Metal Fabrication and Welding (MFAB)

Courses

MFAB 124 Introduction to Welding (3 Hours)
Introduction to Welding is a basic welding, tool, and equipment safety course. This course will expose students to the various welding processes and techniques. Tools, equipment and safety related to the metal fabrication area will be discussed and used by the student. This is a hands-on course. Students will be required to purchase and use personal protective equipment (PPE).

MFAB 126 Cutting Processes for Welding* (3 Hours)
Prerequisites or corequisites: MFAB 124.
Through classroom, lab (shop) and assessment activities, students in this course will learn to safely and accurately set up, use, and troubleshoot common metal-cutting processes. This course uses common industry standards to assess the accuracy and quality of mechanical and thermal cutting performed by students. 1hr. lecture and 4 hrs. lab/wk.

MFAB 128 Basic Machine Tool Technology (3 Hours)
This course provides instruction in the operation of metal cutting machinery, which includes practice in the safe operation of a lathe, vertical mill and precision grinders. Layout equipment, measuring tools, gauges, hand tools, drilling machine, bench grinder, power saws and heat-treating equipment will also be presented. Machine tool safety, shop math and trigonometry will be emphasized throughout the course.

MFAB 131 Shielded Metal Arc Welding (SMAW) I* (3 Hours)
Prerequisites or corequisites: MFAB 124 and MFAB 126.
Through classroom and/or lab/shop learning and assessment activities, students in this course will describe the Shielded Metal Arc Welding process (SMAW); demonstrate the safe and correct setup of the SMAW workstation; associate SMAW electrode classifications with base metals and joint criteria; demonstrate proper electrode selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes in the flat position; build pads of weld beads with selected electrodes in the horizontal position; perform basic SMAW welds on selected weld joints; and perform visual inspection of welds.

MFAB 133 Gas Metal Arc Welding (GMAW) I* (3 Hours)
Prerequisites : MFAB 124 and MFAB 126.
Through classroom and/or shop/lab learning and assessment activities, students in this course will: explain gas metal arc welding process (GMAW); demonstrate the safe and correct set up of the GMAW workstation; correlate GMAW electrode classifications with base metals and joint criteria; demonstrate proper electrode selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes in the flat position; build pads of weld beads with selected electrodes in the horizontal position; produce basic GMAW welds on selected weld joints; and conduct visual inspection of GMAW welds.

MFAB 136 Gas Tungsten Arc Welding (GTAW) I* (3 Hours)
Prerequisites : MFAB 124 and MFAB 126.
Through classroom and/or lab/shop learning and assessment activities, students in this course will: explain the gas tungsten arc welding process (GTAW); demonstrate the safe and correct set up of the GTAW workstation; relate GTAW electrode and filler metal classifications with base metals and joint criteria; build proper electrode and filler metal selection and use based on metal types and thicknesses; build pads of weld beads with selected electrodes and filler material in the flat position; build pads of weld beads with selected electrodes and filler material in the horizontal position; perform basic GTAW welds on selected weld joints; and perform visual inspection of GTAW welds.

MFAB 140 Maintenance Repair Welding* (3 Hours)
Prerequisites : MFAB 131 and MFAB 133 and MFAB 136.
Upon successful completion of this course, the student should be able to perform oxyfuel cutting (OFC), shielded metal arc welding (SMAW), gas metal arc welding (GMAW) and plasma arc cutting (PAC). Basic blueprint and standard AWS welding symbols will be introduced. Selected welds and assignments will be tested according to industry and AWS standards. The student will be required to provide ANSI Z-87.1 approved safety glasses and may be expected to provide other basic hand tools and/or equipment as required by employers. This course is designed for individuals who have welding experience or who are employed by a company that requires welding skills. This course can be customized for advanced training.

MFAB 180 Blueprint and Symbols Reading for Welders (2 Hours)
Upon successful completion of this course, the student should be able to identify basic welding positions and explain, list, sketch, draw, use or describe current American Welding Society (AWS) welding symbols and weld joint configurations. The student will be introduced to several methods of producing welding blueprints, object representatives, and specific meanings of selected lines, surface features, sectional views and basic math formulas used in the welding industry. The student will be able to identify the symbols used for fillet welds and groove welds made with and without backing. Topics such as pipe welding representations, pipe welding connections, pipe welding classifications, welder certification, metallurgical effects of heat on metals and the importance of weld quality and welding safety will be studied.

MFAB 205 Shielded Metal Arc Welding (SMAW) II* (3 Hours)
Prerequisites or corequisites: MFAB 131.
Upon successful completion of this course, the student should be able to weld fillet welds in the vertical-up (3F), and overhead (4F) weld positions, and groove joints in the vertical up, (3G) and overhead position (4G) weld positions with and/or without backing to industry standards. Students will be required to prepare materials using oxy-fuel cutting techniques. Students will perform a welding proficiency test equal to or exceeding the American Welding society (AWS) standard D1.1. Structural welding code. Students will be expected to provide basic hand tools and/or equipment.

MFAB 210 Gas Metal Arc Welding (GMAW) II* (3 Hours)
Prerequisites or corequisites: MFAB 133.
Upon completion of this course the student should be able to perform more advanced welds in selected positions on a variety of metal thicknesses. Mild steel, stainless steel, and aluminum metals will be utilized. Emphasis will be on short circuit, spray arc and pulse arc modes of metal transfer using larger diameter wire electrode. Industry standard testing techniques will be used.

MFAB 215 Fabrication Practices I* (3 Hours)
Prerequisites : MFAB 131 and MFAB 133 and MFAB 136.
Upon completion of this class, the student should be able to work from discipline specific drawings to manufacture and assemble a mock building section. This class is a capstone course and is intended to serve all MFAB graduate students who have completed the fundamental skills coursework within the metal fabrication certificate or degree programs. The Fabrication Practices I class is part one of an advanced comprehensive class intended to put to practical use the skills obtained throughout the existing Metal Fabrication and Welding Technology Career program. This class will put emphasis on structural steel fabrication, erection, and assembly. The coursework will focus on modern welding fabrication techniques and practices used in the manufacturing and installation of structural steel, piping systems, and miscellaneous welded mechanical items. Students will work in teams of three or four persons.

MFAB 220 Flux Core Arc Welding (FCAW)* (3 Hours)
Prerequisites : MFAB 133.
Upon completion of this course the student should be able to identify safety rules associated with the flux core arc welding (FCAW) process, identify FCAW equipment components, and perform welds in selected positions on a variety of metal thicknesses to industry standards.

MFAB 240 Metallurgy (2 Hours)
Metallurgy is the study of the science and technology of metals. This course covers the extractive, mechanical and physical phases of metallurgy. Topics include the identification of metals, types and classification of metals, heat treatment procedures and common steel manufacturing processes. AWS terms and definitions will be emphasized throughout the course.

MFAB 241 Gas Tungsten Arc Welding (GTAW) II* (3 Hours)
Prerequisites or corequisites: MFAB 136.
Upon successful completion of this course the student will be able to do more advanced GTAW welding projects. Weld in a variety of positions and on several thicknesses of material. Emphasis will be on safety, quality, measurements, and out of position welding. Students will weld on tubular material of a variety of sizes and thicknesses. Square and/or round tube will be fabricated to mate at several common angles using power tools and equipment.

MFAB 250 Fabrication Practices II* (3 Hours)
Prerequisites : MFAB 215.
Upon completion of this class, the student should be able to work from discipline specific drawings to manufacture and assemble a mock piping loop, storage tank/vessel, and miscellaneous parts. This class is intended to serve all MFAB graduate students and current MFAB students who have completed the fundamental skills coursework within the metal fabrication certificate or degree programs. The Fabrication Practices II class is part two of an advanced comprehensive class intended to put to practical use the skills obtained throughout the existing Metal Fabrication and Welding Technology Career program. This class will put emphasis on pressure holding tanks and pressure vessels. Coursework will focus on modern welded fabrication techniques and practices used in the manufacturing and installation of steel pipe, tank and vessel systems, and miscellaneous welded mechanical structural items. Students will work in teams of three or four persons.

MFAB 255 Advanced Machine Tool Technology* (3 Hours)
Prerequisites or corequisites: MFAB 128.
This course provides students further instruction and practice on machine tool operations. Advanced techniques using lathes, milling machine, drill presses and precision grinders and the use of specialized tooling, clamps and jigs are covered. Machining techniques requiring special applications such as steady rest, and centering techniques will be addressed. Students will learn the various techniques of working with stock to produce parts from drawing, plans and sketches. Hardening, tempering and basic metallurgy will also be covered.

MFAB 259 Shielded Metal Arc Welding (SMAW) III* (3 Hours)
Prerequisites : MFAB 205.
Upon successful completion of this course, the student should be able to weld one-inch thick groove joints in the flat (1G), horizontal (2G), vertical up, (3G) and overhead (4G) weld positions, with and/or without backing to industry standards. The course will cover unlimited thickness qualifications. Students will use heat sensing tools and equipment to pre heat, maintain inter-pass temperature, and properly post heat selected welds. Students will perform a welding proficiency test equal to or exceeding the American Welding Society (AWS) standard D1.1. Structural welding code. Students will be expected to provide basic hand tools and/or equipment.

MFAB 271 Metal Fabrication Internship* (3 Hours)

Prerequisites : Department approval.

Upon successful completion of this course, the student should be able to apply classroom knowledge to an actual work situation. The internship will provide advanced students with on-the-job experience under the supervision of professionals in the industry. The work will be developed cooperatively with area employers, college staff and each student to provide a variety of actual job experiences directly related to the student's career goals. 15 hrs. minimum on-the-job training/wk.

MFAB 291 Independent Study* (1-7 Hour)

Prerequisites : 2.0 GPA minimum and department approval.

Independent study is a directed, structured learning experience offered as an extension of the regular curriculum. It is intended to allow individual students to broaden their comprehension of the principles of and competencies associated with the discipline or program. Its purpose is to supplement existing courses with individualized, in-depth learning experiences. Such learning experiences may be undertaken independent of the traditional classroom setting, but will be appropriately directed and supervised by regular instructional staff. Total contact hours vary based on the learning experience.