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Course Outline for WLDT 61BL
ADVANCED SMAW AND FCAW SKILLS LAB
Effective: Spring 2018

I. CATALOG DESCRIPTION:

WLDT 61BL — ADVANCED SMAW AND FCAW SKILLS LAB — 2.00 units

Advanced skills in Shielded Metal Arc (SMAW) and Flux Cored Arc (FCAW) welding of steel in the horizontal, vertical and overhead positions to A.W.S. Codes. Safety and proper use of SMAW, FCAW, oxy-fuel cutting and plasma arc cutting equipment. Blueprint usage in the welding shop environment.

2.00 Units Lab

Prerequisite

WLDT 61AL - Beginning SMAW and FCAW Skills Lab
with a minimum grade of C

Corequisite

WLDT 61A - Beginning SMAW and FCAW Theory
or

WLDT 61B - Advanced SMAW and FCAW Theory

Grading Methods:

Letter or P/NP

Discipline:

- Welding

	MIN
Lab Hours:	108.00
Total Hours:	108.00

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

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. WLDT61AL

1. Identify and demonstrate safe use of basic equipment associated with:
2. Shielded Metal Arc (SMAW)
3. Flux Core Arc (FCAW)
4. Plasma cutting
5. Oxy-fuel cutting
6. Carbon arc cutting
7. Illustrate the uses and limitations of each process
8. Employ proper electrode and wire selection for application
9. Practice FCAW, SMAW welded plate steel in the flat and horizontal positions to AWS specifications
10. Apply circumferential welds in flat and rolled position
11. Identify and demonstrate safe practices in the welding shop
12. Use simple blueprints to make parts
13. Operate the following welding support equipment safely:
14. Saw

IV. MEASURABLE OBJECTIVES:

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

- A. Demonstrate and describe safe use of advanced equipment associated with:
 1. Shielded Metal Arc Welding (SMAW);
 2. Flux-core Arc Welding (FCAW)
 3. Plasma cutting
 4. Oxy-fuel cutting
 5. Carbon arc cutting
- B. Describe the uses and limitations of each process;

- C. Classify proper electrode and wire selection for applications;
- D. Recognize common metals;
- E. Demonstrate FCAW, SMAW welded plate steel in the horizontal, vertical and overhead positions to AWS specifications;
- F. Perform circumferential welds in all positions;
- G. Outline the uses and limitations of Constant Current and constant voltage power sources;
- H. Operate plasma and oxy-fuel cut manually in all positions;
- I. Employ Oxy-fuel cutting with a shape cutting machine;
- J. Identify and practice safe practices in the welding shop;
- K. Use advanced blueprints to make parts;
- L. Safely operate advanced welding support equipment.

V. CONTENT:

- A. Advanced equipment associated with each welding/cutting process covered
- B. Uses and limitations of each process covered
- C. Electrode and wire selection for different applications
- D. Common metals
- E. FCAW, SMAW welded plate steel in the horizontal, vertical and overhead positions to AWS specifications
- F. Circumferential welds in all positions
- G. Welding power supplies, AC and DC, constant current and constant voltage
- H. Plasma and oxy-fuel cutting in all positions
- I. Machine cutting of shapes
- J. Safe handling and use
 - 1. Shielded Metal Arc (SMAW)
 - 2. Flux core Arc (FCAW)
 - 3. Oxy-fuel cutting
 - 4. Plasma cutting
 - 5. Carbon arc cutting
- K. Advanced blueprint usage in the welding shop
- L. Advanced welding support equipment safe use and application

VI. METHODS OF INSTRUCTION:

- A. **Lecture** -
- B. **Discussion** -
- C. Correlation with real world industrial applications
- D. Visual aids
- E. One-on-one, hands-on instruction
- F. Group demonstration

VII. TYPICAL ASSIGNMENTS:

- A. Welding samples using different welding processes
 - 1. Shielded Metal Arc Welding (SMAW)
 - 2. Flux-core Arc Welding (FCAW)
- B. Welding samples using different welding joints
 - 1. Butt joint
 - 2. Tee joint
 - 3. Lap joint
 - 4. Corner joint
 - 5. Edge joint
- C. Welding samples using different positions \
 - 1. Horizontal
 - 2. Vertical
 - 3. Overhead
- D. Welding Samples using different materials
 - 1. Carbon Steel
 - 2. Stainless Steel
- E. Cutting samples using hand held oxy-acetylene cutting torch
- F. Cutting samples using semi-automated oxy-acetylene cutting torch
- G. Cutting samples using hand held plasma arc cutting torch

VIII. EVALUATION:

- A. **Methods**
 - 1. Exams/Tests
 - 2. Projects
 - 3. Class Participation
 - 4. Class Work
 - 5. Home Work
 - 6. Lab Activities
- B. **Frequency**
 - 1. Exams once per semester
 - 2. Projects on an as assigned basis
 - 3. Participation will be evaluated daily
 - 4. Work samples will be submitted for grading as completed over the duration of the semester
 - 5. Homework as assigned
 - 6. Lab safety and proper use of tools will be evaluated on a daily basis

IX. TYPICAL TEXTS:

- 1. American Welding Society (2012). *SPECIFICATION FOR WELDING PROCEDURE AND PERFORMANCE QUALIFICATION* (2012 ed.). Miami, Florida: American Welding Society.
- 2. American Welding Society (2015). *Structural Welding Code - Steel* (2015 ed.). Miami, Florida: American Welding Society.
- 3. Jeffus, L. (2012). *Welding Principles and Practices* (11th ed.). Clifton Park, NY: Delmar.
- 4. Texts assigned in corequisite lecture course.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

- A. Personal Protective Equipment
- B. Safety Glasses (ANSI Z87.1)
- C. Leather welding gloves

- D. Long sleeve shirt or jacket
- E. Leather shoes or boots
- F. Welding Helmet (preferred)