) of various joint designs and with a variety of electrode types in flat and horizontal positions. There will also be a brief intro into flux cored arc welding and gas tungsten arc welding (TIG).

**II. COURSE OUTCOMES:**

*(Specify the learning skills the student demonstrates through completing the course and link critical thinking skills to specific course content and objectives.)*

Upon completion of this course, students will be able to:

- I. Perform fusion welds, brazing and soldering, on plate, pipe, and tubing with the oxy-fuel torch.
- II. Apply proper fusion welding techniques on plate with the SMAW & GMAW processes in the flat & horizontal positions.
- III. Choose the correct welding power source, polarity, and consumables for SMAW & GMAW welding process.

**III. COURSE OBJECTIVES:**

*(Specify major objectives in terms of the observable knowledge and/or skills to be attained.)*

In the process of completing this course, students will:

- I. Understand the correct safety procedures for working in both school and industrial shops.
- II. Know the tools used in welding fabrication.
- III. Identify proper techniques in welding, brazing on soldering with oxy-fuel process.
- IV. Demonstrate proper techniques in welding with the SMAW & GMAW processes.
- V. Describe the correct machine setup for various SMAW & GMAW Electrodes.
- VI. Use various cutting processes.
- VII. Participate in shop maintenance and repair activities.
- VIII. Understand basic set up and operation of FCAW and GTAW processes.

**IV. COURSE OUTLINE:**

**Lecture Content:**

## A. Introduction

1. Orientation to shop and program
2. Safety
3. Welding terms and joint designs

## B. Tools in the Welding Industry

1. Hand tools
2. Power tools
3. Welding power sources
4. Related equipment

## C. Oxyacetylene Welding

1. Safety
2. Equipment
3. Setup and operation
4. Application and techniques for welding

## D. Shielded Metal Arc Welding

1. Safety
2. Equipment
3. Setup and operation
4. Application and techniques for flat and horizontal positions.
5. Selecting the electrode

## E. Brazing and Soldering

1. Ferrous
2. Non-ferrous

## F. Cutting Operations

1. Oxyfuel cutting
2. Plasma cutting
3. Carbon air arc gouging

## G. Gas Metal Arc Welding and Fluxcored Arc Welding

1. Safety
2. Equipment
3. Set up and operation
4. Application and techniques for flat and horizontal positions
5. Electrodes and shielding gasses

## H. Gas Tungsten Arc Welding

1. Basic set up
2. Basic operation

**Lab Content:**

## A. Introduction

1. Orientation to shop and program
2. Safety
3. Joint designs

## B. Tools in the Welding Industry

1. Hand tools
2. Power tools
3. Welding power sources
4. Related equipment

## C. Oxyacetylene Welding

1. Safety
2. Equipment
3. Setup and operation
4. Application and techniques for welding

## D. Shielded Metal Arc Welding

1. Safety
2. Equipment
3. Setup and operation
4. Application and techniques for flat and horizontal positions.
5. Selecting the electrode

## E. Brazing and Soldering

1. Ferrous
2. Non-ferrous

## F. Cutting Operations

1. Oxyfuel cutting
2. Plasma cutting
3. Carbon air arc gouging

G. Gas Metal Arc Welding and Fluxcored arc welding

1. Safety
2. Equipment
3. Set up and operation
4. Application and Techniques for flat and horizontal positions
5. Electrodes and shielding gasses

H. Gas Tungsten Arc Welding

1. Basic set up
2. Basic operation

V. APPROPRIATE READINGS

**Reading assignments may include but are not limited to the following:**

I. Sample Text Title:

1. Recommended - Jeffus, L *Welding and Metal Fabrication*, Delmar Cengage Learning, 2012,
2. Recommended - Oberg, E *Machinery's Handbook*, ed. 29 Industrial Press, 2012,

II. Other Readings

- Global or international materials or concepts are appropriately included in this course
- Multicultural materials and concepts are appropriately included in this course

If either line is checked, write a paragraph indicating specifically how global/international and/or multicultural materials and concepts relate to content outline and/or readings.

VI. METHODS TO MEASURE STUDENT ACHIEVEMENT AND DETERMINE GRADES:

Students in this course will be graded in at least one of the following four categories. Please check those appropriate. A degree applicable course must have a minimum of one response in category A, B, or C.

<b>A. Writing</b>			
Check either 1 or 2 below			
	1. <i>Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.</i>		
X	2. <i>Substantial writing assignments are NOT required. If this box is checked leave this section blank. For degree applicable courses you must complete category B and/or C.</i>		
	a) essay exam(s)		d) written homework
	b) term or other paper(s)		e) reading reports
	c) laboratory report(s)		f) other (specify)

**Required assignments may include but are not limited to the following:**

<b>B. Problem Solving</b>			
Computational or non-computational problem-solving demonstrations, including:			
X	a) exam(s)		d) laboratory reports
X	b) quizzes		e) field work
X	c) homework problems		f) other (specify):

**Required assignments may include but are not limited to the following:**

Sample exam question:

1. What steps would you take to set up SMAW powersource to weld 1/4" thick plate with 1/8" E7018 electrode?

<b>C. Skill demonstrations, including:</b>			
X	a) class performance(s)	X	c) performance exams(s)
	b) field work		d) other (specify)

**Required assignments may include but are not limited to the following:**

Lab assignments include beads, tee joints, butt joints, and other welds and cutting objectives with oxy-fuel welding, oxy-fuel cutting, and electric arc welding (SMAW).

<b>D. Objective examinations including:</b>			
X	a) multiple choice	X	d) completion
X	b) true/false		e) other (specify):

X	c) matching items	
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**COURSE GRADE DETERMINATION:**

Description/explanation: Based on the categories checked in A-D, it is the recommendation of the department that the instructor's grading methods fall within the following departmental guidelines; however, the final method of grading is still at the discretion of the individual instructor. The instructor's syllabus must reflect the criteria by which the student's grade has been determined. (A minimum of five (5) grades must be recorded on the final roster.)

If several methods to measure student achievement are used, indicate here the approximate weight or percentage each has in determining student final grades.

Problem Solving 20 - 40% Skills Demonstration 40 - 60% Objective Examination 20 - 40%

**VII. EDUCATIONAL MATERIALS**

For degree applicable courses, the adopted texts, as listed in the college bookstore, or instructor-prepared materials have been certified to contain college-level materials.

Validation Language Level (check where applicable):	College-Level Criteria Met	
	YES	NO
Textbook	<u>  X  </u>	<u>      </u>
Reference materials	<u>  X  </u>	<u>      </u>
Instructor-prepared materials	<u>  X  </u>	<u>      </u>
Audio-visual materials	<u>  X  </u>	<u>      </u>

Indicate Method of evaluation:

- Used readability formulae (grade level 10 or higher)
- Text is used in a college-level course   X
- Used grading provided by publisher
- Other: (please explain; relate to Skills Levels)

<i>Computation Level</i> (Eligible for MATH 101 level or higher where applicable)	<u>      </u>	<u>  X  </u>
Content		
Breadth of ideas covered clearly meets college-level learning objectives of this course	<u>  X  </u>	<u>      </u>
Presentation of content and/or exercises/projects:		
Requires a variety of problem-solving strategies including inductive and deductive reasoning.	<u>  X  </u>	<u>      </u>
Requires independent thought and study	<u>  X  </u>	<u>      </u>
Applies transferring knowledge and skills appropriately and efficiently to new situations or problems.	<u>  X  </u>	<u>      </u>
List of Reading/Educational Materials		
Recommended - Jeffus, L <i>Welding and Metal Fabrication</i> , Delmar Cengage Learning, 2012,		
Recommended - Oberg, E <i>Machinery's Handbook</i> , ed. 29 Industrial Press, 2012,		

Comments:

- This course requires special or additional library materials (list attached).
- X   This course requires special facilities:  
Welding Shop

Attached Files:

- [Manufacturing Pathways](#)
- [MFGT 60 Advisory Justification](#)

**BASIC SKILLS ADVISORIES PAGE** The skills listed are those needed for eligibility for English 125, 126, and Math 201. These skills are listed as the outcomes from English 252, 262, and Math 250. In the right hand column, list at least three major basic skills needed at the beginning of the target course and check off the corresponding basic skills listed at the left.

Check the appropriate spaces.

- Eligibility for Math 201 is advisory for the target course.
- Eligibility for English 126 is advisory for the target course.
- Eligibility for English 125 is advisory for the target course.

If the reviewers determine that an advisory or advisories in Basic Skills are all that are necessary for success in the target course, stop here, provide the required signatures, and forward this form to the department chair, the appropriate associate dean, and the curriculum committee.

**REQUISITES**

**Prerequisite -- IT 205 FOUNDATION SKILLS IN INDUSTRIAL TECHNOLOGY**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Recognize the various types of tools, materials, and processes as they relate to manufacturing technology.</li> <li>• Students will be able to describe basic functions within a manufacturing career pathway of their choice.</li> </ul> | <ul style="list-style-type: none"> <li>• Understand the correct safety procedures for working in both school and industrial shops.</li> <li>• Participate in shop maintenance and repair activities.</li> </ul> |
|--|---|

**ESTABLISHING PREREQUISITES OR COREQUISITES**

Every prerequisite or corequisite requires content review plus justification of at least one of the seven kinds below. Prerequisite courses in communication and math outside of their disciplines require justification through statistical evidence. Kinds of justification that may establish a prerequisite are listed below.

Check one of the following that apply. Documentation may be attached.

Significant statistical evidence indicates that the absence of the prerequisite course is related to unsatisfactory performance in the target course.

Justification: Indicate how this is so.

The health or safety of the students in this course requires the prerequisite.

Justification: Indicate how this is so.

The prerequisite course is part of a sequence of courses within or across a discipline.

The prerequisite is required in order for the course to be accepted for transfer to the UC or CSU systems.

Justification: Indicate how this is so.

The prerequisite/corequisite is required by law or government regulations.

Explain or cite regulation numbers:

The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.

Justification: Indicate how this is so.

The safety or equipment operation skills learned in the prerequisite course are required for the successful or safe completion of this course.

Justification: Indicate how this is so.

Three CSU/UC campuses require an equivalent prerequisite or corequisite for a course equivalent to the target course:

**Justification:**

**JUSTIFICATION OF LIMITATION ON ENROLLMENT**

Enrollment in courses or blocks of courses may be limited based on performance, honors, or other performance based criteria. Be mindful of the disproportionate impact the limitation will have on specific groups of students. It is important to determine if the limitation will disproportionately keep under-represented students from enrolling in the course or block of courses.

Describe the reasons for limiting the enrollment.

Course Designator: MFGT 60
Course Title(s): Introduction to Welding
Rationale for Limiting Enrollment: 0