ETP-ENGINEERING TECH: POWER (ETP)

ETP 1100C Safe Work Practices (3 Credits)
This course provides students with knowledge of the National Electrical Safety Code; FECA Safe Work Practices Handbook or the APPA Safe Work Practices Handbook and OSHA (CFR 29) Section 1910.269 Electric Power Generation, Transmission, Distribution and related sections. The course, along with appropriate self-study, provides students with the information to sit for a CDL.

ETP 1101C Basic Electricity for Line Workers (2 Credits)
This course introduces students to basic electricity and the fundamentals of electrical power that apply particularly to the line worker. Students will study the history of electricity; AC and DC circuits; the principles of induction, capacitance and reactance; portable generators and basic wiring; conductors and insulator technology and electric power. Students will demonstrate proficiencies in basic electrical formulae and measuring/metering instruments.

ETP 1104C First Aid Rescue & CPR (2 Credits)
This course meets all the requirements of OSHA for electrical line workers as required in OSHA (CFR 29) 1910.269 (a (2)(l) 'manhole and pole top rescue' and 1910.269 (b (1) 'First Aid and CPR'. Students will demonstrate industry practices for rescuing injured co-workers aloft from structures, from bucket trucks or aerial devices, and from manholes. Students will become certified to perform life saving skills in First Aid and CPR.

ETP 1105 OSHA Electrical Standards and the NESC (3 Credits)
This course is designed to provide the participants with an overview of all safety aspects of outside electrical installations and equipment used in those installations. The installations include overhead electrical installations on poles and towers and underground electrical installations, both direct buried and conduit buried. In addition, the course will cover substation electrical installations with emphasis on material used, equipment in place, and the requirements of the Lockout/Tagout (l O/TO) system. Some other specific areas of study will include grounding requirements, overcurrent/overvoltage protection, personal protective equipment, and identification of hazardous locations.

ETP 1130C Pole Climbing, Ropes & Rigging (3 Credits)
This Electrical Distribution Technology course is a key to beginning a career as an electric utility line worker in the commercial power industry. The student will master the art of climbing wooden poles and developing confidence working safely high above the ground. Proficiency is to be demonstrated in understanding, application, care and maintenance of pole climbing equipment. Training will include the demonstration of a working knowledge of physical tasks associated with the responsibilities of an apprentice line worker position. The course will cover safe work practices, basic power line construction techniques, and the application of ropes, slings and rigging equipment for assembly of overhead electric systems.

ETP 1134C Underground Distribution (3 Credits)
Students will study installation, operation, and maintenance of URD loops and radial systems. Students will study and be able to discuss trenching safe work practices, identify primary and secondary risers and be able to install a variety of primary terminators and splices. Students will also demonstrate proficiency installing pads, hand holes, secondary risers, and terminations. Participants will also study primary and secondary cable failure modes; URD switching on live and dead front equipment, fault finding, and testing of URD cables.

ETP 1135C Street & Area Lighting (3 Credits)
This course provides an understanding of electric street and area lighting system principles of design, application, installation, operation, and maintenance for overhead and underground distribution equipment.

ETP 1138C Electric Utility Print Reading (2 Credits)
The student will learn the importance of engineered documentation from the initial design concept, construction sequencing, and archiving documentation for the future care and maintenance of an existing electrical utility system. This course will cover AC/DC control diagrams, system 1 line, system 3 line, zones of protection, equipment wiring prints, logic diagrams and miscellaneous drawings. Concepts will include a basic understanding of electrical prints/schematics and their importance to the electrical power utility.

ETP 1140C Electrical Distribution Structures (3 Credits)
This course is designed to provide participants with the knowledge and skills necessary to apply blueprint reading and staking practices related to distribution structures. Participants will be involved in hands-on experiences in an outdoor lab.

ETP 1150C Trucks & Excavation Equipment (3 Credits)
Students will demonstrate proficiencies in computing, planning and lifting loads; pole truck auger and winching operations; non,verbal hand signaling; winch cable maintenance and inspection and daily vehicle inspections of boom truck; bucket truck, digger truck, back hoe and trencher equipment. Students will demonstrate pole boring equipment and aerial work platform operations. Students will demonstrate maintenance of gloving bucket booms, liners and dielectric testing, and equipment trailering safety.

ETP 1700C Introduction to the Electrical Utility Industry (2 Credits)
Students will study the history and importance of the electric power utility industry. This course includes instruction with regard to electrical utility safety, human performance, and utility regulation. The student will learn the basics of electric utility transformers, breakers, switches, generating plants, substations, power lines and miscellaneous utility infrastructure and operational protocol.

ETP 2020 American Power Systems (3 Credits)
Students in this course will learn the history of the electric utility and the Cooperative, Municipal Public and Investor Owned business structures, including the evolution of regulatory agencies and current status of power company deregulation. Students will study the importance of organization and aspect of vertical integration. Students will be introduced to the functions of Human Resources and Public Relations organizations. Students will be introduced to State and Federal power provider regulations including the areas of environmental and wildlife protections; conservation and Green Power trends and will be introduced to other Department of Labor Safety standards. Students will demonstrate a basic understanding of inter and intrastate power sales and agreements, power pooling, purchased power, and leased systems. Students will study and demonstrate an understanding of the importance of pole line management, GPS/GIS Distribution facilities management applications, budgeting, and construction cost estimating.

ETP 2102C Rubber Gloving - Hot Line (3 Credits)
Hot line maintenance, carefully done by industry approved standards, has proven to be an effective method for work on energized power circuits. Maximum application of insulating equipment and utilization of the basic principles of isolation are required to the greatest degree possible.

ETP 2110C Metering & Energy Management (3 Credits)
This course provides students with knowledge of modern electric metering theory, application, and safety, together with an understanding of electric energy use and conservation management.

ETP 2120C Basic Transformer (3 Credits)
Basic electrical and magnetic principles as applied to the operation of distribution transformers will be presented in this course. Emphasis will be placed on understanding and applying transformer connections in three-phase banks; the physical construction of transformers, auto-transformers and reactors; and safety requirements for installing and maintaining transformer equipment. Troubleshooting transformers and transformer bank problems will be an integral component of the course.

ETP 2122C High Voltage Transformers (2 Credits)
The student will learn the operation details of high voltage transformers.

ETP 2131C Pole Line Equipment I (3 Credits)
This course is designed to provide students with the knowledge and skills necessary to perform overhead line installations, pole line inspection, transformer inspection, maintenance, and change-outs. Students will be involved in hands-on experiences in an outdoor lab.

ETP 2132C Pole Line Equipment II (3 Credits)
Students will study blueprint reading and safe work practices applying to overhead line installations. Students will learn to install and operate pole line mounted oil circuit breakers, primary metering, reclosers, three phase transformer banks, capacitor banks, and regulators. Students will learn basic trouble shooting and maintenance techniques for the related equipment.

ETP 2137C Electrical Distribution Substations (3 Credits)
This course focuses on electric substation installation and operation of equipment for changing voltage, switching circuits, regulating output levels, interrupting faults, and providing communication-control functions.

ETP 2161C High Voltage Circuit Breakers (2 Credits)
The student will learn the operation details of high voltage circuit breakers.

ETP 2260C Protective Relay 1 (3 Credits)
This course is designed to provide students with an explanation of the history and philosophy of protective relays. Student will explore the differences between electromechanical and microprocessor based relays, electrical power fuses, fuse curves, and protection coordination in power systems. The different types of protective relays are also discussed and identified. Participants will also learn about current and potential instrument transformers.

ETP 2261C Protective Relay 2 (3 Credits)
Students will be introduced to the principles of operating over-current, line distance, reactance and differential relays. The course will involve discussions on distribution feeder, power transformers, substation bus, and generator protection. Students will participate in the operations of supervisory control and data acquisition (SCADA) equipment and programmable logic controllers (PLC). An introduction to microprocessor relay logic and program calculations is also covered.

ETP 2270C Substation Systems (2 Credits)
This course will introduce students to the grounding and ground field principles associated with substation technologies. Students will be given a basic understanding of the DC current battery systems and battery charges. Substation control house design is explored and an understanding of Mobile Substation and applications is also discussed. Participants will explore the operation of miscellaneous alarm and control circuits.

ETP 2931C Capstone in Protective Relay (2 Credits)
This capstone project is a requirement for the completion of the A.S. in Engineering Technology Degree with Substation Relay specialization. Participants will be required to demonstrate their ability to engineer control house relay panel drawings in CAD and properly apply those drawings to the construction and wiring of a relay panel. Student must be able to functionally test and commission protective relays in a simulated environment and document print red lining for archival.