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Industrial Maintenance Apprenticeship Summary

Length of Apprenticeship	Approximately 38 months or approximately 6,612 hours
Total Classroom Training Hours	612
Total OJT Hours	6,000

Weeks of Training Per Year: Approximately 45 weeks

Training Hours per Week: 6 hours

Maximum # of Students per Cohort: 12 students

Minumum # of Students per Cohort 4 students

Technical Training Outline

Based on the job descriptions provided by the Industry Partnership, PMI proposes the formal classroom portion of the apprenticeship training program include the following courses:

Basic Print Reading (36 Hours)

This course introduces the basic principles of blueprint reading. Topics include line types, orthographic projections, dimensioning methods, and notes. Upon completion, students should be able to interpret basic blueprints and visualize the features of a part.

Technical Math 1 (24 Hours)

This course is a review of mathematical functions and formulas including fractions, decimals, areas, volumes of geometric figures, certain algebraic/trigonometric functions, descriptive geometry, use of measuring instruments, and others as required by electrical occupations.

Inspection Principles (12 Hours)

This course introduces individuals to the necessary elements required to be effective in the use of precision gaging equipment utilized in the manufacturing industry. Instruction geared toward dimensional inspection techniques.

Machine Technology (48 Hours)

In this course, students will learn the proper selection, application and care of shop tools such as a drill press, vertical mill, band saw, pedestal grinder and other various hand tools. Safety requirements for working with shop tools and machinery will be discussed. Students will perform drilling, reaming, countersinking, counter boring, tapping and chamfering utilizing a drill press and or milling machine. Students will also perform basic lathe operations such as turning or facing.

Fundamentals of Electricity (72 Hours)

This course is designed to acquaint the student with the theory and practice of using electricity as it applies to industrial technology. The topics covered include atomic theory, electrostatic charges, basic concepts of electric circuits, Ohm's Law, Kirchhoff's law, series, parallel and hybrid circuits, component symbols, measuring instruments and transformer theory, magnetism, motors, generators, relays, and magnetically operated devices. Circuit analysis and calculations of electrical quantities will also be taught and performed.

Control Wiring (48 Hours)

In this course, students will learn to identify and analyze electrical symbols and diagrams. Identification, installation, and troubleshooting of control devices, solenoids, relays and timers utilized in motor control circuits will be demonstrated. Students will be exposed to contactors and magnetic motor starters used in motor control circuits and motor reversing circuit components. Students will learn to identify, install and troubleshoot sensing devices and controls used in electrical motor control circuits. *Prerequisites: Technical Math 1, Fundamentals of Electricity*

AC/DC Applications (48 Hours)

This course is designed to introduce concepts of electricity involving the behavior of both direct and alternating current circuits. Industrial motor control fundamentals are covered, as well as the basic theory of magnetic controls, control components, pilot devices, control circuit diagrams and troubleshooting. This course begins with magnetism and electromagnetic theory followed by the principles of operation of series, shunt and compound direct current generators and motors, manual motor starters and applications of acceleration, braking, reversing of motors used in rotating machinery. *Prerequisites: Technical Math 1, Fundamentals of Electricity*

Basic Maintenance Welding (36 Hours)

This course is an introduction to the fundamentals of welding practices that will emphasize the safety precautions and requirements to be utilized when performing welding tasks. Participants will learn to explain the basic fundamentals of welding, demonstrate various welding techniques, execute proper shop and equipment safety, and make effective, longer-lasting welds.

Mechanical Drive Systems (72 Hours)

This course introduces the basic principles of mechanical systems, component operation, system design, component installation and adjustment, troubleshooting, maintenance, and applications. Components include: fractional horsepower and heavy duty style components, 3 types of bushings, 7 types of couplings,

single and multiple belt drives, single and multiple chain drives, silent chains, synchronous and HTD belt drives, spur gear drives, manual lubrication, plain bearings, roller bearings, seals, and gearboxes. Students will learn how to perform shaft alignment using various techniques.

Fluid Power Technology (72 Hours)

This course will cover the basic principles of fluid science, component operation, circuit design, and applications. Hydraulic components include: fixed pumps, cylinders, motors, flow control valves, pressure-compensated flow control valves, pressure control valves, gages, flow meters, directional control valves, check valves, and accumulators. Pneumatic components include: cylinders, motors, flow control valves, pressure regulators, gages, flow meters, check valves, and directional control valves.

Programmable Logic Controllers (PLCs) (96 Hours)

This course covers industrial programmable controllers and program writing including; but not limited to, basic relay logic programming, program control instructions, sequence instructions, data manipulation, math instructions, program editing and troubleshooting. *Prerequisites: Technical Math 1, Fundamentals of Electricity and Control Wiring*

Preventative Maintenance Applications (48 Hours)

This course introduces the theory of maintenance and the skills necessary to maintain equipment used in industrial facilities. Topics include maintenance theory, predictive and preventive maintenance, electrical/mechanical equipment operation and maintenance, and maintenance documentation. Upon completion, students should be able to perform maintenance on electrical/mechanical equipment in industrial facilities.

Total Length: 612 Hours

Any questions regarding the content of this proposal should be directed to:

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Mechatronics Apprenticeship Costs 2019

Course	Course #	Hours	Book Cost *	Course cost	Total
Print Reading for Industry	MEA 110	36	\$115.00	\$756.00	\$871.00
Industrial Math	MEA 001	24	\$179.00	\$504.00	\$683.00
Inspection Principles	MEA 111	12	no book	\$252.00	\$252.00
Shop Machine Operations	MEA 112	48	\$163.00	\$1,008.00	\$1,171.00
Fundamentals of Electricity	MEA 120	72	\$164.00	\$1,512.00	\$1,676.00
Electric Motor Controls	MEA 121	48	\$179.00	\$1,008.00	\$1,187.00
AC/DC Applications	MEA 122	48	no book	\$1,008.00	\$1,008.00
Basic Maintenance Welding	MEA 113	36	\$8.00	\$756.00	\$764.00
Mechanical Drive Systems	MEA 130	72	\$166.00	\$1,512.00	\$1,678.00
Fluid Power Technology	MEA 140	72	\$130.00	\$1,512.00	\$1,642.00
Programmable Logic Controllers	MEA 150	96	\$162.00	\$2,016.00	\$2,178.00
Preventative Maintenance Applications	MEA 160	48	no book	\$1,008.00	\$1,008.00
TOTALS			\$1,266.00	\$12,852.00	\$14,118.00
* Book cost may go up or down					

