

Welding Technology Program

Course Description



Introduction to Computers

3 Credits

Offered autumn and spring. Introduction to computer terminology, hardware, and software, including wire/wireless communications and multimedia devices. Students utilize word processing, spreadsheet, database, and presentation applications to create projects common to business and industry in a networked computing environment. Internet research, email usage, and keyboarding proficiency are integrated.

Prerequisite(s): None

Interpersonal Skills in the Workplace

1 Credit

This course will introduce students to interpersonal communication theory which can be applied to a workplace environment. Students will learn effective communication strategies that promote success in professional and personal relationships.

Prerequisite(s): None

Technical Mathematics

3 Credit

Designed to provide the mathematical background necessary for success in the industrial areas. Topics covered include percent, ratio proportion, formula evaluation, basic algebra and geometry concepts, trigonometry, measurement, statistics, and graphing. Markdowns, inventory turnover, and other basic formulas.

Prerequisite(s): ALEKS Placement ≥ 2

Related Metals Process II

3 Credits

Instruction and use of drills, files, threads and threading processes, basic lathe, drill press, and band saw operation, including precision measuring instruments. Fasteners, layout procedures, and basic hand tools are covered.

Prerequisite(s): None

Blueprint Reading and Welding Symbols

3 Credits

Practical experience in reading and drawing orthographic projections, interpreting dimensions, notes, scales, and welding symbols. Isometric projection (pictorial), sections, and auxiliary views with practical experience using conventional drafting tools and computer aided drafting (CAD).

Prerequisite(s): WLDG 150

Fabrication Basics

4 Credits

Conception, design, and construction of a metal structure to industry standards using shears, presses, and other machine tools common to the welding industry. Skills are developed in the areas of shielded metal arc welding and flux core arc welding, oxyacetylene cutting, plasma arc cutting, and air carbon arc cutting.

Prerequisite(s): MPR 114T; WLDG 180; Corequisite(s) WLDG 117, 187

Welding Layout Techniques



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2 credits

Using practical layout techniques students develop basics for blueprint construction, layout on pipe and structural steel, and use of tools common to material layout.

Prerequisite(s): None

Shielded Metal Arc Welding

4 Credits

Theory and safe operation of shielded metal arc welding (SMAW) of carbon steel on plate and structural components in all positions to industry standards. Visual inspection and destructive testing used to determine acceptability based upon industry standards (American Welding Society Structural Welding Code-Steel). Power sources and electrodes are covered in depth. Materials are prepared using mechanical plate shears and thermal cutting techniques. Thermal cutting techniques are examined relative to theory of operation and safe practices. Processes use are oxy-fuel cutting, plasma arc cutting, and air carbon arc cutting. Theory and operation of oxyacetylene welding examined.

Prerequisite(s): None

OSHA Rules and Regulations

1 Credit

Study of the Occupational Safety and Health Administration rules and regulations that affect the welding and construction industries.

Prerequisite(s): None

Flux Core Arc Welding

4 Credits

Theory, practice, and safe operation of flux core arc welding equipment. Coupons are welded in the flat, horizontal, and vertical positions to industry standards using a variety of welding electrodes, diameters, and power sources, which prepare students for welding qualification to the American Welding Society Structural Welding Code specifications.

Prerequisite(s): WLDG 180

Applied Metallurgy

4 Credits

Covers the manufacturing of iron and steel. Examination of physical and mechanical properties. Phase changes with the application of heating and cooling cycles. Ferrous crystal types and properties. Suggested welding procedures for low, medium, and high carbon steels, alloy steels, and cast iron.

Prerequisite(s): None

Introduction to Technical Writing



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3 Credit

Introduction to technical writing situations that integrate text, design, and graphics. Emphasis is on evidence-based, informative writing that uses design and graphics to visually represent logic and organization. Course focuses on writing as a process and includes student's self-assessment. Major assignments include a pure technical document, exploration of credibility, and public science writing. Students are expected to write without major faults in grammar or usage and to have basic computer literacy.

Prerequisite(s): None

Front Line Supervision

3 Credits

Introduces basic employee development with emphasis on the responsibilities of a newly-appointed supervisor. Emphasizes organizational structure, motivation, delegation of authority, the hiring process, employee development, employee performance, evaluations, and dealing with employee conflict.

Prerequisite(s): None

Introduction to CAD

3 Credits

An introduction to computer aided design and drafting software for production of drawings and plans for architecture and engineering systems. Fundamentals of two dimensional drafting and drawing management for professional design.

Prerequisite(s): M 090 or ALEKS Score >2 Recommended

Advanced Related Metals Processes

3 Credit

Advanced skill development using machine tools such as milling machines, lathes, surface grinders, and drill presses, emphasizing safety and providing greater complexity than provided in MCH 114. Welding and machining are used together demonstrating how sequencing work improves quality and productivity.

Prerequisite(s): MCH 114 or 115

Pipe Welding – Integrated Lab

4 Credits

Emphasis on skill development in the welding of pipe sections to extremely high quality levels as required by national codes and standards. Pipe welding using GTAW for the root pass and SMAW for the remaining passes in all positions. Visual inspection and destructive testing used to evaluate work according to industry standards.

Prerequisite(s): WLDG 180; **Corequisite(s):** WLDG 215

GTAW (Integrated Lab) - Gas Tungsten Arc Welding



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4 Credit

The theory and safe operation of Gas Tungsten Arc Welding (GTAW). Examination of power source controls and operation along with associated consumables such as gasses, electrode filler materials for carbon steel, stainless steel, and aluminum. Welding skill development according to industry standards using these materials in the flat, horizontal, and vertical positions.

Prerequisite(s): WLDG 180, 187, 210

Metal Fabrication Design/Construction

4 Credits

Students combine all knowledge and skills developed in the welding program to design and draw a full set of plans (blueprints) for an instructor-approved project using extensive welding, metal fabrication equipment, machining process and automation. High quality performance, consistent with business and industry required.

Prerequisite(s): MPR 114T, 214T; WLDG 117, 180, 187, 215, 275

Gas Metal Arc Welding

4 Credits

Theory and safe operation of Gas Metal Arc Welding (GMAW). Theory of flux core arc welding applied to GMAW. Primary focus on application, practical skill development, and producing welds that meet industry standards. Metals welded are low carbon steel, stainless steel, and aluminum. Short circuit arc and spray arc transfer used. Examination of gas and electrode selection.

Prerequisite(s): WLDG 187

Weld Testing Certification

2 Credits

Fundamental concepts and requirements of the American Society of Mechanical Engineers (ASME) and American Welding Society (AWS) are examined. Through laboratory experience students are provided the opportunity to qualify (certify) under the two codes mentioned above.

Prerequisite(s): WLDG 180, 187, 215, 275

Automation in Welding

3 Credits

Application of the welding process to automation. Examination of simple automation techniques such as tools, clamping, and fixturing to aid in the rapid joining of production runs. Increasing complexity is examined leading into equipment that carries the welding gun, tractors, and carriages by fully automated systems with the student performing set-up and troubleshooting (Submerged Arc Welding) and automated parts processing (optical tracer torch). Programmable controllers are investigated and used. Programming and use of a PUMA 650 Industrial Robot.

Prerequisite(s): WLDG 117, 150, 187, 215; CADX 100



