# APPRENTICESHIP (APR)

**APR 101: Intro to Trades and Technology (4)**
This course provides an introduction to the necessary skills required for working in the trades. Students explore current trends in apprenticeship and basic requirements to enter individual programs. Students will become familiar with licensing and certification in a chosen trade. General topics include: industry opportunities and basic concepts in safety, trade vocabulary, trade calculations, hand and power tools, blueprint reading, and basic rigging. 3 lecture, 3 lab hrs/wk
**Terms Typically Offered:** Fall

**APR 111: Machine Shop Practices I (3)**
This is a basic machine shop course introducing the student to basic machine shop concepts and general shop practices involving the use of an engine lathe, milling machine, drill press, grinders, and other machine shop tools. Instruction will be provided in general machining techniques with safety and economy of operation being emphasized. Students will work at their own pace through specific projects. 6 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or higher.
**Terms Typically Offered:** Fall

**APR 112: Machine Shop Practices II (3)**
This builds upon the skills learned in APR 111 with a continuing emphasis on the fundamentals and mechanics of machine shop concepts and general shop practices involving the use of an engine lathe, milling machine, drill press, grinders, and other machine shop tools. Instruction will be provided in general machining techniques with safety and economy of operation being emphasized. Students will work at their own pace through specific projects. 6 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** APR 111.
**Terms Typically Offered:** Winter

**APR 113: Machine Shop Practices III (3)**
The student learns the operation of horizontal and vertical milling machines, their setup, basic operation and use of accessories such as digital readouts, rotary table, dividing head, gear and cam milling and the use of indicators, wigglers and edge finders. 6 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** APR 112.
**Terms Typically Offered:** Spring

**APR 115: Computer Aided Drafting I (3)**
This is a beginning level course, which introduces computer aided drafting (CAD). The AutoCad software is used to set up drawings and perform basic drawing and editing commands. Emphasis is on two-dimensional drawings and engineering architectural aspects of computer drafting. This is an online enhanced course, meaning you are required to use online resources to pass this course. 2 lecture, 2 lecture/lab hrs/wk
**Terms Typically Offered:** Fall

**APR 120: Industrial Safety (3)**
This course will present training in OR-OSHA standards and related general safety and health provisions. Oregon Safety Law and subjects listed in OAR 437, Division 3 and OAR 437, Division 2 training and accident prevention measures are included, as well as safety committee procedures. 3 lecture hrs/wk
**Terms Typically Offered:** Winter

**APR 121: Hydraulics I (3)**
An introductory course covering the basic principles of hydraulics for the future industrial hydraulics technician. Included in the course are pressure, force and area relationships, HP, GPM, and velocity relationships, fundamentals of reservoir design, fluids and fluid flows, and fundamentals of hydraulic pumps. Common industrial circuits are developed and studied with the use of lab trainers. Students will disassemble, inspect, and reassemble both components and circuits in structured lab sessions. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or higher.
**Terms Typically Offered:** Fall

**APR 122: Hydraulics II (3)**
This is the second in a five-course series for the industrial apprentice and is a continuation of Hydraulics I. The focus is on pressure relief valves, hydraulic actuators and flow controls. Each component is studied in structured classroom sessions, while lab activities are directed at disassembly, inspection and circuitry involving the specific component. Students will be using lab trainers to examine the operation of circuits using these components. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 121.
**Terms Typically Offered:** Winter

**APR 123: Hydraulics III (3)**
This course is a continuation of Hydraulics II. Each student will study contamination control, hydraulic actuators, flow controls and hydraulic accessories. Circuits using those components are fabricated, discussed and studied during the structured lab sessions. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 122.
**Terms Typically Offered:** Spring

**APR 130: Mech Principles-Drive Designs (3)**
This course will familiarize the student with the proper identification, interchanging, application, failure analysis, and selection of all types of bearings. Drive designs will also be taught in relation to belts and roller chain. 3 lecture hrs/wk
**Terms Typically Offered:** Fall

**APR 131: Basic Metallurgy (3)**
Covers the principles related to metals, their structure and physical properties. The testing of various metals, their uses and the results of heat treating are explored. Laboratory time is provided for experiments and demonstrations to correlate with classroom activities. 1 lecture 4 lecture/lab hrs/wk
**Registration-Enforced Prerequisite/Corequisite:** WLD 101 or APR 140.
**Terms Typically Offered:** Fall

**APR 140: Beg Welding for Apprentices (1)**
This course covers welding processes, safety, equipment, and essential variables of operation. This is an outcome-based course utilizing a lab format in which students successfully demonstrate their skill level. 3 lab hrs/wk
**Terms Typically Offered:** Winter, Spring

**APR 141: Int Welding for Apprentices (1)**
This course will build upon skills learned in APR 140, with a continuing emphasis on the fundamentals and mechanics, welding processes, safety, equipment, and essential variables of operation. This is an outcome-based course utilizing a lab in which students demonstrate and build their skill level. 3 lab hrs/wk
**Registration-Enforced Prerequisite:** APR 140.
**Terms Typically Offered:** Winter, Spring

**APR 142: Adv Welding for Apprentices (1)**
This course will build upon the skills learned in APR 140 and APR 141, with a continuing emphasis on the fundamentals and mechanics, welding processes, safety, equipment, and essential variables of operation. This is an outcome based course utilizing a lab in which students demonstrate and build their skill level. 3 lab hrs/wk
**Registration-Enforced Prerequisite:** APR 141.
**Terms Typically Offered:** Winter, Spring

**APR 145: Blueprint Reading-Sketching (3)**
A basic course in sketching and reading of shop drawings. A study is made of three-view drawings, pictorial drawings, dimensioning, tolerancing, lines, note and symbol interpretation. 2 lecture and 2 lecture/lab hrs/wk
**Terms Typically Offered:** Winter

**APR 151: Basic Electronics-Electricity (4)**
This course covers information on basic DC and AC electrical theory, definitions, basic component identification and analysis of series, parallel and combination circuits. Emphasis is placed on practical application, troubleshooting and problem solving. 3 lecture, 2 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or higher.
**Terms Typically Offered:** Fall

**APR 153: Electrical Applications-Tech (3)**
This course covers basic application techniques and components generally found in the industrial and commercial environments. Focus is on electrical safety and related industry safety standards. The National Electrical Code Book is utilized where applicable to reinforce code rules and proper application of associated articles. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or higher.
**Terms Typically Offered:** Winter

**APR 155: Electrical Best Practices (2)**
The course includes techniques in conduit bending and installation, conductor installation, cable installation and conductor termination, including hands-on instruction. It covers tools available for installation, fasteners and panelboard mounting. The material presented will stress workmanship and professionalism, and will include a review of NEIS publications. 2 lecture hrs/wk
**Terms Typically Offered:** Winter

**APR 157: Intro to National Elect Code (2)**
This course is an introduction to the National Electrical Code and examines the structure, language and basic content of the Code. It will examine the basic wiring methods outlined in chapters 1, 2 and 3 of the National Electrical Code and evaluate methods and techniques necessary for a safe and reliable installation. 2 lecture hrs/wk
**Terms Typically Offered:** Spring

**APR 159: Electrical Blueprint Reading (2)**
This course will provide the apprentice with the knowledge and understanding of how to read, draw, and interpret electrical drawings, symbols, schematics, prints, and schedules. One-line drawings, controller operational sequencing/ troubleshooting, and applicable sections of the National Electrical Code are included. 2 lecture hrs/wk
**Terms Typically Offered:** Spring

**APR 163: Commercial Wiring (3)**
This course is an introduction to basic commercial wiring and calculations. It will give the student background in all aspects of commercial work, including services. Design techniques are reinforced through the use of testing equipment and installation practice. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or higher.
**Terms Typically Offered:** Fall

**APR 165: AC Electronics and Electricity (4)**
This course covers the theory and application of magnetism, electromagnetism, the generation of electromotive force, AC and DC motor principles, transformer theory, types and applications. Focus is on alternating current principles and the theories involving the proper wiring of AC circuits. The student will be introduced to electrical control circuits and the operation of a transistor. 3 lecture, 2 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** APR 151.
**Terms Typically Offered:** Winter

**APR 167: Electric Motors-Transformers (3)**
This course investigates the electric motors and transformers, and helps the student differentiate between winding styles, frame sizes, NEMA motor type designations, and other criteria. It discusses motor sizing and motor starting characteristics and methods. Troubleshooting and maintenance are covered. NEC requirements for motor and transformer installation are included. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 153.
**Terms Typically Offered:** Spring

**APR 169: Electrical Code Study II (2)**
This course is an in-depth study of grounding, overcurrent and electrical safety as found in Articles 240 and 250, along with safety-oriented excerpts found elsewhere in the National Electrical Code. 2 lecture hrs/wk
**Terms Typically Offered:** Spring

**APR 228: Rigging Fundamentals (3)**
This course introduces the uses of slings and common rigging hardware along with basic inspection techniques, hitch configurations, and load-handling safety practices. Components of wire rope, wire rope inspection, proper installation of wire rope, maintenance guidelines, and end terminations and preparations will also be covered. 2 lecture, 2 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or higher.
**Terms Typically Offered:** Spring

**APR 229: Basic Pneumatics (3)**
This course will help students understand fundamental concepts of a pneumatic system. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or higher.
**Terms Typically Offered:** Spring

**APR 239: Pumps and Pumping (3)**
The course offers a complete spectrum of pump-related information needed to operate, maintain, and repair pumps. Pump theory, pump types, and pump components and their functions are included. Additional information includes pump curves, pump hydraulics, and operating conditions, as well as packing methods and selections, mechanical seals, pump piping systems, and pump identification. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** MTH 052 or MTH 060.

**APR 251: Electrical Sensors and Control (3)**
This course covers the basic concepts of open and closed loop control systems common to motion and process control. Process controls including pressure, temperature, flow, and levels of gases, liquids, and solids are studied. Various measurement methods are covered, and the operation of mechanical and electronic measurement sensors are explained. Introduction to AC and DC variable speed drives, as well as the fundamental operation of programmable logic controllers, PLC programming, basic numbering systems, and application examples are covered. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 167.
**Terms Typically Offered:** Fall

**APR 253: Electrical Code Study III (2)**
This course is an in-depth overview of Chapter 3 in the National Electrical Code. It includes the study of general rules for wiring and calculating ampacity, as well as specific wiring methods and the codes involved in their installation. 2 lecture hrs/wk
**Terms Typically Offered:** Winter

**APR 255: Motor Controls I (2)**
This course will teach basic electromechanical motor control theory, including input devices, logic, and pertinent sections of the National Electrical Code. The course will teach various common motor control circuits and will include hands-on training. 1 lecture, 2 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** APR 151.
**Terms Typically Offered:** Fall

**APR 257: High Voltage Applications (2)**
This course will outline hazards associated with high voltage work, along with applicable safety codes and practices. NFPA 70E will be discussed. Methods for routing, handling and terminating high voltage cable will be reviewed, along with applicable references from the NEC. 2 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 153.
**Terms Typically Offered:** Winter

**APR 259: Solid State and Digital Apps (4)**
This course covers information on thyristors, digital and analog IC's, sensors and transducers. Digital circuit fundamentals are studied with an emphasis on troubleshooting and problem solving. Students will use test equipment to analyze digital integrated circuits. An overview of computer interfacing will be presented. 3 lecture, 2 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** APR 165.
**Terms Typically Offered:** Spring

**APR 261: Electrical Code Study IV (2)**
This course includes instruction on calculations required for wiring to Code, i.e., conduit and box fill, ampacity, motor and transformer calculations, service size, voltage drop and available short-circuit current. 2 lecture hrs/wk
**Terms Typically Offered:** Spring

**APR 263: Communications Alarm-Control (2)**
This course will examine NEC requirements for low voltage installations, and will also cover the theory of operation of communications circuits, control and communications cable types, and termination and splicing techniques for various systems. 2 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 151.
**Terms Typically Offered:** Fall

**APR 265: Motor Controls II (2)**
This course will teach basic motor speed control theory, including input devices, logic, and motion control device theory. It will introduce variable frequency drives and PLC's as well as other speed control methods. The course will include hands-on training. 1 lecture, 2 lecture/lab hrs/wk
**Registration-Enforced Prerequisite:** APR 255.
**Terms Typically Offered:** Winter

**APR 267: Advanced Code Study (3)**
This course is an examination of the contents of Chapters 5, 6 and 7 of the National Electrical Code covering special occupancies and special equipment. It also examines the Oregon Specialty Codes as well as federal codes such as OSHA, UL, IEEE, UBC and others. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 157 or APR 169 or APR 253 or APR 261.
**Terms Typically Offered:** Spring

**APR 269: Journeyman Exam Prep (3)**
This course is refresher instruction with regular drills designed to improve the student's ability to find and interpret National Electrical Code references. 3 lecture hrs/wk
**Registration-Enforced Prerequisite:** APR 157 or APR 169 or APR 253 or APR 261.
**Terms Typically Offered:** Spring