



Proficiency Certification

Electric Power – Distribution System Operation *(Including Operators & Dispatchers)*

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

- **Contribute and interact** with technical professionals in all aspects of distribution system operations
- **Discuss generation** and its fundamental operations
- **Describe the various system protection equipment** and applications for system reliability
- **Discuss energy management programs** and operation during normal and emergency conditions
- **Describe system reliability, security, voltage control and load shedding parameters under normal and emergency operation conditions.**
- **Discuss field activities of the operations department**
- **Promote** your future with courses that earn recognition through certification and college credits

Features and Benefits

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

Courses

Level I Certification (Competent; 120 hrs, 15 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)
- PC150 Communications & Telecommunications (8 hrs)

Level II Certification (Proficient; 88 hrs, 11 Days)

- PC104 Protection Principles (16 hrs)
- PC130 Power Quality (16 hrs)
- PC220 Reliability & Security (including Cyber Security) (16 hrs)
- PC230 Voltage Control & Collapse (16 hrs)
- PC240 Emergency Operations (16 hrs)
- PC250 Situational Awareness (8 hrs)

Program Hours: 208 hours (26 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

PC150 Communication and Telecommunications (8 hrs)

Communications & Coordination ◦ Effective Communications ◦ Departmental and Entities ◦ Best Practice ◦ Telecommunications Systems ◦ Fiber Optics ◦ Microwave ◦ Power Line Carrier ◦ Circuit Types and Classes ◦ Reliability

LEVEL II (Proficient)

PC104 Protection Principles (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

PC130 Power Quality (16 hrs)

Working knowledge of power quality issues ◦ concerns ◦ performance standards ◦ problem types ◦ vulnerable configurations ◦ stray voltages and currents ◦ radio/television interference ◦ ferroresonance ◦ cause analysis ◦ resolution ◦ test, monitor and troubleshoot ◦ case studies

PC220 Reliability and Security (16 hrs)

Control Center Operations ◦ System Reliability Concepts ◦ Reliability Awareness ◦ Equipment Reliability ◦ System Reliability ◦ Cyber Security (terminology, application, situational awareness, vulnerability analysis, studies, drills, threats) ◦ Security Improvement

PC230 Voltage Control and Collapse (16 hrs)

Voltage Control Concepts (excitation, reactive support, regulators, static var compensators, power factor correction and load control) ◦ System Operating Limits (derivation, normal, emergency, flexibility) ◦ Voltage Collapse (types, causes, actions, responsibility)

PC240 Emergency Operations – I (16 hrs)

Responsibilities (TO, RC, BA, GO) ◦ System Emergencies ◦ Real Time Contingency Analysis ◦ Load Shedding ◦ System Restoration ◦ Line Loading ◦ Load Restoration ◦ Offline System Analysis Tools ◦ Backup Control Centers ◦ Backup Operating Plans ◦ Sabotage ◦ Responses ◦ Congestion Management.

PC250 Situational Awareness – I (8 hrs)

Situational Awareness ◦ Situation Analyses ◦ Manage and Control Operations ◦ Operating Tools ◦ Best Practices ◦ Conditional