



**CREDIT COURSE OUTLINE**

**I. COVER PAGE**

<u>(1) MFGT 62</u>	<u>(2) Advanced Welding</u>	<u>(3) 4</u>
Number	Title	Units

<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="3">(4) Lecture / Lab Hours:</td> </tr> <tr> <td colspan="3">Course Hours</td> </tr> <tr> <td style="width:15%;"></td> <td style="width:15%;">Weekly Lec hours:</td> <td style="width:15%; text-align: right;">27.00</td> </tr> <tr> <td></td> <td>Weekly Lab hours:</td> <td style="text-align: right;">144.00</td> </tr> <tr> <td></td> <td>Total Contact hours:</td> <td></td> </tr> <tr> <td colspan="3">Lec will generate __ hour(s) outside work.</td> </tr> <tr> <td colspan="3">Lab will generate __ hour(s) outside work.</td> </tr> <tr> <td>(5) Grading Basis:</td> <td>Grading Scale Only</td> <td></td> </tr> <tr> <td></td> <td>Pass/No Pass option</td> <td style="text-align: center;">X</td> </tr> <tr> <td></td> <td>Pass/No Pass only</td> <td></td> </tr> <tr> <td colspan="3">(6) Advisories:</td> </tr> <tr> <td colspan="3">(7) Pre-requisites (requires C grade or better):</td> </tr> <tr> <td colspan="3"> <ul style="list-style-type: none"> <li>• Manufacturing Technology 61 or equivalent course or verified work experience in the field</li> </ul> </td> </tr> <tr> <td colspan="3">Corequisites:</td> </tr> <tr> <td colspan="3"> <ul style="list-style-type: none"> <li>•</li> </ul> </td> </tr> </table>	(4) Lecture / Lab Hours:			Course Hours				Weekly Lec hours:	27.00		Weekly Lab hours:	144.00		Total Contact hours:		Lec will generate __ hour(s) outside work.			Lab will generate __ hour(s) outside work.			(5) Grading Basis:	Grading Scale Only			Pass/No Pass option	X		Pass/No Pass only		(6) Advisories:			(7) Pre-requisites (requires C grade or better):			<ul style="list-style-type: none"> <li>• Manufacturing Technology 61 or equivalent course or verified work experience in the field</li> </ul>			Corequisites:			<ul style="list-style-type: none"> <li>•</li> </ul>			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="3">(8) Classification:</td> </tr> <tr> <td style="width:15%;"></td> <td style="width:15%;"></td> <td style="width:15%;"></td> </tr> <tr> <td></td> <td>Degree applicable:</td> <td style="text-align: center;">X</td> </tr> <tr> <td></td> <td>Non-degree applicable:</td> <td></td> </tr> <tr> <td></td> <td>Basic skills:</td> <td></td> </tr> <tr> <td>(9) RC</td> <td>Fulfills AS/AA degree requirement: (area)</td> <td></td> </tr> <tr> <td></td> <td>General education category:</td> <td></td> </tr> <tr> <td></td> <td>Major:</td> <td>Maintenance Mechanic Welding Technology</td> </tr> <tr> <td></td> <td>Certificate of:</td> <td>Maintenance Mechanic Welder</td> </tr> <tr> <td></td> <td>Certificate in:</td> <td></td> </tr> <tr> <td>(10) CSU</td> <td>Baccalaureate:</td> <td style="text-align: center;">X</td> </tr> <tr> <td>(11) Repeatable: (A course may be repeated three times)</td> <td></td> <td style="text-align: center;">3</td> </tr> <tr> <td>(12) C-ID:</td> <td></td> <td></td> </tr> <tr> <td></td> <td>Proposed Start Date:</td> <td style="text-align: center;">Fall 2012</td> </tr> </table>	(8) Classification:							Degree applicable:	X		Non-degree applicable:			Basic skills:		(9) RC	Fulfills AS/AA degree requirement: (area)			General education category:			Major:	Maintenance Mechanic Welding Technology		Certificate of:	Maintenance Mechanic Welder		Certificate in:		(10) CSU	Baccalaureate:	X	(11) Repeatable: (A course may be repeated three times)		3	(12) C-ID:				Proposed Start Date:	Fall 2012
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(12) Catalog Description:  
 Advanced welding practices using SMAW, GMAW, GTAW, and FCAW. Objectives will be completed in flat, horizontal, vertical, and overhead positions on steel, aluminum, and stainless steel. A general overview of inspection, testing, and certification, as well as general fabrication design, cost and construction will be covered

**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. Produce certified weldments.
- II. Fabricate products to industry standards.

**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. Review and use correct safety procedures for welding related equipment.
- II. Demonstrate certification level welding skills in flat, horizontal, vertical, and overhead positions with SMAW, GMAW, GTAW, and FCAW.
- III. Explain certification procedures of the AWS D1.1 welding code.
- IV. Identify and prepare joint assemblies used in welding fabrication.
- V. Record data necessary to complete welding procedure specifications (WPS).
- VI. Recognize widely used industrial codes including AWS, ASME, and API.
- VII. Match code organizations with industry affiliation.
- VIII. Contrast inspection techniques.
- IX. Employ repair procedures to correct weld defects.
  - X. Estimate the cost of a fabricated project.
- XI. Use welding skills to fabricate a project.
- XII. Participate in shop maintenance and repair activities.

**IV. COURSE OUTLINE:**

**Lecture Content:**

- A. Safety Procedures
  - 1. Review
  - 2. Implementation of safety procedures
- B. Standards & Codes
  - 1. Industries
  - 2. Requirements
  - 3. Application
- C. Testing Procedures
  - 1. Non-destructive
  - 2. Destructive
- D. Welding & Certification
  - 1. Procedure
  - 2. Welder
  - 3. Testing
- E. Fabrication
  - 1. Design
  - 2. Cost estimating
  - 3. Construction techniques

**Lab Content:**

- A. Safety Procedures
  - 1. Review
  - 2. Implementation of safety procedures
- B. Testing Procedures
  - 1. Non-destructive
  - 2. Destructive
- C. Welding & Certification
  - 1. Procedure
  - 2. Welder
  - 3. Testing
- D. Fabrication
  - 1. Design
  - 2. Cost estimating
  - 3. Construction techniques

**V. APPROPRIATE READINGS**

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

- I. Sample Text Title:
  - 1. Recommended - Jiffus, 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	
	<b>1. Substantial writing assignments are required. Check the appropriate boxes below and provide a written description in the space provided.</b>
X	<b>2. 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.</b>
	a) essay exam(s)
	b) term or other paper(s)
	c) laboratory report(s)
	d) written homework
	e) reading reports
	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	X	f) other (specify): Lab projects

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

Sample question:

1. Determine the amperage needed to correctly remove a backing strip using a 1/4" carbon electrode and the carbon air arc torch.

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

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

Preparation, welding, and testing of fillet and groove welds to industry AWS requirements.

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

**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)	<u>      </u>
Text is used in a college-level course	<u>  X  </u>
Used grading provided by publisher	<u>      </u>
Other: (please explain; relate to Skills Levels)	<u>      </u>

<i>Computation Level</i> (Eligible for MATH 101 level or higher where applicable)	<u>  X  </u>	<u>      </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 - Jiffus, 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).  
 \_\_\_\_\_ This course requires special facilities:  
  X   \_\_\_\_\_ Welding Shop

Attached Files:  
[Manufacturing Pathways](#)

**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**

**Corequisite -- MFGT 61 Intermediate Welding**

<ul style="list-style-type: none"> <li>• Perform fusion welds on plate and pipe with SMAW, GMAW, GTAW, and FCAW in the flat horizontal, vertical, and overhead positions.</li> <li>• Practice setup and procedures for welding of aluminum and stainless steel with GMAW and GTAW processes.</li> <li>• Apply correct cutting procedures for the oxy-fuel, plasma, and carbon air arc processes.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate certification level welding skills in flat, horizontal, vertical, and overhead positions with SMAW, GMAW, GTAW, and FCAW.</li> <li>• Explain certification procedures of the AWS D1.1 welding code.</li> <li>• Identify and prepare joint assemblies used in welding fabrication.</li> </ul>
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**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.  
  X   \_\_\_\_\_ 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.  
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 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 62
Course Title(s): Advanced Welding
Rationale for Limiting Enrollment: 0