I. GENERAL COURSE INFORMATION

Subject and Number: **Welding 23**
Descriptive Title: **Advanced Arc Welding Specialty Lab**
Course Disciplines: **Welding**
Division: **Industry and Technology**

Catalog Description:
This advanced level welding course is designed to further develop advanced specialized welding skills in the structural, sheet metal, and construction industries. This course is for the advanced arc welding student preparing for the American Welding Society (AWS) Structural Steel practical exam and certification.

Note: Letter grade or pass/no pass option.

Conditions of Enrollment:
Prerequisite Welding 10B or equivalent

Course Length:	**X 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: **X Effective Date: Prior to July 1992**
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. Welding students will produce quality weld in the 3G And 4G positions
2. Students will have a developed understanding of the importance of joint fit up
3. At the completion of this course, students will be prepared to take the practical exam for their D1.1 certification.

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. Utilize safety procedures for safe operation of tools, machines and welding equipment found in a welding facility.
   Performance exams
2. Select the proper current, polarity setting, and manipulation techniques for any given electrode.
   Performance exams
3. Pass the coupon bend stress test used for the practical exam portion of the Los Angeles Building and Safety (LABS) structural welding certification / AWS D1.1 welding certification examinations.
   Performance exams
4. Weld three plates together with E 7018 rod and cut in half using an oxy acetylene torch.
   Performance exams
5. Fit-up test plates with proper specifications.
   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	3	I	WELDING SAFETY AND THE WELDING INDUSTRY A. Personal protective equipment B. Occupational safety
Lab	9	II	WELDING PROCEDURES A. Currents and power sources B. Joint design and specifications
Lab	6	III	MATERIAL TESTING A. American Society of Testing and Materials (ASTM) classification of steel plate B. American Institute of Iron and Steel C. Bend test in accordance with AWS standards
Lab	3	IV	CODES A. Structural welding code used in accordance with AWS B. Structural welding code used to complete City of Los Angeles D1.1 certification

Lab	3	V	CERTIFICATIONS A. Shielded Metal Arc Welding (SMAW) B. Flux Core Arc Welding (FCAW)
Lab	38	VI	MANUAL APPLICATION OF SMAW OR FCAW ON ONE INCH PLATE 1/8" 7018 IN ONE INCH PLATE in the vertical position
Lab	38	VII	1/8" 7018 IN ONE INCH PLATE in the overhead position
Lab	8	VIII	Oxy-acetylene cutting 1" plate
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:
Given the necessary materials to complete the AWS D1.1 Structural Steel Welding certification exam, perform all welds indicated within a two-hour time limit. Submit test plates to the instructor.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:
1. Complete a manipulative exam for the AWS D1.1 welding certification. Evaluate all welds and account for the results in a Procedure Quality Report (PQR). Submit welds to the instructor.
2. Perform destructive testing on test coupons. Analyze the samples and discuss weld defects with the instructor.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:
Performance exams
Class Performance

V. INSTRUCTIONAL METHODS
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: 0

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

D. OTHER REQUIRED MATERIALS

Safety glasses
Ear plugs
Welding jacket
Gauntlet gloves welding helmet
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	
Non-Course Prerequisite	To become D1.1 certified, students must pass the written and practical exams. In this course, students learn advanced welding procedures to help them pass the practical exam. If students do not have prior welding experience, they will not be able to succeed in this course.

B. Requisite Skills

Requisite Skills
Correctly set up and operate SMAW and GTAW welding machines. WELD 10B - Correctly set up and use a constant current SMAW and Gas Tungsten Arc welding (GTAW) machine.
Ability to use several welding processes to join metal. WELD 10B - Use various welding processes in joining metals.
Ability to understand the difference between F3 and F4 weld electrodes. WELD 10B - Differentiate between a F3 and F4 category weld electrode.
Ability to cut various metals using several welding processes. WELD 10B - Cut various metals utilizing oxygen-fuel, carbon arc and plasma arc processes.

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 Joseph Poletti on 09/01/1974.

BOARD APPROVAL DATE:

LAST BOARD APPROVAL DATE: 12/04/2018

Last Reviewed and/or Revised by: RENEE NEWELL on 10/11/2018

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