



El Camino College

COURSE OUTLINE OF RECORD - Approved

I. GENERAL COURSE INFORMATION

Subject and Number: Welding 10C
Descriptive Title: Advanced Certification and Career Preparation Lab

Course Disciplines: Welding

Division: Industry and Technology

Catalog Description: This advanced level welding lab is third of a series specifically designed for students to refine their welding skills in E7018 electrodes used in structural steel Shielded Metal Arc Welding (SMAW), Flux Core Arc Welding (FCAW), and E6010 electrodes used in open root welding of ferrous metals in the vertical (3G) and overhead (4G) position. Taken in succession, this course prepares students to advance to level III in American Welding Society (AWS) national skill standards.

Conditions of Enrollment: Prerequisite
 Welding 10B
 with a minimum grade of C
 or
 equivalent

Course Length: Full Term Other (Specify number of weeks):
Hours Lecture: 0 hours per week TBA
Hours Laboratory: 6.00 hours per week TBA
Course Units: 2.00

Grading Method: Both
Credit Status: Associate Degree Credit

Transfer CSU: Effective Date: 2/18/2014
Transfer UC: No

General Education:
El Camino College: _____

CSU GE: _____

IGETC: _____

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. Student will perform destructive test on a qualification plate exam(guided bend tests) .
2. Students will have working knowledge of manual and semi-automatic tooling used in industry.
3. Student will safely operate equipment and exhibit shop safety throughout course.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <http://www.elcamino.edu/academics/slo/>.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Set up and use various welding and cutting apparatus.
Performance exams
2. Prepare a metal test plate for welding.
Performance exams
3. Correctly set up and use a constant current welding machine SMAW or constant voltage welding machine FCAW.
Performance exams
4. Operate welding equipment properly and safely.
Class Performance
5. Identify proper electrodes for material and joint fit up.
Class Performance
6. Demonstrate the proper measures to overcome "arc blow".
Performance exams

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lab	1.5	I	GENERAL SAFETY AND SET UP A. Tool crib etiquette

			B. Equipment review
Lab	1.5	II	LAB TOUR A. Currents and power sources B. Joint design and specifications
Lab	3	III	BLUEPRINT WELDING SYMBOLS AND ABBREVIATIONS A. Assembling parts B. Computing thickness of material, depth of bevel and depth of weld bead for structural steel
Lab	9	IV	GROOVE WELDS A. Grooved butt weld B. "V" groove, "U" groove, and "J" groove mechanical cuts
Lab	40	V	SMAW OR FCAW MANUAL APPLICATION A. SMAW manual application on a one inch plate B. FCAW manual application on a one inch plate
Lab	24	VI	STRUCTURAL WELDING CODE WELDMENTS A. Structural welding code in accordance with AWS B. Structural welding code as modified by the City of Los Angeles C. Structural code as modified by the State of California
Lab	6	VII	BACK OR BACKING AND MELT-THRU WELDS A. Back/backing and melt-thru weld B. Differences between a back weld and a melt-thru weld C. Bend test in accordance with AWS standards
Lab	14	VIII	OPEN ROOT A. 6010 V groove on 3/8" base metal B. Gas Tungsten Arc open root C. 3/32" 7018 cover pass
Lab	9	IX	DESTRUCTIVE TESTING A. Analyzing the samples B. Weld defects C. Vertical position D. Overhead position
Total Lecture Hours		0	
Total Laboratory Hours		108	
Total Hours		108	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Skills demonstrations

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

Prepare and set up 1" V-groove with backing strip for 3G and 4G positions.

Demonstrate knowledge of groove angle, root opening, and backing strip thickness required for SMAW or FCAW process.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. Given a completed weldment, inspect the colver pass to AWS specifications.

Discuss what could prevent discontinuities and defects reflected in final weldment. Demonstrate a destructive test for soundness of weld. Report findings on a lab report.

2. Demonstrate proper settings of amperage on a inverter or rectifier to correctly weld various electrode diameters and flux coatings. Visually evaluate weld bead profile and adjust machine settings to obtain arc force, amperage or electrode angle to control weld puddle.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Performance exams

Class Performance

V. INSTRUCTIONAL METHODS

Demonstration

Laboratory

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

Course is lab only - minimum required hours satisfied by scheduled lab time and estimated student hours outside of class per week is zero.

Estimated Independent Study Hours per Week:

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

Handouts from American Welding Society (AWS) Code Books

A2.4

A5.1

A5.5

A5.18

A5.20

D1.1

D. OTHER REQUIRED MATERIALS

Safety equipment;personal protective gear, chipping hammer, wire brush

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
Course Prerequisite Welding-10B or	Sequential
Non-Course Prerequisite	Without the knowledge of blueprint reading and the implimentation of WPS (welding procedure specification) skills a student is unlikely to succeed as a weld technician in the course.

B. Requisite Skills

Requisite Skills
Ability to safely operate SMAW equipment to complete intermediate welding projects. WELD 10B - Select between various welding processes to complete a joint. WELD 10B - Cut various metals utilizing oxygen-fuel, carbon arc and plasma arc processes. WELD 10B - Differentiate between a F3 and F4 category weld electrode. WELD 10B - Correctly set up and use a constant current SMAW and Gas Tungsten Arc welding (GTAW) machine. WELD 10B - Correctly set up and use a constant voltage Gas Metal Arc Welding (GMAW) and FCAW machine.

<p>WELD 10B - Use various welding processes in joining metals. WELD 10B - Comprehend blueprint reading. WELD 10B - Interpret welding symbols and acronyms according to AWS A2.4.</p>

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
-------------------------	----------------------------

D. Recommended Skills

Recommended Skills

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact
-------------------------------------	-------------------------------

Course created by Renee Newell on 11/01/2013.

BOARD APPROVAL DATE: 02/18/2014

Last Reviewed and/or Revised by Renee Newell on 11/01/2013

18375