



Proficiency Certification

Electric Power – Monitor Control and Communications

APT's Proficiency Certification Program in Electric Power Systems is based on a set of objectives that are valuable to the industry, the employer and the student. This program incorporates strategically designed curriculum to maximize the knowledge and skills in the electric power industry. This certification program consists of two levels of proficiency. **Level I** provides the important knowledge components needed to confidently work in this specialization. **Level II** builds the student's knowledge and skills to the level to proficient. **This certification credit applies towards APT's Associate Degree in Applied Sciences – Electric Power Systems.** This program is a must for those interested in a lifelong career in electrical power systems and wants to be productive, proficient, and recognized.

Note: APT is recognized by the North American Electric Reliability Corporation as a continuing education provider who adheres to NERC Continuing Education Program Criteria. These classes provide NERC CE Hours.

Program Objectives

- **Productively contribute and interact** with technical professionals in all aspects of monitoring, control and communications relating to electric system operation
- **Properly install, maintain and troubleshoot** telecommunications equipment for remote control of power system equipment according to industry practices
- **Describe the safety procedures** working around telecommunications equipment in high voltage environments
- **Discuss signal fundamentals** including physical transport, multiplexing, protocols and equipment compatibility
- **Describe the operation** of fiber optics, microwave, powerline carrier and wireline communication systems
- **Promote** your future by completing valuable courses and earn recognition through proficiency certification
- **Learn installation and repair** techniques to become productive and valuable.

Features and Benefits

- Course curriculum, objectives and learning outcomes target employment and industry needs
- Interactive instruction from highly qualified and experienced instructors
- No prerequisites!
- State-of-the-art curriculum that is always updated
- Vast course selection provides mobility and specialization
- Flexibility in scheduling
- **APT** considers prior experience or other accredited courses towards certificate and degree credit.

Courses

Level I Certification (Competent; 112 hrs, 14 Days)

- PC100 Electric Power System Fundamentals (24 hrs)
- PC101 Power System Equipment (16 hrs)
- PC102 Distribution Systems (24 hrs)
- PC103 Switching, Grounding & Safety (16 hrs)
- PC105 Monitoring & Control (16 hrs)
- PC120 Power Plants (16 hrs)

Level II Certification (Proficient; 80 hrs, 10 Days)

- PC104 Protection Principles (16 hrs)
- PC115 Electrical Print Reading (16 hrs)
- PC205 Monitoring and Control – II (16 hrs)
- PC260 Utility Telecommunications Systems (16 hrs)
- PC265 High Voltage Protection for Telecommunications (16 hrs)

Program Hours: 192 (24 days)

Accreditation



APT is accredited by the U.S. Department of Education's Distance Education and Training Council (DETC).



All courses qualify for CEUs (Continuing Education Units) approved by the International Association of Continuing Education and Training



APT is recognized by the North American Electric Reliability Corporation.



APT courses are approved by Veterans Administration, GI Bill and DANTES!

Contact APT for more information!

www.aptc.edu

(800) 431-8488

LEVEL I (Competent)

PC100 Electric Power System Fundamentals (24 hrs)

Agencies ◦ Terminology ◦ Generation ◦ Transmission ◦ Substations ◦ Distribution ◦ Protection ◦ Interconnections ◦ Control Centers ◦ Telecommunications ◦ Basic Concepts (circuit components, Ohm's Law, AC/DC, single-phase, three-phase, delta and wye)

PC101 Power System Equipment (16 hrs)

Substation Layouts ◦ Transformers ◦ Breakers ◦ Switches ◦ Arresters ◦ Capacitors ◦ Reactors ◦ Control Buildings ◦ Batteries & Chargers ◦ Lines (design, maintenance, vegetation and underground) ◦ Operating Ratings (substation equipment and lines)

PC102 Distribution Systems (24 hrs)

Radial ◦ Overhead ◦ Underground ◦ Metering ◦ Consumption ◦ Protection Overview ◦ Voltage Control (regulators, line drop compensators, capacitors and reactors) ◦ Load Balance ◦ Power Quality ◦ Service Reliability ◦ Automation

PC103 Switching, Grounding & Safety (16 hrs)

Switching & Tagging ◦ Grounding Systems ◦ Ground Potential Rise ◦ Safety (touch-step, personal protective equipment) ◦ Equipment Testing ◦ Arc-Flash ◦ NESC Clearances ◦ PCB ◦ MSDS

PC105 Monitoring and Control (16 hrs)

Monitoring System Conditions ◦ Equipment Organization ◦ SCADA (master & remotes) ◦ E-Tagging ◦ EMS ◦ Time Error Correction ◦ Automatic Time Error Correction ◦ Satellite Time Calibration ◦ Intelligent Devices ◦ Substation Automation

PC120 Power Plants (16 hrs)

Introduction power plants and power plant equipment ◦ Discusses steam turbines, hydro turbines, combustion turbines and common renewable energy plants ◦ Explains distributed generation ◦ Describes electric generator components and characteristic curves

LEVEL II (Proficient)

PC104 Protection (16 hrs)

Faults ◦ Fuses ◦ Relay Types ◦ Sensing Equipment ◦ Control Circuits ◦ Distribution (under-frequency, undervoltage, overcurrent, series reactors and reclosing) ◦ Transmission (zones, differential, breaker failure, out of step, pilot, phase comparison, transfer trip and single pole tripping) ◦ Interconnection ◦ Special and Intelligent Schemes ◦ Disturbance Monitoring Equipment ◦ Transmission Loadability

PC115 Electrical Print Reading (16 hrs)

Identify, illustrate and diagram drawings associated with electric power systems ◦ standard symbols ◦ one-line diagrams ◦ 3-line drawings ◦ wiring diagrams ◦ as-built drawings ◦ DC control circuits ◦ equipment connections ◦ verification ◦ industry standards ◦ construction ◦ maintenance

PC205 Monitoring and Control – II (16 hrs)

Gain working knowledge of control center real time data gathering equipment ◦ communications links ◦ control centers and remote terminal equipment connections ◦ transducers ◦ scale factors ◦ interface relays ◦ calibration procedures ◦ monitoring devices ◦ testing and troubleshooting ◦ cyber security in telecommunications

PC260 Utility Telecommunications Systems (16 hrs)

Telecommunications applications for electric operations ◦ transport fundamentals (fiber optics, microwave, power line carrier, wireless, satellite and wireline communication systems) ◦ substation and distribution automation ◦ auto-transfer switches ◦ Programmable Logic Controllers (PLC) ◦ Intelligent Electronic Devices (IED) ◦ communications protocols (Ethernet, ATM, SONET, IP and Utility Communications Architecture)

PC265 High Voltage Protection for Telecommunications (16 hrs)

High voltage isolation equipment ◦ reliable telecommunications circuits ◦ industry standards and practices ◦ proper installation ◦ Ground Potential Rise concerns ◦ wireline and fiber interfaces ◦ proper maintenance ◦ avoiding interruption of critical communications circuits ◦ optical ground wires ◦ safety for telecom personnel