

# WELDING (WLDG)

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## **WLDG 101 - Welding Fund Auto Tech/Diesel. 2 Credits.**

Offered autumn. Offered at Missoula College. Basic and intermediate processes of shielded metal arc welding (SMAW) and oxyacetylene welding are covered in flat, horizontal, and vertical positions in a variety of joint configurations. Instruction in the oxyacetylene cutting process. This course is designed for Diesel students only.

## **WLDG 103 - Welding Fund Constructn Trades. 2 Credits.**

Offered spring. Offered at Missoula College. Basic welding processes of shielded metal arc welding (SMAW), flux core arc welding (FCAW) are covered in the flat, horizontal, and vertical positions in a variety of joint configurations. The instruction in flux core arc welding is focused on the carpentry building trades. Instruction in the oxyacetylene cutting process is also provided. Safe operation of equipment is covered and work is evaluated to industrial standards. This course is designed for carpentry students.

## **WLDG 117 - Blueprint Rdnng & Weldng Symls. 3 Credits.**

Offered spring. Offered at Missoula College. Prereq., WLDG 150. 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).

## **WLDG 145 - Fabrication Basics. 4 Credits.**

Offered spring. Offered at Missoula College. Prereq., WLDG 180; coreq., WLDG 117, 187. 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.

## **WLDG 150 - Welding Layout Techniques. 2 Credits.**

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

## **WLDG 180 - Shielded Metal Arc Welding. 4 Credits.**

Offered autumn. Offered at Missoula College. 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 used are oxy-fuel cutting, plasma arc cutting, and air carbon arc cutting. Theory and operation of oxyacetylene welding examined.

## **WLDG 184 - OSHA Rules & Regulations Wldng. 1 Credit.**

Offered spring. Offered at Missoula College. Study of the Occupational Safety and Health Administration rules and regulations that affect the welding and construction industries.

## **WLDG 187 - Flux Core Arc Welding. 4 Credits.**

Offered spring. Offered at Missoula College. Prereq., WLDG 180. 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.

## **WLDG 191 - Special Topics. 1-6 Credits.**

(R-6) Offered intermittently. Offered at Missoula College. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

## **WLDG 192 - Independent Study. 1-6 Credits.**

(R-6) Offered intermittently. Offered at Missoula College. Course material appropriate to the needs and objectives of the individual student.

## **WLDG 198 - Internship. 1-6 Credits.**

## **WLDG 205 - Applied Metallurgy. 4 Credits.**

Offered autumn. Offered at Missoula College. 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.

## **WLDG 210 - Pipe Welding - Integrated Lab. 4 Credits.**

Offered autumn and spring. Offered at Missoula College. Prereq., WLDG 180; coreq., WLDG 215. 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. Students will be able to attempt welding qualification test as to code procedure set from American Welding Society ?D1.1 Structural Welding Code-Steel. This test will certify them to a determined process on carbon steel from prequalified variables.

## **WLDG 215 - GTAW (integrated lab). 4 Credits.**

Offered autumn. Offered at Missoula College. Prereq., WLDG 180, 187, and 210. 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.

## **WLDG 245 - Metal Fab Design/Construction. 4 Credits.**

Offered spring. Offered at Missoula College. Prereq., WLDG 117, 180, 187, 215, 275. 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 processes and automation. High quality performance, consistent with business and industry required.

## **WLDG 275 - Gas Metal Arc Welding. 4 Credits.**

Offered spring. Offered at Missoula College. Prereq., WLDG 187. 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.

## **WLDG 280 - Weld Testing Certification. 2 Credits.**

Offered spring. Offered at Missoula College. Prereq., WLDG 180, 187, 215, 275. 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.

**WLDG 285 - Automation in Welding. 3 Credits.**

Offered spring. Offered at Missoula College. Prereq., WLDG 117, 150, 187, 215. 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.

**WLDG 291 - Special Topics. 1-6 Credits.**

(R-6) Offered intermittently. Offered at Missoula College. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.