ELECTRICAL WORKER APPRENTICE (EWA)

EWA 100 Introduction to Electrical Apprenticeship (2 Credits)
30 lecture, 2 total contact hours
This course provides an overview of the electrical apprenticeship program and the responsibilities of an electrician. History, safety, OSHA regulations, and job site conditions are explored. Organizing, motivation and leadership techniques, and labor laws are also covered. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 110 Job Information (3 Credits)
45 lecture, 3 total contact hours
Students study commonly used tools and materials needed for installing complete electrical systems. Shock hazards are discussed and how to use test instruments to check a circuit to verify if it is energized. How to measure voltages and currents on energized circuits, rigging and lifting of loads, and wire insulation properties are also covered. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 120 Blueprint Reading (1 Credit)
15 lecture, 1 total contact hours
The course teaches students how to identify line types, use of drawing tools, and techniques used in creating blueprints. Students also study drafting scales, electrical symbols, mechanical symbols, and job specifications to prepare them for transferring written information into the physical installation of complete electrical systems. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 130 DC Theory (3 Credits)
45 lecture, 3 total contact hours
Students study the basic structure of the atom and how current flow occurs in conductor materials. Circuit analysis techniques are applied to series, parallel, and combination circuits. Also covered is an introduction to generation of electricity using the principles of magnetism and electromagnetism. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 140 Codeology (2 Credits)
30 lecture, 2 total contact hours
This course introduces electrical apprentices to the language and format of the National Electrical Code. An understanding of the NEC is fundamental to making safe and proper electrical system installations and this course teaches valuable skills for finding, studying, and interpreting code rules. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 150 Code Practices (5 Credits)
75 lecture, 5 total contact hours
A comprehensive article-by-article study of the National Electrical Code is presented in this course. The apprentice will discuss and analyze in detail the rules in each article of the NEC as they apply to the installation of each part of a complete electrical system. A thorough understanding of the NEC is requisite for successfully passing the mandatory State of Michigan licensing exam. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 160 AC Theory (4 Credits)
60 lecture, 4 total contact hours
This course studies alternating current systems and circuits. The effects of inductance and capacitance in alternating current systems are calculated using vector analysis techniques so that the apprentice can understand, design, and troubleshoot the alternating current systems that he will install and maintain. Resonance and power factor correction as power quality issues are also discussed. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 170 Semiconductors (2 Credits)
30 lecture, 2 total contact hours
Students are introduced to the basic theory of operation of semiconductor devices. The basics manufacture and construction of P-type and N-type semiconductor materials and the theory of the PN junction are discussed and then expanded upon with the introduction multilayer devices. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 180 Grounding (2 Credits)
30 lecture, 2 total contact hours
This course presents an in-depth study of the requirements of Article 250 of the National Electrical Code as it relates to grounding and bonding of systems and equipment. The student will learn the definitions for each part of the grounding installation and will use code tables to determine the correct sizing of the conductors to be installed. Equipment, materials, and techniques for proper installations will also be covered. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 190 Transformers and Electrical Safety (2 Credits)
30 lecture, 2 total contact hours
The student will learn about OSHA requirements on construction work sites and the proper selection of the proper personal protective equipment and clothing. Electrical safety culture will be discussed and related to transformers which are the most common source of electrical energy in any building. Arc fault current calculations will be presented as part of NFPA 70E requirements for determining safe approach distances for energized equipment. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 200 Motors and Controls (3 Credits)
45 lecture, 3 total contact hours
Students will learn to identify various motor types by their construction and component parts and will learn the operating characteristics of common types of motors that are currently in use in most types of buildings. Reading and understanding nameplate data is presented as a fundamental need for the installation and maintenance of motors. Students will learn to develop control circuits using ladder diagrams to construct complex controls incorporating time delay, interlocking, reversing, plugging, jogging and other fundamental control circuits. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 210 Digital Electronics and PLC's (2 Credits)
30 lecture, 2 total contact hours
This course provides knowledge of digital controls utilizing AND, OR, NAND, XOR, and XNOR logic. Students also study applications of these digital circuits in programmable logic controller installations and applications. Relay ladder logic programming language is studied to provide the student the fundamentals for entering a control program into a PLC. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 220 Instrumentation (1 Credit)
15 lecture, 1 total contact hours
Students learn the fundamentals of process control systems. Topics include instrument symbols, test procedures, instrument calibration, installation, and documentation. Students learn measure pressure, temperature, flow, and levels as well as how to calculate expected readings using range and span information. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 230 Fire Alarms, Telephone and Security Alarms (2 Credits)
30 lecture, 2 total contact hours
This course teaches the fundamentals of fire alarm, telephone, and security alarm systems. Topics include: installation, inspection, testing, and maintenance. Also covered are network cabling, pathways, system performance, and administration. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 240 Distributed Power Generation and Power Quality (2 Credits)
30 lecture, 2 total contact hours
Students will learn basics of UPS systems, solar photovoltaic technology, and fuel cell technology as it would apply to the design, installation, inspection, and maintenance of these systems. Also studied are power quality problems that affect all buildings' distribution systems. Topics include: types of PQ problems, causes of PQ problems, locating the problems, PQ test equipment, and solving PQ problems. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 250 Technical Mathematics (3 Credits)
45 lecture, 3 total contact hours
Students will learn basic principles of applied math using Ohm's Law. Students learn to solve circuitry problems, wire resistance, voltage drops, AC circuit parameters, power factor, and phase angle. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6

EWA 260 Applied Science (3 Credits)
45 lecture, 3 total contact hours
This course prepares apprentices in the electrical trades to accurately apply principles of science to their work. Topics include: the structure of matter, the physical characteristics of copper and aluminum as conductor materials, the atomic structure of conductors versus insulators (dielectrics), temperature-pressure enthalpy diagrams for heating and cooling cycles, and light propagation in fiber optic media. Limited to IBEW 252 Apprentices. Level I Prerequisite: Academic Reading and Writing Levels of 6