

**WLD 42 - Introduction to Welding Inspection****Catalog Description****Transfer Status:** CSU**Prerequisite:** WLD 22, WLD 24, WLD 25, WLD 26, WLD 40, WLD 50, WLD 154 and NCCER Level II Welding Qualification**Corequisite:** WLD 28, WLD 30, WLD 32, WLD 34, WLD 36, WLD 56, WLD 156**Unit(s):** 2.00**Lecture:** 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)**Total:** 34.00 Contact hours/68.00 Out of class hours/102.00 Total hours/2.00 Unit(s)

Course Description: This course instructs on the qualifications and knowledge requirements of a Certified Welding Inspector (CWI). Methods of testing, various procedures, and techniques of inspection. familiarize students with the basic concepts of destructive and nondestructive evaluation processes. Emphasis of record keeping methods used by the American Welding Society (AWS), American Society of Mechanical Engineers (ASME), American Petroleum Institute (API), and American National Standards Institute (ANSI).

Objectives

Upon successful completion of this course, the student should be able to:

1. Apply testing symbols to weldments according various welding standards.
2. Apply codes to weldments that are currently used in the welding industry.
3. Describe the role of a CWI in fabrication and the qualification of a welder.

Course Content

Topic Titles / Suggested Time Topic	
<u>Lecture</u>	
<u>Topics</u>	<u>Lec Hrs</u>
Introduction and safety	1.00
Application and scope	0.50
Definitions	1.50
a. Definitions of welding terms	
b. Master chart of welding, allied processes & thermal cutting	
Symbols	2.00
a. Nondestructive testing symbols	
b. Basic testing symbols	
Ethical and essential requirements for a CWI	2.00
a. Ethical requirements	
b. Essential requirements	
c. Knowledge of testing methods	
d. Welding experience	
Welding inspection operations	2.00
a. Knowledge of drawings, specifications, manufacturing instructions	
b. Welding procedure and welder qualifications	
c. Application of welding and allied procedures	
Quality assurance	1.00
a. Organization requirements	
b. Welding procedures and qualification records	
Welding metallurgy	3.00
a. Mild carbon steel	
b. Hydrogen and steel	
c. Low alloy steels	
d. Austenitic stainless steel	
e. Laminations and lamellar tearing	
Total Hours: 34.00	

Topics	Lec Hrs
Preheating and postweld heat treating	1.00
a. Preheating	
b. Postweld heat treating	
Weld and weld-related discontinuities	3.00
a. Dimensional discontinuities	
b. Weldment and related discontinuities	
c. Mechanical and chemical weld metal	
d. Glossary of weld discontinuities	
Welding procedure specifications	2.00
a. Description and important details	
b. Examples of welding procedure specifications	
Qualification of welding procedure specifications	1.00
a. Description	
Qualification of welders and welding operations	1.50
a. Performance qualification requirements	
b. The test specimen	
c. Testing of qualification welds	
d. Qualification records	
e. Standardization of tests	
f. Retests	
Selection of samples of welding tests	1.00
a. Procedural sampling methods	
b. Control charts for attributes	
Destructive testing of welds	1.50
a. Chemical tests	
b. Corrosion tests	
c. Metallographic tests	
d. Hardness stress	
e. Mechanical tests	
f. Standard tension test	
g. Tests of welded joints	
h. Notched-bar impact tests	
Proof and leak tests	1.00
a. Proof tests	
b. Leak tests	
Nondestructive testing	3.00
a. Inspection by visual testing	
b. Inspection by radiographic testing	
c. Ultrasonic testing of welds and weld related materials	
d. Magnetic particle testing	
e. Penetrant testing	
f. Eddy current (electromagnetic) testing	
g. Acoustic emission testing	
h. Ferrite testing	
i. Nondestructive testing procedures	
Qualification of nondestructive testing personnel	2.00
Codes and standards	3.00
Metric practice	1.00
a. The SI system	
b. Units	
c. Commonly used metric conversions	
Total Hours: 34.00	

Methods of Instruction

- A. Demonstrations

- B. Discussion
- C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- D. Instructor Demonstrations
- E. Multimedia Presentations
- F. Student application

Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Homework
- D. Assignments

Examples of Assignments

Reading Assignments

1. Read chapter 1 and be prepared to discuss in class.
2. Read assigned AWS journal article and be prepared to discuss in class.

Writing Assignments

1. Write an essay explaining how the assigned AWS article can be implemented into the process and how it relates to the class.
2. Describe an order of operations for the assigned destructive testing (DT) method of an SVOG pipe welding joint.

Out-of-Class Assignments

1. Research the proper process for setting up nondestructive testing (NDT) equipment using an AWS publication.
2. Define assigned vocabulary words and also explain how to prevent these weld defects from occurring.

Recommended Materials of Instruction

AWS Committee on Methods of Inspection. (2000). Welding Inspection. -, 3.

National Center for Construction Education and Research (NCCER). (2010). Welding Level Three. *Pearson Education INC, 4th.*

National Center for Construction Education and Research (NCCER). (2010). Welding Level Two. *Pearson Education INC, 4th.*

Other Learning Materials

All tools listed in the Butte College Welding Technology Program Guide.

Minimum Qualifications

Welding

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