

APPRENTICESHIP

Cascade Campus
Technology Education Building (TEB), Room 103
971-722-5651, 971-722-5650
www.pcc.edu/programs/apprenticeship/

CAREER AND PROGRAM DESCRIPTION

Portland Community College provides courses in accordance with the Apprenticeship and Training Laws for the State of Oregon. These courses present technical instruction for the trades and are intended to complement on-the-job skills for both men and women. Each apprenticeable trade has a Joint Apprenticeship and Training Committee (JATC) which outlines the procedures to become a journey person. This outline usually consists of two to five years of supervised, on-the-job experience in various aspects of the trade in conjunction with PCC course work. The JATC committees outline the type of supportive courses needed to prepare students to become qualified journey persons in addition to working with related training courses.

The Associate of Applied Science (AAS) in Industrial Technology Apprenticeship Degree was discontinued in Spring 2009. The new Statewide Apprenticeship degree pathways have replaced the old degree and offers AAS degrees and certificates of completion in electrical, manual construction trades, and industrial mechanics and maintenance. Students transitioned to the new Statewide Apprenticeship Degrees and Certificates from Spring Term 2008 to Spring Term 2009. The 'sunset period' that was offered during the transition period is no longer available for the preceding Industrial Technology Degree.

Consult the Trades and Industry Department for assistance in program planning and transcript evaluation. It is recommended to have your graduation petition and transcript evaluation approved by a Trades & Industry Department advisor prior to filing your petition.

Students wanting to move into management, supervision, or small business management can transfer to Oregon Institute of Technology (OIT) with related-training credits toward a Bachelor of Science (BS) in Operations Management after earning an Apprenticeship AAS degree.

DEGREES AND CERTIFICATES OFFERED

Associate of Applied Science Degree

Electrician Apprenticeship Technologies
Construction Trades, General Apprenticeship
Industrial Mechanics & Maintenance
Technology Apprenticeship

Certificate of Completion

Limited Electrician Apprenticeship Technologies
Electrician Apprenticeship Technologies
Manual Trades Apprenticeship
Construction Trades, General Apprenticeship
Mechanical Maintenance Apprenticeship
Industrial Mechanics & Maintenance
Technology Apprenticeship

PREREQUISITES AND REQUIREMENTS

Students pursuing a designated and sponsored Oregon State Bureau of Labor and Industries occupation must meet entrance requirements for their chosen career.

JOURNEY PERSON LICENSE RENEWAL

PCC's Trades and Industry Department is an approved training agent for continuing education for journey person electrical license renewal through the State of Oregon Electrical Licensing Division.

PRE-APPRENTICESHIP

PCC provides Pre-Apprenticeship opportunities to students seeking careers in the trades or an apprenticeship. These courses prepare students to apply for an apprenticeship, meet the minimum entry qualifications, and possibly boost your application score. Women and minorities are encouraged to participate.

The Trades Preparation course covers construction trade topics, industry orientation, material handling, scaffolding, rigging, hand and power tool use, 30 hour OSHA safety certification, site visits and mock interviews. This course is approved by the Oregon Apprenticeship Council as an authorized Pre-Apprenticeship course.

The Exploring Trades and Apprenticeship course explores career opportunities within the Trades. It introduces resources for assisting students in identifying the skills needed to succeed in these fields.

Consult the Trades and Industry Department for assistance in program planning.

ELECTRICIAN APPRENTICESHIP TECHNOLOGIES PATHWAY

ELECTRICIAN APPRENTICESHIP TECHNOLOGIES AAS DEGREE

4000, 6000 or 8000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 75 credits
- General Education: 16 credits
- Credit for Prior Certification: 0 – 22 credits
- Approved Program Electives: 0 – 41 credits
- Total Credits: 90 – 108 credits

The AAS degree total credit requirement depends upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee, however a minimum of 90 credits is required for all degrees.

ELECTRICIAN APPRENTICESHIP TECHNOLOGIES CERTIFICATE

6000 Hour BOLI-ATD Trades: Limited Energy Technician-License A and Sign Maker/Fabricator

8000 Hour BOLI-ATD Trades: Inside Electrician, Limited Manufacturing Plant Electrician, Sign Assembler/Fabricator, Sign Maker/Erector and Stationary Engineer

6000-8000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 99 credits
- Related Instruction: 9 credits*
- Credit for Prior Certification: 0 credits
- Approved Program Electives: 0 credits
- Total Credits: 25 – 108 credits

**See related instruction list for approved courses*

This certificate requires a minimum of 16 credits of related classroom training as well as 9 credits of related instruction. Embodied in this certificate are many state certifications. Both the total related training credits and the total related instruction credits depend upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee.

LIMITED ELECTRICIAN APPRENTICESHIP TECHNOLOGIES CERTIFICATE

4000 Hour BOLI-ATD Trades: Limited Energy Technician- License B, Limited Maintenance Electrician, Limited Renewable Energy Technician, and Limited Residential Electrician

4000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 44 credits
- Related Instruction: 0 credits
- Credit for Prior Certification: 0 credits
- Approved Program Electives: 0 credits
- Total Credits: 16 – 44 credits

This certificate requires a minimum of 16 credits of related classroom training. Embodied in this Certificate are many state certifications. The total related training credits required depend upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee.

CONSTRUCTION TRADES, GENERAL APPRENTICESHIP PATHWAY

CONSTRUCTION TRADES, GENERAL APPRENTICESHIP AAS DEGREE

4000, 6000 and 8000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 75 credits
- General Education: 16 credits
- Credit for Prior Certification: 0 – 22 credits
- Approved Program Electives: 0 – 41 credits
- Total Credits: 90 – 108

The AAS degree total credit requirement depends upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee, however a minimum of 90 credits is required for all degrees.

CONSTRUCTION TRADES, GENERAL APPRENTICESHIP CERTIFICATE

6000-8000 Hour BOLI-ATD Trades: Asbestos Removal, Carpenter, Exterior/Interior Finisher, HVAC/R, Painter, Pile Driver, Plumber, Scaffold Erector, and Sheet Metal Worker

6000-8000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 99 credits
- Related Instruction: 9 credits*
- Credit for Prior Certification: 0 credits
- Approved Program Electives: 0 credits
- Total Credits: 25 – 108 credits

**See related instruction list for approved courses*

This certificate requires a minimum of 16 credits of related classroom training as well as 9 credits of related instruction. Embodied in this certificate are many state certifications. Both the total related training credits and the total related instruction credits depend upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee.

MANUAL TRADES APPRENTICESHIP CERTIFICATE

4000-Hour BOLI-ATD Trades: Brick Mason, Concrete Finisher, Floor Covering Installer, Glazier/Glass Worker, Laborer, Plasterer, and Roofer

4000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 - 44 credits
- Related Instruction: 0 credits
- Credit for Prior Certification: 0 credits
- Approved Program Electives: 0 credits
- Total Credits: 16 – 44 credits

This certificate requires a minimum of 16 credits of related classroom training. Embodied in this certificate are many state certifications. The total related training credits required depend upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee.

INDUSTRIAL MECHANICS & MAINTENANCE TECHNOLOGY APPRENTICESHIP PATHWAY

INDUSTRIAL MECHANICS & MAINTENANCE TECHNOLOGY APPRENTICESHIP AAS DEGREE

4000 or 8000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 75 credits
- General Education: 16 credits
- Credit for Prior Certification: 0 – 22 credits
- Approved Program Electives: 0 – 41 credits
- Total Credits: 90 – 108 credits

The AAS degree total credit requirement depends upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee, however a minimum of 90 credits is required for all degrees.

INDUSTRIAL MECHANICS & MAINTENANCE TECHNOLOGY APPRENTICESHIP CERTIFICATE

8000 Hour BOLI-ATD Trades: Boiler/Turbine Operator, Die Cast Mold, Heat and Frost Insulator, Industrial Mobile Mechanic, Instrument Technician, Machinist, Millwright, Motor Winder, Pipefitter, Roll Turner, and Welder

8000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 99 credits
- Related Instruction: 9 credits*
- Credit for Prior Certification: 0 credits
- Approved Program Electives: 0 credits
- Total Credits: 25 – 108 credits

*See related instruction list for approved courses

This certificate requires a minimum of 16 credits of related classroom training as well as 9 credits of related instruction. Embodied in this certificate are many state certifications. Both the total related training credits and the total related instruction credits depend upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee.

MECHANICAL MAINTENANCE APPRENTICESHIP CERTIFICATE

4000 Hour BOLI-ATD Trades: Air Frame and Power Plant Technicians, Boiler Operator, and Programmable Logic Controller

4000 Hour BOLI-ATD Trades:

- College credit courses for Related-Training: 16 – 44 credits
- Related Instruction: 0 credits
- Credit for Prior Certification: 0 credits
- Approved Program Electives: 0 credits
- Total Credits: 16 – 44 credits

This certificate requires a minimum of 16 credits of related classroom training. Embodied in this certificate are many state certifications. The total related training credits required depend upon which state apprenticeship the student is pursuing and the requirements of the governing Joint Apprenticeship and Training Committee.

RELATED INSTRUCTION

For related instruction, choose one course from each category for a minimum of 9 credits from the following lists: (Many other classes are available to meet Related Instruction; substitutes can be approved by the Department.) Consult the Trades and Industry Department for assistance in program planning.

Computation:

PHY 101 Fundamentals of Physics I

Communication:

WR 115 Introduction to Expository Writing

WR 121 English Composition

SP 100 Introduction to Speech

Human Relations:

PSY 101 Psychology and Human Relations

SOC 204 Sociology in Everyday Life

PSY 216 Social Psychology

COURSE DESCRIPTIONS

APR 100 Exploring Trades and Apprenticeship 1.00 Explores career opportunities within the Trades. Includes traditional careers and new opportunities in fields such as Renewable Energy and Sustainability. Introduces resources for assisting students in identifying skills needed to succeed in these fields. Audit available.

APR 101 LME: Electrical Theory Fundamentals 3.00 Covers electrical theory and math for computing the values of voltage, amperage, resistance and power. Also covers various types of electrical circuits (series, parallel, combination) when applying Ohm's Law. Introduces electrical safety, conductors, wire sizes and their application as per the American Wire Gauge (AWG) Table. The principles of voltage drop, efficiency and cost of electrical energy will also be covered. Audit available.

APR 102 LME: DC Motors 3.00 Covers the principles of magnets, magnetism and electromagnetism; AC/DC generators and the process of generating a voltage; DC motors and alternating current principles, including the components of an AC sine wave/wave-form. Electrical safety, principles of inductance, inductive reactance, capacitance and capacitive reactance, various types of capacitors, capacitor testing and their use an industrial environment will also be discussed. Prerequisites: APR 101 or TE 9631. Audit available.

APR 103 LME: AC Motors and Transformers 4.00 Covers the theory, construction, and application of transformers and three phase and single phase AC motors. Includes the theory and application of Delta wound and Wye wound motors and transformers. Includes Power Factor in electrical circuits, motor nameplate data, reading schematics, and electrical safety standards especially for Arc Blast and Arc Flash prevention and protection. Prerequisite: APR 102 or TE 9623. Audit available.

APR 104 LME: Luminaries and Equipment 3.00 Introduces lighting fundamentals and their application in the industrial environment. Also covers fuses, receptacles, wiring methods, blueprints, batteries and some solid state components related to their use. Prerequisites: APR 103 or TE 9633. Audit available.

APR 121 Intro Electricity and Circuits 3.00 Covers general atomic theory, electron flow in conductors, calculations of Ohms law when determining the values of voltage, current, resistance and power in series, parallel and combination electrical circuits. Covers sizing and the application of conductors and the concept of Voltage Drop in electrical circuits. Audit available.

APR 122 AC/DC Motor Principles 3.00 Covers the basic principles of alternating current, direct current, and electromagnetism as applied to generators, and alternating current and direct current motors, including the concepts of inductance, inductive reactance, capacitors, capacitive reactance, and their effects upon alternating current circuits. Prerequisites: APR 121 or TE 9610. Audit available.

APR 123 AC Theory for Motors and Transformers 4.00 Focuses on alternating current power distribution, transformers, motors, storage cells, solid state semiconductor devices, and Delta/Wye three phase motor winding connections as applied to the heavy industrial environment. Prerequisite: APR 122 Audit available.

APR 124 Electrical Systems Operations 3.00 Covers alternating current measure instruments, test equipment, advanced motor theory, blueprint reading, electrical related materials, AC systems, advanced transformer theory, lighting, grounding and bonding, contactors, relays and general installation requirements to meet code specifications. Prerequisites: APR 123 or TE 9612. Audit available.

APR 125 Electrical Circuits and Wiring Methods 3.00 Covers residential and commercial lighting, fixtures, and ballast in detail. Includes conductor selection, overcurrent, protection, motor maintenance, calculations, controls, troubleshooting, services, construction upgrades, wire methods, tagout, lockout and appliances. Covers series, branch, and parallel circuits in detail, and the basic use of a multimeter to check for voltage, current, and resistance. Prerequisites: APR 124 or TE 9613. Audit available.

APR 126 Electrical Systems Installation per NEC 3.00 Covers standby electrical systems, temporary electrical services, fire alarm systems, specialty systems, advanced controls, heat tracing, freezing protection, installation practices, and what constitutes a low voltage and limited energy circuit as per the NEC and the requirements for each. Prerequisites: APR 125 or TE 9614. Audit available.

APR 131 Refrigeration I 2.00 Covers refrigeration principles and different basic cycles which include heat transfer, temperature, and basic physics and gas laws. Lab includes the use of tools and instruments used for charging and evacuation and recovery methods. APR 131 and FMT 101 both cannot be taken for credit. Prerequisites: MTH 20; (WR 90 or ESOL 262); (RD 90 or ESOL 260). Audit available.

APR 132 Refrigeration II 2.00 Cover and analyze the operation of refrigeration system components. Includes compressors, condensers, evaporators, refrigerants and metering devices. Lab includes system components and compressor testing methods, focusing on charging, evacuation and recovery methods. APR 132 and FMT 102 cannot both be taken for credit. Prerequisites: APR 131 or FMT 101 or TE 9242. Audit available.

APR 133 Refrigeration III 2.00 Covers the operation of refrigeration HVAC systems, emphasizing maintenance and controls. Lab includes troubleshooting systems along with evacuation and charging techniques. APR 133 and FMT 103 cannot both be taken for credit. Prerequisites: APR 132 or FMT 102 or TE 9243. Audit available.

APR 150 Pre-Apprenticeship Construction Training 6.00 Introduces Evening Trades and Apprenticeship Program (ETAP) students to the environment of the commercial construction trades, including workplace safety, construction mathematics, blueprint reading and layout, foundations, wall layout and framing, and roof structures. Prerequisite: Department Permission required. Audit available.

APR 200 Trades Preparation 8.00 Includes Pre-Apprenticeship Construction Trade topics such as industry orientation, hazardous materials, general on-the-job questions, material handling, scaffolding, rigging, fire protection, hand and power tool use, fall protection, and electrical basics. Covers safety procedures that apply to each topic. Also covered will be related terminology, task planning, methods and functions of construction, apprenticeship application process, program requirements, resume and interview skills and OSHA 30-hour safety training. Recognized by the Oregon Bureau of Labor and Industry: Apprenticeship and Training Division's Council as an approved Pre-Apprenticeship program. Prerequisite: Placement in MTH 60 or higher or department permission. Audit available.

APR 201 Electrical Motor Controls 2.00 Provides knowledge and skills needed to design, install, maintain, service and troubleshoot electric motors. Focuses on the operation and installation of control systems, specifically motor starters and controllers. Electromagnetic controls, motors and transformers will also be covered. Lab activities will utilize electrical test equipment to analyze electric motor control malfunctions. This class can be used towards Continuing Education Units for Oregon State electrical licensing purposes. APR 201 and ELT 201 cannot both be taken for credit. Prerequisites: FMT 111 or APR 204 or Department Permission. Audit available.

APR 202 LME: Electrical Code Level I 4.00 Provides a working knowledge of the NEC. Assists LME apprentices in preparing for the state electrical exam. Topics include definitions, requirements for electrical installations, identification and use of electrical conductors, wiring, circuit-protection, wiring methods, materials, and electrical safety standards. Prerequisites: APR 104 or TE 9634. Audit available.

APR 203 LME: Electrical Code-Level II 4.00 Provides a working knowledge of the NEC. Topics include installation code requirements for the following: electrical equipment for general use such as motors, luminaries, air conditioners, cords, switchboards and panel boards. Also covers special occupancies which will assist students in locating and understanding electrical code requirements for hazardous locations such as gas stations, spray paint booths, aircraft hangars, health care facilities, places of assembly, theaters, manufactured buildings, mobile homes, temporary locations, etc. Electrical standards will be emphasized. Prerequisites: APR 202 or TE 9636. Audit available.

APR 204 LME: Electrical Code-Level III 4.00 Provides a working knowledge of the NEC. Assists LME apprentices in preparing for the state electrical exam. Topics include: Special Equipment including electric signs, cranes, hoists, elevators, electric welders, information technology equipment, pools, and foundations; Special Conditions including emergency systems, Class 1, 2, and 3, low voltage control circuits, fire alarm systems, and fiber optics; and Communication Systems. Covers State of Oregon statutes governing electrical installations, building code division administrative rules covering license requirements and responsibilities, State of Oregon amendments, supplemental code reference materials, safety standards and practice exams. Prerequisites: APR 203 or TE 9637. Audit available.

APR 221 Advanced AC Circuitry 3.00 Includes the theory of alternating current and power. Also includes alternating current, resistance in AC circuits, inductance and inductive reactance, capacitance and capacitive reactance, power factor correction, power in AC circuits, vector analysis and three phase connections and calculations. Prerequisites: APR 124 or TE 9615. Audit available.

APR 222 Hazardous Locations 3.00 Includes introduction to hazardous locations, Class I, II, III installations, commercial garages-repair and storage, aircraft hangars, gasoline dispensing and service stations, bulk storage plants, finishing processes and health care facilities. Prerequisites: APR 221 or TE 9616. Audit available.

APR 223 Motor Control Operations including PLC's 3.00 Reviews basic motor controls and progresses to moderately complex machine controls. Includes fundamentals of motor control, control of motor starting, control components, programmable controllers, pilot devices, control circuit diagrams, solid state logic and diagrams, development of control circuits and troubleshooting electrical controls. Prerequisites: APR 222 or TE 9617. Audit available.

APR 224 Electrical Code - Level I 4.00 Emphasizes the use and understanding of the National Electrical Code. Assists plant maintenance electricians in preparing for the state electrical exam. Topics include grounding, motors, wiring methods, overcurrent protection, branch circuits, calculations, feeders and specialty codes. Prerequisites: APR 223 or TE 9618. Audit available.

APR 225 Electrical Code - Level II 4.00 Emphasizes the use and understanding of the NEC. Topics include cable, raceway, busway, cablebus, switches, panel boards, lighting, heating equipment, transformers and the taking of practice exams. Prerequisites: APR 224 or TE 9619. Audit available.

APR 226 Electrical Code - Level III 4.00 Emphasizes the use of understanding of the NEC. Topics include code articles, OAR's, supplemental code reference materials, calculations and practice exams. Completion of the series prepares the student apprentice to become a licensed Manufacturing Plant Electrician Journey person. Prerequisites: APR 225 or TE 9620. Audit available.

APR 227 NEC Review and Exam Preparation 3.00 Assists and prepares the Electrical Professional and the Electrical Apprentice to take State of Oregon Electrical Licensing Examinations. Includes use of the National Electrical Code, Oregon Electrical Specialty Codes, and applicable Oregon Administrative Rules. Includes electrical calculations applicable to an examination and to the workplace. Recommended: WR 115, RD 115, and MTH 20 or equivalent placement test scores.

APR 230 National Electrical Code 3.00 Instructs the electrical professional where and how to find required information in the NEC book, demonstrating how the various articles work together to provide complete information on a subject. Most code articles (90 through 450) will be explained in detail. This class can be used towards Continuing Education Units for Oregon State electrical licensing purposes. APR 230 and ELT 230 cannot both be taken for credit. Audit available.

APR 231 National Electrical Code II 3.00 Prepares electricians for state examination as prescribed by Oregon State Building Codes Division. Includes code explanations and applications. This class can be used towards Continuing Education Units for Oregon State electrical licensing purposes. APR 231 and ELT 231 cannot both be taken for credit. Audit available.