

# WELDING ENGINEERING TECH (WEL)

## **WEL 110 OFC/OAW, Electric Welding and Cutting**

2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours

This course is intended to teach students the fundamentals of using OFC, OAW, Basic GMAW, Plasma cutting, CAC, and welding safety. Welding and cutting safety are in accordance with AWS / ANSI Z49.1.

## **WEL 111 Interpreting Engineering Blueprints**

2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours

This course will cover the theory and application of blueprint reading involving the use of ASME Y14 Series, the USA standards used in engineering documentation, along with selection and calculations for dimensioning and tolerancing using the geometric tolerancing criteria. It will also study the use of engineering charts and tables used in the Machinery's Handbook to determine the proper fit between mating parts.

## **WEL 124 CAD with Weldments**

3 Class Hours, 2 Lab Hours, 4 Quarter Credit Hours

Prerequisites: MCT 115

This course is a continuation of MCT 115 Computer-Aided Design I with an emphasis on the SolidWorks weldment environment. Topics include 2D and 3D sketching, welded structures, structural members, weldment drawings with cut lists, weld beads, weld symbols, and weld notes.

## **WEL 131 Materials & Manufacturing Processes**

3 Class Hours, 2 Lab Hours, 4 Quarter Credit Hours

Material properties will be discussed as they apply to product design, manufacturing process design and control. Fundamentals of machining technology, with step-by-step analysis of how to turn materials into products will be reinforced through a hands-on manufacturing project.

## **WEL 151 Industrial Welding I (SMAW)**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

This course is intended to teach students the fundamental theory of Shielded Metal Arc Welding (SMAW). Introductory SMAW lab activities focus on machine selection, classification of electrodes, safety issues and basic welding techniques using electrode 7018 fillet weld for plate build up and for joints in the following positions: flat (1F), horizontal (2F), vertical (3F) and overhead (4F).

## **WEL 152 Industrial Welding II (Advanced SMAW)**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

Prerequisites: WEL 151

An advanced study of shielded metal arc welding (SMAW) as it relates to joining two pieces of steel together using a backing strip with E7018 and open root with E6010 root and 7018 fill and cover passes for 100 percent weld in positions 1G, 2G, 3G and 4G. Class and lab activities will emphasize code compliant weldments.

## **WEL 153 Industrial Welding III (GMAW)**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

Prerequisites: WEL 152

This course is intended to teach students the fundamental theory of Gas Metal Arc Welding (GMAW). Introductory GMAW lab activities focus on the application and use of consumable wire electrode application with GMAW and Flux Cored Arc Welding (FCAW) equipment, safety issues and basic welding techniques with steel plate in various positions. Properties of gases with regard to flow and regulation will also be presented.

## **WEL 216 AWS SENSE Level I**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

This course will guide students through the standardized AWS (American Welding Society) SENSE curriculum. The students will cover information for nine modules; they are as follows: Module 1: Occupational Orientation, Module 2: Safety and Health of Welders, Module 3: Drawing and Welding Symbol Interpretation, Module 4: Shielded Metal Arc Welding (SMAW), Module 5: Gas Metal Arc Welding (GMAW), Module 6: Flux Core Arc Welding (FCAW), Module 7: Gas Tungsten Arc Welding (GTAW), Module 8: Thermal Cutting Processes, and Module 9: Welding Inspection and Testing.

## **WEL 242 Destructive & Non-Destructive Testing**

2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours

Corequisites: ABT 232

This course will introduce the field of destructive and nondestructive testing as it applies to the welding industry. Topics include the most common types of weld discontinuities, the most commonly used testing methods, and the advantages and limitations of each. Laboratory exercises will utilize various destructive and nondestructive weld testing techniques in accordance with American Welding Society (AWS), American Society of Mechanical Engineers (ASME), and American Petroleum Institute (API).

## **WEL 254 Industrial Welding IV (FCAW)**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

Prerequisites: WEL 153

An advanced study of gas metal arc welding (GMAW) as it relates to joining two pieces of metal together with emphasis on steel open root plate and aluminum vee groove plate with backing and steel open root plate. Class and lab activities will emphasize code compliant weldments.

## **WEL 255 Industrial Welding V**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

Prerequisites: WEL 254

This course is intended to teach students the fundamental theory of Gas Tungsten Arc Welding (GTAW). Introductory GTAW lab activities focus on the application and use of consumable electrode process; Gas Tungsten Arc Welding (GTAW) equipment, safety issues and basic welding techniques with steel plate in various positions. Properties of shielding gases with regard to flow and regulation will also be presented.

## **WEL 259 Capstone Design Project**

2 Class Hours, 4 Lab Hours, 4 Quarter Credit Hours

Prerequisites: WEL 255

Advanced theory and lab activities that require demonstration of code compliant weldments, utilizing common welding practices and materials in a student-designed project. Students will be assigned a faculty advisor to assist them in this comprehensive project-based course.

## **WEL 260 Introduction to Robotic Welding**

2 Class Hours, 2 Lab Hours, 3 Quarter Credit Hours

Prerequisites: WEL 152 and WEL 271

The course studies the utilization of robotics, automated controls and assembly processes in the welding engineering environment. Included in this course will be establishing the safety, efficiency and performance of automated systems and machinery. Learned skills will include the ability to integrate weld machinery into the manufacturing system to enhance the automation process. Additional skills will include: identify, troubleshoot and resolve system errors. Levels of automation, as well as flexible and hard automation, open and closed loop control, adapted control and material handling will be discussed.

**WEL 271 Pipe Welding I (SMAW)**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

Prerequisites: WEL 153

This course covers the fundamentals for layout and fabrication of typical pipe connections and to use mathematics, basic equations and charts for properly fabricating and welding these connections. Students will gain exposure to the various types of joints, fit-up, and welding of branch connections, laterals, circumferential sleeves and bull plugs. Hands-on laboratory exercises emphasize the complete pipefitting process from interpretation of blueprints and actual pipe layout, to Shielded Metal Arc Welding (SMAW) of pipe connections in various positions. Class and lab activities will emphasize code compliant weldments.

**WEL 272 Pipe Welding II (SMAW/GMAW)**

1 Class Hours, 4 Lab Hours, 3 Quarter Credit Hours

Prerequisites: WEL 271

This course is intended to continue to teach students the theory of Shielded Metal/Gas Metal Arc Welding (SMAW/GMAW) to pipe welding. SMAW/GMAW lab activities focus on the application and use of Shielded Metal/Gas Metal Arc Welding (SMAW/GMAW) and include GTAW equipment, safety issues and basic welding techniques with pipe and tube in various positions. Properties of shielding gases with regard to flow and regulation will also be presented.