

EL CAMINO COLLEGE COURSE OUTLINE OF RECORD

I. Course Information

Course Acronym:*

WELD

Course Number:* 29

Descriptive Title:* Blueprint Reading

Division: Industry and Technology

Department:*

Welding

Course Disciplines: Welding

Catalog Description:*

This course is designed to provide weld industry standards for topics that include: basic industrial prints and shop drawings, understanding the various views, interpreting lines, measurements, types of welding joints, symbols and nomenclature used per the American Welding Society (AWS) A2.4 standard as applied to the welding trade.

Conditions of Enrollment:

Prerequisite:

Co-requisite:

**Recommended
Preparation:**

**Enrollment
Limitation:**

Course Length: Full Term

**Hours Lecture (per
week):** 3

**Hours Laboratory (per
week):** 0

Outside Study Hours:* 6

Total Course Hours:* 54

Course Units:* 3

Grading Method: Letter Grade only

Credit Status: Credit, degree applicable

Transfer CSU: Yes

Effective Date: 01/20/2016

Transfer UC: No

Effective Date:

General Education:
ECC

Term:

Other:

CSU GE:

Term:

Other:

IGETC:

Term:

Other:

II. Outcomes and Objectives

A. Student Learning Outcomes (SLOs) (The course student learning outcomes are listed below.)
SLO revisions are completed via the SLO Change Form available on the College Curriculum Committee website.

Student Learning Outcomes:

SLO #1

Student will exhibit a working knowledge of welding symbols according to American Welding Society (AWS) A2.4 code.

SLO #2

Student will be able to identify orthographic drawings illustrated on blueprints.

SLO #3

Student will interpret required fit-up and weldment information contained in reference line details and print drawings.

B. Course Objectives (The major learning objective for in this course are listed below.)

Course Objectives:

1. Sketch oblique, isometric and pictorial views.
2. Examine blueprint interpretation practices commonly used by welding and metal fabrication industries.
3. Identify and utilize weld symbols correctly when mapping out fabrication procedure.

III. Outline of Subject Matter

(Topics should be detailed enough to enable an instructor to determine the major areas that should be covered to ensure consistency from instructor to instructor and semester to semester.)

Example:

- I. Main Topic (3 hours, lecture)
 - A. Sub topics
 - B. Sub topics
 1. Super sub topic
 2. Super sub topic

Major Topics:

1. AMERICAN WELDING SOCIETY (AWS) WELD SYMBOLS AND REFERENCE LINE (5 hours, lecture)

1. Types of welds
 1. Fillet weld specifications
 2. Groove weld specifications
2. Symbols review

2. TRADE MATH (4 hours, lecture)

1. Linear units of measurement
2. Fractions and decimals
3. Tolerances

3. PRINT DRAWING SPECIFICATIONS (6 hours, lecture)

1. Notes and specifications
2. Dimensioning from orthographic drawings
3. Three-view drawings
4. Detail fabrication requirements; datum points

4. OBJECT REPRESENTATION (4 hours, lecture)

1. Alphabet of lines and object lines
2. Hidden lines and center lines
3. Extension lines and dimension lines
4. Projection lines

5. LINE DRAWINGS AND DIMENSIONS (3 hours, lecture)

1. Print drawing dimensioning
2. Identify details of parts with 3- view depictions
3. Center to center/end to center measurements

6. GEOMETRIC DIMENSIONING AND TOLERANCES (5 hours, lecture)

1. Angles and linear relationships
2. Degrees and spatial geometry

7. BASIC JOINTS AND STRUCTURAL SHAPES (3 hours, lecture)

1. Identify the five basic joints
2. Identify symbols and acronyms of structural shapes
3. Standard Index measurement of structural shapes
4. Base metal specifications

8. RELATIONSHIP OF PRINT VIEWS (6 hours, lecture)

1. Recognizing the views shown in print
 1. Interpreting details given in view formation
 2. Locating fit-up and weld specifications displayed between view dynamics
2. Completing and interpreting section detail
 1. Cutting plane line
 2. Half sections, partial sections, and full-section assembly drawings

9. TECHNICAL DRAWING (3 hours, lecture)

1. Spatial perspective
2. Details and off sets

10. FABRICATION DETAILS (3 hours, lecture)

1. Joint fit-up and tolerances
2. Stud detail
 1. Counterbore/countersink symbol representation
 2. Depth and thread detail

11. WORKING DRAWINGS (3 hours, lecture)

1. Symbols, representation and dimensioning
2. Relationship of print views

12. BACK WELD OR BACKING WELD-COMPLETE JOINT PENETRATION (CJP) AND MELT-THRU WELDS (1 hour, lecture)

1. Applications of a CJP weld and melt-thru welding
2. Differences between a back weld and backing weld
3. Reference line applications

13. FRICTION, PROJECTION AND RESISTANCE WELDING (2 hours, lecture)

1. Plug and slot welds
2. Spot and seam welding
3. Resistance welding

14. FLANGE WELDS (1 hour, lecture)

1. Identifying a flange weld
2. Drawing the welding symbol for an edge flange weld and a corner flange weld
3. Comparing the differences between flange welds

15. BLUEPRINTS and CONSTRUCTION DRAWINGS: A UNIVERSAL LANGUAGE (5 hours, lecture)

1. Types of construction drawings
2. Contrasting shop drawings to blueprints

Total Lecture Hours: 54

Total Laboratory Hours: 0

Total Hours: 54

IV. Primary Method of Evaluation and Sample Assignments

A. Primary Method of Evaluation (choose one):

- 1) Substantial writing assignments
- 2) Problem solving demonstrations (computational or non-computational)
- 3) Skills demonstrations

Primary Method of Evaluation: 2) Problem solving demonstrations (computational or non-computational)

B. Typical Assignment Using Primary Method of Evaluation

Typical Assignment Using Primary Method of Evaluation: Sketch front, top and side multiview drawings from isometric view.

- 1. Use A size graph paper 8.5" X 11", a ruler and #2 pencil
- 2. Pictorial drawing #1: draw the front view using a scale of 1/4 inch equals one inch
- 3. Pictorial drawing #2: draw the top view using a scale of 1/4 inch equals 1 inch
- 4. Pictorial drawing #3 located to the right of and in alignment with #2: draw the right view using a scale of 1/4 inch equals 1 inch

Submit drawing to the instructor or scan and upload via the course management system.

C. College-level Critical Thinking Assignments

Critical Thinking Assignment 1: Sketch various pictorial and orthographic projections using proper symbols and abbreviations. Discuss the principles of a fillet weld to include: leg size, length, pitch, contour and finishing. Submit sketch to the instructor or scan and upload via the course management system.

Critical Thinking Assignment 2:

Interpret welding and supplementary symbols on a print. On a one-page report, write the sequence of procedures for preparing the groove, including materials and equipment to be used. Enter weld locations and specifications on the print and submit report and print to the instructor or scan and upload via the course management system.

Critical Thinking Assignment #3

Sketch an isometric view of pipelines including orthographic plan and elevation views. Submit drawing to the instructor or scan and upload via the course management system.

D. Other Typical Assessment and Evaluation Methods

Examples: Class Performance, Objective Exam, Clinical Evaluation, Oral Exams, Completion, Other Exams, Embedded Questions, Performance Exams, Essay Exams, Presentation, Fieldwork, Quizzes, Homework Problems, Reading Reports, Journal kept throughout course, Term or Other Papers, Laboratory Reports, True/False, Matching Items, Written Homework, Multiple Choice, Other (specify)

Other Evaluation Methods:

- Homework Problems
- Matching Items
- Multiple Choice
- Other Exams
- Quizzes

V. Instructional Methods

Examples: Lecture, Group Activities, Lab, Role play/simulation, Discussion, Guest Speakers, Multimedia presentations, Field trips, Demonstration, Other (specify)

Instructional Methods:

- Demonstration
- Discussion
- Lecture

If other:

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

Work Outside of Class:*

- Answer questions
- Problem solving activities
- Skill practice
- Study

If Other:

VII. Texts and Materials

A. Up-to-date Representative Textbooks: Please use the following format(s):

Printed Text - Author, Title, Edition, Publisher, Year.

Digital Text (OER Text) - Author (last name first). Title. Edition or Version (if beyond 1st). Publisher, Publication year or Revision date. URL. License.

Sample: Dillon, Dave. Blueprint for Success in College and Career. Version 1.3. Rebus Community, 2018. press.rebus.community/blueprint2/. Licensed under CC BY 4.0.

If you wish to list a text that is more than 5 years old, please annotate it as a “discipline standard”.

**Multiple textbooks may be listed.*

Up-To-Date Representative Textbooks: John R. Walker, W. Richard Polanin, WELDING PRINT READING, 7th edition Goodheart-Willcox, 2020

Thomas Proctor, PRINT READING FOR WELDERS, 5th edition, American Technical Publishers, 2014. (Discipline Standard)

B. Alternative Textbooks: Please use the following format(s): if applicable

Printed Text - Author, Title, Edition, Publisher, Year.

Digital Text (OER Text) - Author (last name first). Title. Edition or Version (if beyond 1st). Publisher, Publication year or Revision date. URL. License.

Sample: Dillon, Dave. Blueprint for Success in College and Career. Version 1.3. Rebus Community, 2018. press.rebus.community/blueprint2/. Licensed under CC BY 4.0.

If you wish to list a text that is more than 5 years old, please annotate it as a “discipline standard”.

**Multiple textbooks may be listed.*

Alternative Textbooks: ZTC (Zero textbook course)
Canvas-assisted content

C. Required Supplementary Readings

Required Supplementary Readings:

D. Other Required Materials

Other Required Materials: Graph paper
Isometric paper
Eraser
Ruler

VIII. Conditions of Enrollment

A. Requisites (Course Prerequisites and Corequisites) Skills needed without which a student would be highly unlikely to succeed.

Requisite:

Category:

Requisite course(s):
List both prerequisites and corequisites in this box.

Requisite and Matching skill(s):
Bold the requisite skill.
List the corresponding course objective under each skill(s).

B. Requisite Skills: (Non-Course Prerequisite and Corequisites) Skills needed without which a student would be highly unlikely to succeed.

Requisite Skill:

Requisite Skill and Matching Skill(s):
Bold the requisite skill(s). If applicable

C. Recommended Preparations (Course) (Skills with which a student's ability to succeed will be strongly enhanced.)

Requisite course:

Requisite and Matching skill(s):
Bold the requisite skill.
List the corresponding course objective under each skill(s).

D. Recommended Preparation (Non-Course) (Skills with which a student's ability to succeed will be strongly enhanced.)

Requisite Skill:

Requisite Skill and Matching skill(s):
Bold the requisite skill. List the

E. Enrollment Limitations

**Enrollment
Limitations and
Category:**

**Enrollment
Limitations Impact:**

Course Created by: Renee Newell

Date: 10/01/2012

**Original Board
Approval Date:** 01/20/2016

**Last Reviewed and/or
Revised by:** Renee Newell

Date: 05/09/2023

**Last Board Approval
Date:** 11/20/2023 effective FALL 2024