Las Positas College
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Course Outline for WLDT 62B

ADVANCED GTAW AND GMAW THEORY

Effective: Spring 2018

I. CATALOG DESCRIPTION:
WLDT 62B — ADVANCED GTAW AND GMAW THEORY — 1.00 units

Theory of fuel and inert gas welding of Non-Ferrous alloys, Oxy-Fuel welding, Oxy fuel brazing, flame cutting, and plasma cutting. Gas Tungsten Arc (GTAW) and Gas Metal Arc (GMAW) welding equipment and supplies. Nomenclature and metallurgy of Non-Ferrous alloys. Introduction to blueprint reading and welding symbols. Hazardous material regulations and safety data sheets.

1.00 Units Lecture

Corequisite
WLDT 62AL - Beginning GTAW and GMAW Skills Lab
or

WLDT 62BL - Advanced GTAW and GMAW Skills Lab

Grading Methods:
Letter or P/NP

Discipline:
- Welding

	MIN
Lecture Hours:	18.00
Total Hours:	18.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

III. PREREQUISITE AND/OR ADVISORY SKILLS:

IV. MEASURABLE OBJECTIVES:

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

A. Understand the theory and safe use of “TIG”, Gas Tungsten Arc Welding (GTAW) use for advanced levels of work and materials;
B. Understand the theory and safe use of Gas Metal Arc Welding (GMAW) for advanced levels of work and materials;
C. Understand the theory and use of shape cutting process;
D. Understand the theory and safe use of welding manipulators and positioners;
E. Understand the theory and safe use of special welding processes;
F. Uses and limitations of each welding/cutting process covered;
G. Understand basic metallurgy and numbering systems for Non-Ferrous alloys;
H. Understand electrode and wire selection and numbering systems for Non-Ferrous alloys
I. Understand raw material manufacturing processes;
J. Understand and identify basic structural shapes, sheet and plate used in industry;
K. Understand and identify basic pipe and tubing used in industry;
L. Apply advanced orthographic and isometric blueprint reading skills;
M. Use and understand American Welding Society (AWS); Welding Procedure Specifications (WPS) and Procedure Qualification Reports (PQR);
N. Understand the role of the Certified Welding Inspector (CWI) and identify weld discontinuities and defects;
O. Destructive and Non Destructive Testing (NDT);
P. Career opportunities in the welding trade.

V. CONTENT:
A. Advanced GTAW and GMAW theory and process
B. Shape cutting theory and process basics
    1. Laser Cutting
    2. Water Jet Cutting EDM Cutting’
    3. EDM Cutting
    4. Equipment & supplies
    5. Uses and limitations
    6. Safety
    7. Industrial applications

C. Welding positioners and manipulators
D. Special welding processes
E. Advanced industrial, metals, electrodes, metallurgy and numbering systems
    1. Aluminum
    2. Copper
    3. Magnesium
    4. Nickel
    5. Titanium
F. Basic metals raw material manufacturing and sources
G. Structural shapes, sheet, plate, tubing, pipe. Common stock sizes, thicknesses and uses in industry
H. Advanced blueprint reading and interpretation
I. Welding inspection
    1. Welding procedures, PQR, WPS
    2. Welding discontinuities, NDT and destructive testing
    3. Role of the CWI
J. Metal trades hazards and safe practices, personal protective equipment

VI. METHODS OF INSTRUCTION:
A. **Lecture** -
B. Correlation with real world industrial applications
C. Visual aids
D. **Discussion** -

VII. TYPICAL ASSIGNMENTS:
A. Weekly reading assignments from text
B. Quizzes based on weekly reading assignments
C. Tests cover entire body of knowledge in course

VIII. EVALUATION:
A. **Methods**

1. Exams/Tests
2. Quizzes
3. Class Participation
4. Class Work
5. Home Work

B. **Frequency**

1. The Exams will be administered near the halfway point and during finals week
2. Quizzes will be administered periodically during the semester on an as needed basis
3. Participation will be evaluated daily
4. Classwork evaluated as assigned
5. Homework evaluated as assigned

IX. TYPICAL TEXTS:

1. American Welding Society (2012). *SPECIFICATION FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION* (2012 ed.). Miami, Florida: American Welding Society.
2. Jeffus, L. (2012). *Welding Principles and Practices* (11th ed.). Clifton Park, NY: Delmar.
3. American Welding Society (2015). *Structural Welding Code - Steel* (2015 ed.). Miami, Florida: American Welding Society.
4. Bowditch, W.A., Bowditch, K.E., & Bowditch, M.A. (2017). *Welding Fundamentals* (5th ed.). Tinley Park , IL: Goodheart-Willcox Company.
5. Brown, W., & Brown, R. (2016). *Print Reading for Industry* (10th ed.). Tinley Park , IL: Goodheart-Willcox Company.

X. OTHER MATERIALS REQUIRED OF STUDENTS: