



A Global Leader in Technology Education

2010 COURSE CATALOG

(Updated 12-9-9)

Degree Programs, Certificate Programs
College classes and training for the
Electric Power, Green Energy and Telecom Industries.

Applied Professional Training, Inc.

(800) 431-8488

5751 Palmer Way, Suite D, Carlsbad, CA 92010 – www.aptc.edu

WELCOME TO APPLIED PROFESSIONAL TRAINING

Applied Professional Training (APT) is a degree granting institution with 15 years of success educating the workforces of the Electric Power and Telecommunications (TeleCom) Industries. *APT* provides technical training services to telecommunications and electric power industries throughout the United States, Canada, and internationally using industry experts who average over 20 years experience in their fields. We back our programs with ongoing industry-specific course development. We provide associate degree programs, certification programs and individual courses that are available on-site as well as online. *APT* classes are accredited by the Distance Education and Training Council (DETC) which is recognized by the U.S. Dept of Education. Our students qualify for corporate tuition assistance, G.I. Bill and VA funding.

APT is nationally accredited through the Distance Education and Training Council (DETC). *APT* has classes recognized for college credits through the American Council on Education (ACE). Several *APT* courses are recognized by industry certification agencies with certification exams proctored in class. For example, *APT*'s Fiber Optics course is recognized by the Electronics Technician Association (ETA' Int'l), the Association of Communications and Electronic Schools International (ACES' Int'l) and the Fiber Optics Association (FOA) for industry certification.

In light of the California Bureau for Private Postsecondary and Vocational Education (BPPVE) having to cease operations in accordance with a "sunset" provision in the state law, *APT* has entered into a voluntary agreement with the California Department of consumer affairs to continue to operate in compliance with all applicable state statutes, rules, and regulations.

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MISSION STATEMENT

Applied Professional Training's mission is to provide students with the highest level of technical skills training available to assure a successful future in the telecommunications and electric power industries and to simultaneously increase business productivity through effective training and education of personnel. **APT** does this by offering training programs of consistently high quality with an unequalled staff and backing our programs with ongoing industry-specific course development. **APT** is a service company and training school dedicated to long-term relationships with students and businesses. **APT** is striding to become known as the premier provider of high quality technical training for telecommunications firms, electric utilities, aeronautical and maritime companies, plus governmental and educational entities worldwide.

APT is committed to enhancing student learning and career achievement. **APT** achieves the objectives of the mission statement by providing high quality courses and an associate's degree program focused to give career minded students a lifetime foundation of desirable employment knowledge and skills. **APT** is also committed to providing interested students with industry vocational skills through certificate programs that meet industry needs and expectations.

Lastly, **APT** prides itself on identifying industry trends and developing state of the art courses to offer students the ability to fulfill future opportunities. **APT** understands the expectations and needs of employers seeking qualified candidates. Therefore, **APT** continues to match supply with demand by providing highly trained professionals for future position opportunities.

Our motto: "If our students achieve success, then APT has achieved success."

MEET THE STAFF

APT is proud of their staff that is willing and able to assist each student with their training needs. Feel free to contact anyone of the following office support staff:

President, CEO and School Director: Steven W. Blume

Mr. Steve Blume holds a Master of Science Degree in Electrical Engineering, specialization in power, a Bachelor of Science Degree in EE specialization in Telecommunications and a Post Graduate Minor Degree in Managerial Sciences. He has over 35 years experience in Telecommunications, Electric Power and Renewable Energy industries.

Vice-President, School Operation and School Assistant Director: Michael S. Blume

Mr. Michael S. Blume holds a Bachelor degree in Electrical Engineering from UCLA. Michael provides leadership support in operations functions as well as assisting in institution standards. Michael is instrumental in providing new methods for efficiency, control, student services and technology enhancements for the benefit of both the school and the company.

Telecommunications District Education Executive Director: Sheryl Kinzel

Mrs. Sheryl Kinzel is a recognized industry professional in labor relations, hiring, staffing, career center management and human resources development for over 30 years with at&t. Sheryl is responsible for overseeing APT's District Representatives and marketing of telecommunications courses nationwide for key account customers, as well as assists in school and tuition-program compliance.

Telecommunications Education Representatives

- District 3: Jeff Self
- District 6 Houston: Mohamad Hishmeh
- District 7: Sheryl Kinzel
- District 9 north: Janis Aydelott
- District 9 south: Mara Glenn
- District 9 San Diego: Kingsley Vargas

Telecommunications Instruction Director Support: Art Lowery

Mr. Art Lowery holds several industry certifications in telecommunications technologies, has excellent technical and communications skills and brings over 30 years experience from AT&T central office, network design, data and voice communications technology and management. Art is dedicated to helping APT instructors lead students to career success.

Telecommunications Instruction Director Support: Deb Cruickshank

Ms. Deb Cruickshank holds several industry certifications in telecommunications "Fast Packet" Data and Voice Communications with emphasis in Wide Area Network planning, design, construction, maintenance and tech support. Deb has a strong background in course development and is very knowledgeable with several manufactures' equipment. Deb assists APT with instructor training and support. As an instructor, Deb adds real life experiences, practical applications and discussions on emerging technologies.

Electric Power Instruction Director Support: Steve W. Blume [Interim]

This position is responsible for the continuous development of high quality instructors in the electric power and renewable energy industries.

Electric Power Account Executive: Michele Wynne

Michele Wynne has a Bachelor of Science degree in Electrical Engineering with 30 years experience in electric power system projects and engineering studies. She is recognized as an electric industry professional having extensive experience and now manages APT's electric power projects, provides staff engineering constancy, and assists with marketing and sales.

Operations Manager and Renewable Energy Director: Jeff Fairbanks

Mr. Jeff Fairbanks holds a Bachelors degree from CSU San Marcos with several diverse years of professional experience in management functions and practices. Jeff provides management support in all APT functions relating to the school financials and operations.

Technology and Development Control Manager: Allan Dela Cruz

Mr. Allan Dela Cruz holds a Bachelor's degree in Electrical Engineering from SDSU, with many years of experience in most of all APT technology applications. Allan manages and directs all hand-on support for both equipment and computer based lab classes.

School HQ Supervisor and Scheduling Controller: Kristin Alles

Ms. Kristin Alles holds a Bachelors degree from CSU San Marcos, with multiple years of professional experience providing first level supervisory oversight on both office and school functions. Ms. Alles is the primary point of contact for oversight of all student enrollment programs, school relationships and general event operation functions.

Class Operations Coordinator: Emily Tyson

Ms. Emily Tyson holds a Bachelors Degree from CSU San Marcos, providing both general school support and primary course operation support. Ms. Tyson liaises between the instructors and the event controller by coordinating printing and shipping all school materials.

School Registrar and Organization Consultant: Cecili Chadwick [Interim]

Ms. Cecili Chadwick holds a Masters Degree at Claremont Graduate University. Cecili provides student support liaising as well school certification and accreditation compliance.

Financial Affairs: John Schilpp

Mr. John Schilpp holds a Bachelors Degree in Business Administration-Accountancy with several years of corporate controller experience. John provides primary oversight on APT's company financials, accounting and Human Resources programs.

Instructors: Applied Professional Training, Inc. has several highly qualified industry professionals teaching classes in electric power systems, renewable energy and telecommunications technologies. They average over 25 years experience, with formal degrees, industry certifications and understand APT's valued corporate philosophies and commitments to our customers. They teach from a basis of hands-on, real-world knowledge that can't be equaled by someone with a purely academic background. Several of APT's instructors frequently make presentations at industry conferences and professional seminars. Several instructors write technical papers and publish articles for other industry professionals.

APPROVAL DISCLOSURE STATEMENT

In the State of California, private postsecondary schools such as **APT** must receive approval to operate from the California Bureau for Private Postsecondary and Vocational Education (BPPVE). **APT** has always operated with Bureau approval, and in compliance with all applicable state statutes, rules, and regulations. On July 1, 2007, the Bureau ceased operations in accordance with a "sunset" provision in the state law.

APT continues in operation, and has entered into a voluntary agreement with the California Department of Consumer Affairs. Under that agreement, **APT** continues to comply with all applicable state statutes, rules, and regulations that were in effect as of the close of business on June 30, 2007.

Currently, the California Legislature is considering two bills related to private postsecondary education. One of the stated purposes of Assembly Bill 1525 is to provide that institutions that have received approval as of June 30, 2007 continue to retain those licenses until July 1, 2008. This date is intended to cover the anticipated time the Bureau is not operative. The second bill, Senate Bill 823, is intended to create a new agency to succeed the Bureau on January 1, 2008.

If you have questions, please contact **APT** at: (800) 431-8488.

Any questions or problems concerning this school that have not been satisfactorily answered or resolved by the school may be directed to the State of California, Department of Consumer Affairs, located at 1625 North Market, Sacramento, CA 95834, (916) 574-7720.

ACCREDITATIONS

APT is accredited by the Distance Education and Training Council (DETC) as a degree granting institution. DETC is recognized by the U.S. Department of Education as a nationally recognized accrediting agency. The DETC is further recognized by the Council for Higher Education Accreditation (CHEA).

Distance Education and Training Council
1601 18th Street, NW, Suite 2
Washington, DC 20009-2529
(202) 234-5100
www.detc.org



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DEGREE PROGRAM ADMISSION & APPLICATION

Persons 18 years of age or older having a high school graduation diploma or an equivalent GED (General Education Diploma) meet minimum entrance requirements. High school students requesting concurrent enrollment may be admitted as "special part-time" students subject to specified criteria. International students must comply with all requirements of the U.S. Citizenship and Immigration Services.

There are no prerequisite entrance exams. However, students must be able to provide proof of having a math proficiency at the Applied Sciences Math level.

APPLICATION AND EDUCATION PROCESS

Each student must submit an application for the degree program. All applications will be reviewed for acceptance by the director of administration. Students must uphold financial responsibility and maintain a 2.0 grade point average (based on A=4, B=3, C=2, D=1, F=0).

ENTRANCE REQUIREMENTS & ADMISSION PROCEDURES

Students must complete an *APT* admission application form and any applicable transfer credit, transcript and course enrollment forms. All tuition must be paid by the first day of each class. A student can enroll online, mail or fax a printed version of the application form. Application forms are available via the *APT* website: www.aptc.edu or faxed from the office. (Call 800 431-8488).

General Admission Requirements

- College-admission of students still in high school and/or under the age of 18 is generally not permitted at this time. This program is targeted to working professionals and telecommunications employees seeking career advancement and/or enhanced skills.
- A high school diploma or equivalent is required from applicable educational institution.
- All incoming students should demonstrate a U.S. high-school level proficiency in English.
- All incoming students should possess fundamental arithmetic and science skills.
- Additional admissions requirements may apply. Please consult with an admissions advisor for more information.

APT grants academic credit toward its associate degree for appropriate general education courses satisfactorily completed at other recognized colleges and universities accredited by DOE. A general description of the procedure for evaluating prior education for purpose of transfer credit(s) is as follows:

- Students/applicants will arrange to have all necessary transcripts sent to the *APT* Registrar.
- Upon receipt, the transcripts are reviewed by the *APT* Credit Evaluation Committee for applicability and if qualified, for the number of transfer credits that will be granted.

- The student will be notified of the Credit Evaluation Committee's decision, in writing.
- The applicable credits will be recorded in the student's permanent record.
- The transcripts will be filed in the student's permanent record.

As a matter of policy, **APT** admissions requirements are developed in strict compliance with all local, state and federal laws pertaining to the protection of student's rights regarding race, sex, color and national origin. Further, all **APT** admissions policies adhere to DETC Business Standard II B.

NON-APT COURSE CREDIT

APT will accept course credit from other DOE accredited institutions, qualified work experience and College Level Examination Program (CLEP) testing according to the maximum limits described below:

Work experience may qualify for up to 12 units of elective credit. **Transfer credit** may qualify for up to 12 units of elective credit. A combined maximum of 18 units of transfer credit plus work experience credit may be used for elective credit. CLEP testing is not permitted for elective courses. **APT's** Credit Evaluation Committee (CEC) must approve all applications for transfer and/or work experience credit.

Transfer Credit from another accredited institution, college or university may be applied toward **APT's** associate's degree. The institution must be nationally or regionally accredited in the U.S.A., recognized by the Dept of Education and the course title, description and learning outcomes must closely match **APT's** courses specified in the degree program. **APT's** Credit Evaluation Committee (CEC) will review all applications; acceptance is based on strict guidelines.

Qualified Work Experience Credit will be considered for course credit towards **APT's** AA degree. Qualified work experience may consist of past and present related work responsibilities, internship in the degree area and/or military experience. **APT's** CEC will review all work experience applications for acceptance based on strict guidelines. The committee will look for key skill outcomes that apply directly to **APT's** associate's degree objectives. The student will be required to submit supporting documentation consisting of detailed essays, letters of recommendations, industry certifications and other requests as seen appropriate by the CEC.

CLEP (College Level Examination Program) testing will be considered for course credit. Normally CLEP testing verifies knowledge in specific areas. **APT** will consider CLEP testing outcomes towards satisfying general education requirements only. CLEP will not be allowed for Core or Elective credits/units.

ASSOCIATES DEGREE IN APPLIED SCIENCES: ELECTRIC POWER SYSTEMS

PROGRAM OBJECTIVES

APT's Associates Degree in Electric Power Systems is a program 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 benefits of distance learning with instructor-led education and the industry necessities. Simulators and lab coursework enhance practical learning.

- A. Entry level students establish a foundation for advanced study in modern electric power courses.
- B. The course objectives closely relate to employment and industry needs.
- C. Students use state-of-the-art technology curriculum that is continuously updated.
- D. All program courses use highly experienced expert instructors.
- E. Students demonstrate knowledge learned to enhance job opportunities and career advancement.
- F. Students have the option to obtain industry certifications from renowned agencies and organizations.
- G. The vast selection of program courses provides flexibility for specialization.
- H. The program accommodates the utilization of applicable work experience.
- I. Graduates obtain comprehensive knowledge to enable upward mobility to higher level degree programs.
- J. The program offers flexibility in course scheduling to help accommodate adult learners.

PROGRAM FORMAT

The courses taken under this distance learning program are composed of self study theory, concepts and applications that are combined with instructor led resident sessions. The distance portion is composed of study guides, workbooks, lesson questions and projects that are later reviewed in class by the instructor. The expert instructor expands on concepts and applications during the resident sessions. Also, the resident sessions include strategically designed hands on exercises that exceed requirements for industry certifications. Therefore, students have the option to take industry certification exams in class while advancing in their telecommunications program. This is a win-win situation for adult learners wanting to increase current employment options while earning a formal degree for advancement in the telecommunications industry.

AS DEGREE PROGRAM

This AS degree program requires a minimum of 60 units to complete. The curriculum consists of core courses (20 units), elective courses (22 units) and general education courses (18 units). Based on review, students may apply work experience, transfer credits and CLEP (College Level Examination Program) testing toward degree requirements. Students may also apply previous *APT* course college credits towards this degree at no limit. *APT*'s Credit Evaluation Committee will evaluate all transfer and work experience credit.

Minimum Requirements

The minimum units required to complete the AS degree is summarized below:

- 20 Units: *APT* Core Courses
- 22 Units: Elective Courses
- 18 Units: General Education Courses

Total: 60 Units (minimum)

CORE COURSES

Twenty (20) units of core courses are required to complete the degree. The core courses are listed below:

Course	Initial Core Course – Select one	Units	Tuition
MATH101	Mathematics for Applied Sciences	4	\$1295
PWR102	DC & AC Circuits with Print Reading	4	\$1295
PWR100 or PWR103	Electric Power Systems Operations	4	\$1295
PWR104	Introduction to Electric Power Industry	4	\$1295
PWR105	Power Plants	4	\$1295
PWR105	Substations and Transmission Lines	4	\$1295
PWR115	Introduction to Distribution Engineering	4	\$1295

Note: MATH101 can be a General Education course.

Transfer credit is permitted for Mathematics for Applied Sciences only. The credit must be from math courses that contain Algebra, Geometry, and basic Trigonometry concepts. The application for transfer credit will be reviewed by *APT*'s *Credit Evaluation Committee* (CEC). All other core courses must be completed at *APT*.

CORE COURSES

MATH101 (4 units)

Mathematics for Applied Science

This course provides students with a solid mathematical foundation in Applied Sciences. The course includes a Study Guide, CD with practice tests, workbook, and access to online help.

PWR102 (4 Units)

DC and AC Circuits with Print Reading

This course introduces students to the more advance or practical mathematical concepts as they apply to electric power systems. The application examples studied include electrical circuit theory and analysis of motors, equipment, tools and testing. The student is introduced to the various aspects of High Voltage vs. Low Voltage power systems. Also included in this class is electrical and structural print reading basics. The student learns how to read, understand, translate, and use electrical prints as they apply to electric power systems. Print reading essentials will be covered in this course to acclimate students to industry expectations. Student learns how to read schematics, wiring diagrams, equipment elevations and clearances.

PWR100 (4 Units)

Electric Power Systems Operations

This course provides students with a working knowledge of electric power systems operations. The course covers generation, transmission and distribution including household wiring. Basic electrical terminology and concepts are covered with regard to design, construction, operations, and maintenance of power plants substations and transmission and distribution lines. The student learns the basics of substation equipment, system protective relaying, and system planning functions. The course includes discussions of normal and emergency system operations give a true perspective of real time operations. Topics such as reactive supply, voltage control, stability, reliability, and other system parameters are discussed. The course usually includes a visit to a local substation or power plant.

PWR103 (4 Units)

Introduction to Electric Power Industry

This course gives students an overview of all aspects of electric power system operations from generation through transmission and distribution and all the way to household wiring. Electrical terminology and basic concepts are discussed with regard to design, construction, operations, and maintenance of power plants substations and transmission and distribution lines. The course starts with a brief history then discusses the various regulatory agencies and governing bodies to provide students a complete perspective of the electric power industry. System control centers and telecommunications systems used by power companies are discussed. When possible, a field trip to a local power plant or substation is included in this class.

PWR104 (4 Units)

Power Plants

This course discusses how mechanical energy is converted to electrical energy and provides students with power plant operations knowledge. Power generation is a major component in the electric power industry and this course provides insight into several types of power plants systems that convert various energy resources into electric energy. The various prime movers and their associated major components are discussed such as high pressure and temperature steam turbines, water turbines used in hydro power plants, combustion and combined cycles power plants and others. This course includes overview discussions on system stability, reliability and control from the power plant operations perspective.

PWR105 (4 Units)

Substations and Transmission Lines

This course provides the student with the knowledge necessary to safely work in and around substations, understand the purpose and function of substation equipment, and how to safely conduct and execute operating procedures. This course discusses the test instruments associated with substation maintenance to assure reliable equipment operations. The lab experience gives students necessary skills to pursue a career in the electric utility industry areas of substation construction, operations and maintenance. Topics include substation overview, construction, equipment, grounding, operation, wiring practices, maintenance, and safety. The transmission lines section of this course gives students the insight of how transmission lines are designed and operated. AC and DC transmission systems are discussed and compared.

PWR115 (4 Units)

Introduction to Distribution Engineering

This course provides students with a working knowledge in the design, construction, operations and maintenance of distribution and consumption of electrical power. This course starts with system

fundamentals as they apply to the distribution systems, consumption configurations, and substation interfaces. Distribution system protection including relays and fuse coordination with circuit breakers, reclosers, sectionalizers and lightning arresters. The common problems associated with distribution systems are discussed, such as;

ferroresonance, stray voltages and currents, television interference, and others. Proper safety techniques that involves switching procedures, grounding and personal protection is discussed.

ELECTIVE COURSES

A minimum of *twenty-two (22) units* of elective courses are required. A list of the elective courses is shown below.

Course	Elective Courses:	Units	Tuition
PWR110	Industry Safety and Grounding	4	\$1295
PWR120	Electric Metering	4	\$1295
PWR130	System Protection	4	\$1295
PWR135	Energy Management and SCADA	4	\$1295
PWR200	Power System Planning, Reliability and Security	4	\$1295
PWR202	Transmission and Interconnected Systems	4	\$1295
PWR205	Generation and Transmission Operations	4	\$1295
PWR230	Emergency Operations and Restoration	4	\$1295
PWR240	Telecommunications for Electric Utilities	4	\$1295
PWR270	Solar Photovoltaic Systems	4	\$1495
PWR275	Wind Power Systems	4	\$1495
EXP280	Independent Study	3	\$1295
EXP290	Internship	3	\$1295

A minimum of 12 elective course units must be taken at **APT**. If you are a prior **APT** student, you may transfer credits to the like kind course listed above, depending on whether you took a college credit or certificate course, you may be required to complete a special project and closed book final.

ELECTIVE COURSES

PWR110 (4 units)

Industry Safety and Grounding

This course provides the field operations and construction personnel perspective of the theory, practice and regulatory requirements of electrical safety in substations, transmission and distribution facilities. Students are introduced to the requirements and expectations of the applicable industry agencies responsible for the safety of public and employee conditions. The vital safety issues of human vulnerability, personnel protection equipment, regulatory requirements and company compliance are the focus of this course. The student becomes thoroughly familiar with the concepts of “equipotential” and “single-point grounding.” The safety aspects outlined in OSHA, NESC and NEC publications are discussed. This course is designed to significantly reduce the risk of serious injury accidents in high voltage environments.

PWR120 (4 units)

Electric Metering

The various types, shapes and sizes of electric meters used in the electric power industry for measuring electrical energy consumption are covered in this course. The course starts with an overview of the metering industry, the basic equipment used, and the terms/definitions of metered quantities are presented. The parts of the various electromechanical, solid state and hybrid meters are discussed. The requirements for single-phase, three-phase installations, advanced applications and problems/issues encountered are discussed in this metering course. The fundamentals of meter reading are also discussed, including remote monitoring, and energy diversion are covered. Technical standards, common problems and meter safety are discussed.

PWR130 (4 units)

System Protection

This course presents the role of system protection and the design, construction, maintenance and operation of basic and advanced schemes. How protective relays are used to provide system reliability, stability, and what could happen if protective relays did not operate properly. The course covers the use of fuses, solid state and electromechanical relays, breakers and other protection devices needed to protect equipment from power and lightning faults and the undesirable conditions should protection be compromised. This course is designed to discuss all the components in system protection and combine those components to present the overall application of power system protection. This course covers distribution, transmission, substation, generation and interconnected power system protection schemes. DC control circuits and reliability practices are discussed.

PWR135 (4 units)

Energy Management & SCADA

Energy control centers use Energy Management Systems (EMS) to monitor and control power throughout the grids. These EMS include Supervisory Control and Data Acquisition (SCADA) systems that actually operate the equipment in the substations and power plants. This course covers how energy control centers operate remote equipment and the associated hardware. The fundamentals of operations, various communications systems used between the Energy Control Centers and Remote Terminal Units are discussed in this course. The fundamentals of Cyber security with respect to power system control centers are also covered in this course.

PWR200 (4 units)

Power System Planning, Reliability and Security

This course explains how interconnected power system are planned for growth and reliability. Course topics include load growth and load shed studies, strategies to improve reliability, new business studies, project scoping documents, and revenue requirements studies. The process of planning for reliability and system security are also covered in this course for normal and abnormal/emergency conditions. The student is introduced to system reliability concepts, reliability awareness and readiness, and how maintenance affects system reliability. The student is introduced to cyber security issues such as; vulnerability, threat analysis, data communications security protocols and network penetration.

PWR202 (4 units)

Transmission and Interconnected Systems

Communications among power system operators and connected entities, internal operations and regulatory agencies is essential for the reliable operation of interconnected power grids. This course covers these communication protocols and regulatory requirements. The software tools, monitoring devices, and random signals that help system operators become aware of potential system decaying conditions are covered in this course. Situational awareness is regarded as frontline offense to potential system problems and this course examines those signs in great detail. The concepts of how resource balancing of generation, reactive support, regulator operation, and voltage support to help control voltage and improve system performance are covered in this course. The importance of system and equipment operating limits on voltage control is discussed. The adverse affects of the lack of voltage control, such as automatic load shedding and system stability constraints, early warning signs and operational policies and procedures give students a working knowledge of how power grids actually perform.

PWR205 (4 units)

Generation and Transmission Operations

This course covers the operational aspects of generation and transport of electrical power through interconnected networks. System generation principles, characteristics and constraints are explained and how to maximize power transfer under stabilized and emergency conditions. The impact frequency, generator droop, automatic generation control, regulating reserves, unit sharing have on power system stability are covered. System dynamics and protection applications are incorporated to maximize reliability, stability and disturbance minimization of large scale interconnected power systems.

The concepts of generation resource balancing, reactive support, regulator operation, and static Var compensation to control voltage and improve system performance are covered in this course. The importance of system and equipment operating limits and the adverse affects of the lack of voltage control, such as automatic load shedding and system stability constraints give students a working knowledge in generation and transmission operations.

PWR230 (4 Units)

Emergency Operations and Restoration

This course is designed to give students a working knowledge in reliable system operations. The essential emergency operations topics are covered in this course. Topics include: how to respond to system emergencies, restoration philosophy and practices, tools/technologies available to manage emergency conditions and restoration. Other

related topics include reserve margins, back up control centers, black start, islanding, and real time contingency analysis. This course includes discussions on destabilizing events, early warning signs, etc. that can result in loss of load.

PWR240 (4 units)

Telecommunications for Electric Utilities

This course covers the theory, application, design, operation and maintenance of various telecommunications systems used by electric utilities for electric operations, customer products & services and revenue generation applications. The course starts with a review of communications basics then covers the capabilities, advantages and disadvantages of using fiber optic, microwave, power line carrier, radio, satellite and hardwire communication systems are compared. The students learn about automation devices applications such as, auto-transfer switches, Programmable Logic Controllers (PLC), Intelligent Electronic Devices (IED), outage notification devices and more. The concepts behind "Distribution Automation", "Demand Side Management", and "Substation Automation" are discussed. The course covers the basic protocols and network strategies used to effectively link devices together, such as Ethernet, ATM, SONET, Internet Protocol, and other standard utility communications protocols and networks.

PWR270 (4 units)

Solar Photovoltaic Systems

This course provides students with a working knowledge of Solar Photo Voltaic (PV) systems. This course is for individuals wanting to gain an in depth knowledge of PV systems, design techniques, equipment module

functionality as well as installation requirements and methods. This course has "hands on" installation activities including roofing materials and power equipment modules. This course covers residential, commercial and telecommunications applications. Students learn the requirements for efficient PV systems and the steps needed to install a high quality PV installation.

PWR275 (4 units)

Wind Power Systems

This course covers the design and installation of wind turbines in sizes up to 20kW. The electrical energy output of turbines at various speeds is discussed. Turbine size designs for residences, farms, businesses, schools and other facilities are discussed in this course. Students learn safety procedures, electrical generation, connections, grounding requirements, sizing formulas, etc. to meet customer energy demands. The various component parts and functions of wind turbines to help troubleshoot and repair turbines and equipment are covered. Students learn how to perform site evaluations and tower placement with the proper formulas to gain ultimate energy efficiency. Safety for various construction and installation types is discussed in this course.

EXP280 (3 units)

Independent Study

Detailed description and requirements listed on next pages.

EXP290 (3 units)

Internship

Detailed class description and requirements listed on subsequent pages.

SIMULATOR COURSES

APT has several simulator courses that are used for lab activities to demonstrate and practice theories and engineering principles for normal and disturbance power system operations. Students learn to identify early warning signs and practice best approach recovery methods.

Transmission & Emergency Operations

1. Voltage Collapse
2. Line Loading (Skill Level 1-3)
3. Load and Loop Flow (Skill Levels 0-4)
4. Cold Load Pick Up (Skill Levels 1-3)
5. Line Energization (Skill Levels 1-3)
6. Motor Starting (Skill Levels 1-4)
7. Area Control Error
8. Restoration Management Parts I & II (Skill Levels 1-8)
9. Islanding Situation Response (Skill Levels 0-3)

Generation

1. Speed Droop and AGC
2. Generator Loading (Skill Levels 1-4)
3. Transmission Line Relief Management (Skill Levels 0-2)
4. Generator Dispatch Bands
5. Generator Event Response (Skill Levels 1-3)
6. Area Constraint Response (Skill Levels 1-2)
7. Jointly Owned Unit Sharing
8. Deployment Reserve Sharing Group
9. ASM Regulating Reserve (Skill Level 1-6)

Ancillary Services Market

1. 40 Unit ASM Sequential Operations
2. 66 Unit ASM Co-Optimization
3. Load Flow with Least Marginal Price

Skill Level Constraints & Conditions

- Equipment Operating Limits (normal and emergency)
- Underfrequency Load Shed
- Load Curtailment
- Voltage and Frequency Constraints
- Ramp Rate Constraints
- Disturbance Response and Control
- System Blackstart Restoration
- Protection Coordination
- Protection Misoperations
- System Reliability Constraints
- Reliability Coordination Enhancements
- Contingency Events, Response & Analysis
- System Performance Outcomes (normal, single, double and extreme contingencies)
- Overloaded Condition Analysis
- Optimum Performance Analysis
- “What if” and “Open Play”

Learning Outcomes

- Evaluate compromising operational conditions and respond appropriately in a timely manner
- Implement effective system recovery strategies to minimize disturbance impact
- Demonstrate proper generation and reactive power balance to assure maximum system reliability
- Identify early warning signs for potential disturbance and respond appropriately in a timely manner
- Assess protection coordination with regard to variable operating conditions
- Apply proper procedures for blackstart restoration
- Demonstrate the basics and accelerate to the experienced level of electric power simulation

INDEPENDENT STUDY PROCEDURES AND REQUIREMENTS

Applied Professional Training (APT) offers up to three (3) credit hours for this Independent Study. This course is intended for self-motivated students to pursue distance learning outside of regular course offerings for the benefit of advanced learning of related intellectual interests and career plans.

Independent Study courses are supervised by *APT* faculty members, generally involving substantial interaction. 135 hours of independent study is required. (A 2 unit option is available requiring 90 hours of study.)

Procedures

1. Student submits *APT*'s Independent Study course application with a resume.
2. *APT*'s Credit Evaluation Committee (CEC) either approves or denies the application.
3. Upon approval, *APT* will assign a support instructor as an academic advisor.
4. The student and instructor determine project scope and the means for demonstrating learned outcomes. The instructor may assign reading material, research, project report, etc. to satisfy the academic requirement
5. Student must submit weekly progress reports or attend periodic meetings with the instructor.
6. A log shall be kept by the student and readily available for view by *APT* staff upon request.
7. The student must complete an exit survey/evaluation regarding the course program and its benefit to the student

Requirements

1. Student must be enrolled in an *APT* degree program
2. The project must be within the intended scope of degree program.
3. Students are required to have a cumulative GPA of 2.5 or better.
4. Students must complete a minimum of 135 hours of independent study for three (3) credit hours. The course must be completed in 3 months or less.
5. Students must complete a minimum of 90 hours of independent study for two (2) credit hours. The course must be completed in 3 months or less.
6. A minimum of 15 hours per week of independent study is required for three (3) credit hours and 10 hours per week for 2 credit hour courses.
7. Students may enroll in only one Independent Study course in the Associate's Degree program.
8. Student's conduct must be professional and responsible.

INTERNSHIP PROCEDURES AND REQUIREMENTS

APT offers up to three (3) credit hours for participating in an internship program. Students that have the opportunity to work with an established company in their field of study (i.e., sponsor) can advance their learning experience while receiving course credit. *APT's* internship program has both work related and academic components. 135 hours of independent study is required. (A 2 unit option is available requiring 90 hours of study)

Procedures

1. Student submits *APT's* Internship application with sponsor information and resume.
2. A representative from *APT's* Credit Evaluation Committee (CEC) will contact the student's sponsor to discuss work scope, type, scheduling, and student expectations.
3. The student might be asked to submit a current doctor's physical exam report that includes illegal drug testing.
4. *APT's* Credit Evaluation Committee either approves or denies the application.
5. Upon approval, *APT* will assign a support instructor as an academic advisor.
6. The CEC or instructor may assign research, project report, etc. to satisfy the academic component of the course.
7. Student must submit weekly progress reports or attend scheduled meetings with the instructor.
8. A log shall be maintained by the student and immediately available upon request.
9. The sponsor may be asked to provide a written evaluation of the student's performance during the internship.
10. Instructor evaluates the student based on fulfillment of both work and academic components of the course.
11. The student must complete an exit survey/evaluation regarding the course and its benefit to the student
12. The instructor may conduct regular or surprise visits to verify progress, accomplishments and intellectual growth.

Requirements

1. Student must be enrolled in an *APT* degree program
2. Students are required to have a cumulative GPA of 2.5 or better.
3. Students must complete a minimum of 135 hours of actual work under the supervision of a sponsor for three (3) credit hours. The program must be completed in 3 months or less.
4. Students must complete a minimum of 90 hours of actual work under the supervision of a sponsor for two (2) credit hours. The program must be completed in 3 months or less.
5. Fifteen hours per week of work related activities are required for 3 credit hours and ten hrs/wk for 2 credit hours.
6. Student's conduct must be professional and responsible.

SPECIALIZATION AREAS (OPTIONAL)

A minimum of 4 classes must be taken in a specialization area to qualify.

Facilities and Equipment [FE]

PWR110 Industrial Safety & Grounding
PWR120 Electric Metering
PWR130 System Protection
PWR135 Energy Management & SCADA
PWR240 Telecommunications for Electric Utilities

Power Generation [PG]

PWR110 Industrial Safety & Grounding
PWR130 System Protection
PWR135 Energy Management & SCADA
PWR202 Transmission and Interconnected Systems
PWR205 Generation and Transmission Operations
PWR230 Emergency Operations & Restoration
PWR270 Solar Photovoltaic
PWR275 Wind Power Systems

System Operations [SO]

PWR110 Industrial Safety and Grounding
PWR120 Electric Metering Distribution Systems
PWR130 System Protection
PWR135 Energy Management & SCADA
PWR200 Power System Planning, Reliability & Security
PWR202 Transmission and Interconnected Systems
PWR205 Generation and Transmission Operations
PWR230 Emergency Operations and Restoration

Design & Management [DM]

PWR110 Industrial Safety & Grounding
PWR120 Electric Metering
PWR130 System Protection
PWR135 Energy Management and SCADA
PWR200 Power System Planning, Reliability & Security
PWR270 Solar Photovoltaic
PWR275 Wind Power Systems

ASSOCIATES DEGREE IN APPLIED SCIENCES: TELECOMMUNICATIONS TECHNOLOGY

PROGRAM OBJECTIVES

APT's Associates Degree in Telecommunications Technology program is based on a set of objectives that are valuable to the industry, the employer and the student. The program incorporates strategically designed curriculum to maximize the benefits of distance learning education while coupling essential hands-on skills training through resident learning sessions. Industry expert instructors provide course review and hands on training during the resident sessions. All course objectives associated with this Telecommunications Technology program collaborate to meet or exceed program objectives.

- A. Entry level students establish a foundation for advanced study in modern telecommunications courses
- B. The course objectives closely relate to employment and industry needs
- C. Students use state-of-the-art technology curriculum that is continuously updated
- D. All program courses use highly experienced expert instructors
- E. Students demonstrate knowledge learned to enhance job opportunities and career advancement
- F. Students have the option to obtain industry certifications from renowned agencies and organizations
- G. The vast selection of program courses provide flexibility for specialization
- H. The program accommodates the utilization of applicable work experience
- I. Graduates obtain comprehensive knowledge to enable upward mobility to higher level degree programs
- J. The program offers flexibility in course scheduling to help accommodate adult learners

PROGRAM FORMAT

The courses taken under this distance learning program are composed of self study theory, concepts and applications that are combined with instructor led resident sessions. The distance portion is composed of study guides, workbooks, lesson questions and projects that are later reviewed in class by the instructor. The expert instructor expands on concepts and applications during the resident sessions. Also, the resident sessions include strategically designed hands on exercises that exceed requirements for industry certifications. Therefore, students have the option to take industry certification exams in class while advancing in their telecommunications program. This is a win-win situation for adult learners wanting to increase current employment options while earning a formal degree for advancement in the telecommunications industry.

AS DEGREE PROGRAM

A minimum of 60 units is required to complete the AS degree. The curriculum consists of 4 core courses (16 units), elective courses (26 units) and general education courses (18 units). Based on review, students may transfer general education and limited technical course credits/units toward degree requirements. Credit for related work experience, internship and CLEP (College Level Examination Program) testing are also possible means for credit towards degree requirements. Guidelines and limitations for transfer, work experience and CLEP credit are discussed later in this document.

Minimum Requirements:

- 15 Units: *APT* Core Courses
- 27 Units: Elective Courses
- 18 Units: General Education Courses

Total: 60 Units (minimum)

CORE COURSES

Fifteen (15) units minimum of core courses are required to complete the degree, which translates to four 3-unit courses. These core courses are listed below:

Course	Initial Core Course – Select one	Units	Tuition
MATH101	Mathematics for Applied Sciences	4	\$1295
TEL102	Basic Electronics	4	\$1395
TEL103	Data Communications Part I*	3	\$1495
TEL104	Data Communications and Networks*	4	\$1595
TEL105	Fiber Optics Communications	4	\$1495

**TEL103 or TEL104 (not both) applies toward minimum core courses.*

Transfer credit for core requirements is permitted for Mathematics for Applied Sciences only. The credit must be from math courses that contain Algebra, Geometry, and basic Trigonometry concepts. The application for transfer credit will be reviewed by *APT's Credit Evaluation Committee* (CEC). All other core courses must be completed at *APT*.

CORE COURSES

MATH101 (4 units)

Mathematics for Applied Sciences

This course provides students with a solid mathematical foundation for the Basic Electronics course and corporate placement tests with 40 hours of classroom instruction and up to 135 hours independent study. The Study Guide includes a CD with practice tests, workbook, and access to online help.

TEL102 (3 units)

Basic Electronics

The focus of this course is to give students a fundamental understanding of basic AC and DC principles and circuit theory as it applies to the telecommunications industry. The terminology of voltage, current and power are explained as well as the functions of resistors, capacitors, inductors, transistors, etc. used in electronic circuits. The course includes 40 hours of classroom instruction, up to 90 hours independent study, and two elective term papers/projects.

TEL103 (3 units)

Data Communications Part I

The DC-I class sets the foundation for the basic concepts used in modern data communications networks. DC-I also prepares students for the advanced concepts learned in DC-II that are needed for A+, Net+, CTP and CCNA industry certifications. The first section of DC-I covers Microcomputer Hardware including, microprocessor operation, motherboards, storage devices and peripheral devices. Section two covers Internetworking Basics including data communications fundamentals, digital and analog encoding, media types and connectors, transport methods, the OSI reference model and network hardware. Section three is an Introduction to Communications Protocols including basic packet switching, addressing and TCP/IP fundamentals. The course includes interactive hands-on sessions. The course includes 40 hours of classroom instruction, up to 90 hours independent study, and two elective term papers/projects.

TEL104 (4 units)

Data Communications and Networks

This course covers Communications Networks, Network Connectivity, Data Representation, Digital Communications Techniques and Basic Data Transport Concepts. Data networking concepts such as transport media and standards, LAN hardware functionality, TCP/IP protocols, and signal processing are discussed in detail. Students learn the basics of xDSL, ATM, Frame Relay and other data transport services. Network convergence of voice and data and emerging technologies are introduced. Hands-on activities will solidify the knowledge and skills learned from this course. The course includes 56 hours of and up to 74 hours independent study.

TEL105 (4 units)

Fiber Optics Communications (4 units)

This course is designed to provide students with a working knowledge of how voice, data and video signals are composed, multiplexed and transmitted over fiber optic systems used in modern telecommunication networks. Extensive hands-on exercises will provide experience in lab, fiber splicing, connector installation, OTDR training and testing techniques. Students will also learn about the latest emerging fiber technologies and trends towards FTT_x (Fiber To The Home/Curb/Premise/Node). The course includes 40 hours of classroom instruction up to 135 hours independent study. Student qualifies to take ETA, ACES, and FOA industry certifications.

ELECTIVE COURSES

A minimum of *twenty seven (27) units* of elective courses are required. A list of the elective courses is shown below: (Units are shown as # Theory+ # Lab)

Course	Elective Courses:	Units	Tuition
TEL110	Data Communications Part II	3	\$1495
TEL115	Voice over Internet Protocol (VoIP)	4	\$1495
TEL120	Internet Protocol-Television (IPTV)	4	\$1495
TEL125	Multi-Media Universal Technician (MMUT)	4	\$1495
TEL130	Broadband Services Technologies (BST)	4	\$1495
TEL135	Data Cabling Installation (DCI)	4	\$1495
TEL140	Wireless Communications Technology (WCT)	4	\$1495
TEL205	Central Office Telecommunications (COT)	4	\$2295
TEL210	Convergent Technologies Professional (CTP)	4	\$2095
TEL230	Cisco Certified Network Administrator (CCNA)	4	\$2295
TEL235	Analyzing Cisco Internetworks	4	\$1495
TEL240	FCC General Radiotelephone License (GROL) with Radar	3	\$1295
TEL245	Advanced Data Technologies (ADT)	3	\$1495
TEL250	Solar Power for Telecommunications	4	\$1495
EXP280	Independent Study / Course Project (IS)	3	\$1295
EXP290	Internship Program (IP)	3	\$1295

A minimum of 12 elective course units must be taken at **APT**. If you are a prior **APT** student, you may transfer credits to the like kind course listed above with successful completion of a special project and closed book final.

ELECTIVES

TEL110 (3 units)

Data Communications Part II

The DC-II covers the advanced concepts and required knowledge competencies expected of A+, Net+, CTP and CCNA certifications. The first section of this course discusses TCP/IP Operations and includes IP addressing, DOD and Cisco Protocol models, subnetting, Variable Length Subnet Masks (VLSM), Classless Interdomain Routing (CIDR), collision and broadcast domains. Section two covers Networking Protocols including TCP, Ethernet, routing algorithms and protocols, Spanning Tree, Virtual LANs, and IPv6. Section three is an extensive hands-on lab about Network Troubleshooting. Students will build and configure a LAN and complete troubleshooting exercises using network commands. Students will use a protocol analyzer to examine packet structure and protocols.

TEL115 (4 units)

Voice over Internet Protocol

This course is designed to provide students with a working knowledge of TCP/IP telephony and voice communications using Internet Protocol. The course discusses traditional circuit switching technologies and the evolution of packet switching networking in Local Area Networks and broadband telecom environments. Current industry standards, protocols and software/hardware equipment used for VoIP are covered in detail as well as technical and regulatory challenges. Students learn how calls are made between VoIP phones, computers and traditional analog phones over high speed data networks through extensive hands-on exercises for voice communications over a high speed data network using a proxy server, VoIP phones, soft phones, ATA and analog phones. Students qualify to take ETA Certification.

TEL120 (4 units)

Internet Protocol-Television

Learn about the revolutionary changes happening in the telecommunications industry as Service Providers transition from traditional analog telephone service to advanced Internet Protocol based Converged Technologies. This course will provide an understanding of how IPTV, VoIP and High Speed Internet services are being combined over new high speed Fiber to the Neighborhood networks. It is intended for those interested in emerging IP Centric Services. This course includes Student Participation in actual hands-on Demonstrations using TV set-top equipment, video streaming encoders, and PC serial converter boxes while using two VoIP connected telephones!

TEL125 (4 units)

Multi-Media Universal Technician

This course provides students with a working knowledge of all media services to residential and commercial installations; including fiber optics (FTTX, FTTP), Wireline (DSL, twisted pair), coax cable (CATV), and Satellite. The course begins with discussing information transport types (fiber, copper, etc.) and media content types (HDTV, SDTV, Internet, Telephony, Security and others). Structured and non-structured wiring practices are covered. General OSHA safety procedures associated with residential and commercial wiring installations are discussed. Low Voltage National Electric Code (NEC) rules and regulations are discussed to help prepare the student for LV certification. The extensive hands-on exercises cover the tools and test equipment associated with installation, troubleshooting and testing. Optional ETA RESI and Data Cabling and ACES Data Cabling certifications.

TEL130 (4 units)

Broadband Services Technologies

This course provides students with knowledge of residential, light commercial installations and computer networking for broadband services. The course begins with residential wiring installation standards, fiber optic connectors, and common computer cabling and connectors such as USB standards. Standard terminations are discussed for both telephony and data jacks as well as approved connector methods. General computer networking components associated with residential and light commercial installations are discussed including wire hubs, switches, gateways, routers, modems, firewalls and Network Interface Cards. An extensive discussion of TCP/IP protocols, IP addressing, Windows™ networking setup procedures and OS interfaces is then followed by an in-depth study of network diagnostic and troubleshooting methods for TCP/IP workstations. Troubleshooting and diagnostic methods are reinforced with hands on lab and demo.

TEL135 (4 units)

Data Cabling Installation

This fundamental course in data cabling provides students with a working knowledge of structured wiring and standards for residential and commercial installations. Students are introduced to TIA/EIA 568B Commercial Building and 570A Residential and Small Business Standards for Installation and Certification Testing. The extensive hands-on exercises include learning the skilled and safe use of tools used by Data Cabling Installers. Students will terminate and test common connectors and cable types such as RJ45, RJ11, Cat5e and Coax BNC connectors.

TEL140 (4 units)

Wireless Communications Technology

This course will provide students with an understanding of modern wireless communications technologies for both voice and data. It is intended for those who are interest in the growing wireless

industry or those who wish to gain knowledge of current and emerging wireless applications and systems. This course is appropriate for those with some previous voice or data communications knowledge such as LAN (TCP/IP), principals or digital communications, or principals of wireless communication. This class reinforces these principals with a Wireless LAN Lab using laptops and various wireless access devices.

TEL205 (4 units)

**Central Office
Telecommunications**

This course provides a fundamental understanding of local and toll central office switching and transport network architecture. A detailed description of the various switching and transport equipment used to provision both POTS and Special Service type circuits is provided. The outside plant infrastructure for both the local loop and the interoffice is also discussed. The extensive hands-on activities provided will solidify the students training with opportunities to demonstrate both knowledge and skill based competencies learned in the course.

TEL210 (4 units)

**Convergent Technologies
Professional**

This course is designed to provide students with a working knowledge of TCP/IP telephony and voice communications using Internet Protocol. The course discusses traditional circuit switching technologies and the evolution of packet switching networking in Local Area Networks and broadband telecom environments. Current industry standards, protocols and software/hardware equipment used for VoIP are covered in detail as well as technical and regulatory challenges. Students learn how calls are made between VoIP phones, computers and traditional analog phones over high speed data networks through extensive hands-on exercises. Student qualifies for ETA and CTP Certifications.

TEL230 (4 units)

**Cisco Certified Network
Administrator**

This course provides students with the knowledge required to become a Cisco Certified Network Associate as described by the new Cisco 640-802 CCNA exam. The first of the four modules of this course provides detailed coverage of Cisco Internetworking Operating System (Cisco IOS). The next module covers all aspects of managing a Cisco Internetwork, including internal components of a router, backup and restoring configurations, discovery protocol, hostname, IP routing, and checking network connectivity. Module 3 covers routing protocols such as EIGRP, OSPF and Spanning Tree, NAT, VLANs, Security (firewalls and access lists), WAN-LAN connections, wireless networking, and IPv6. The final module consists of the primary lab where the key learning from the previous modules are put into practice building active and computer simulated networks, testing configurations, and troubleshooting. Data Communications and Networks must be completed as a prerequisite. *APT* may approve other course or past experience as the prerequisite.

TEL240 (3 units)

**FCC General Radiotelephone
License w/ radar**

Enroll in this preparation course and receive the very popular lifetime license in the mail directly from the FCC! The GROL is required to operate and maintain aircraft, ship, and other radio communications equipment. Radar principles and applications are included in this class. Several employers recognize this license as evidence of your ability and knowledge in the field of radio and electronic communications. The course includes the administration of the official FCC exams and the proven course format and training techniques result in an extremely high pass ratio.

TEL245 (3 units)

Advanced Data Technologies

This elective course is designed to provide students with an understanding of the most current concepts and products in Data Communications. Advanced technologies for Broadband Wireline, Fiber Optics, Switching and Wireless are discussed. An overview of products and services offered by major providers is presented along with discussion current industry trends, emerging technologies and regulatory issues facing the telecommunications industry marketplace.

TEL250 (4 units)

**Solar Power for
Telecommunications**

This course provides students with a working knowledge of Solar Photo Voltaic (PV) systems used in the telecommunications industry. This course is for individuals wanting to gain an in depth knowledge of PV systems, design techniques, equipment module functionality as well as installation requirements and practical grid-tie and off grid battery interconnection methods. This course includes "hands on" solar PV equipment activities to demonstrate skills learned. This course is covers solar PV installations used for telecom equipment with references to industrial and residential rooftop and pedestal structures. This course includes the necessary steps needed to design, install and test a high quality and efficient performing PV systems. This course is designed to exceed the knowledge required by NABCEP's Certificate.

EXP280 (3 units)

Independent Study

Detailed class description and requirements on subsequent pages.

EXP290 (3 units)

Internship

Detailed class description and requirements are listed on subsequent pages.

INDEPENDENT STUDY PROCEDURES AND REQUIREMENTS

APT's Independent Study course is intended for motivated students to pursue distance learning outside of regular course offerings for the benefit of advanced development of intellectual interests and career plans. Independent Study courses are to be supervised by faculty members, generally involving substantial interaction. Prior to enrollment, the student shall submit *APT's* Independent Study proposal and contract form to the *APT* office. The *APT* office shall assign an instructor. The contract must be approved by the Education Director.

Procedures

1. Student submits *APT's* Independent Study course application with a resume.
2. *APT's* Credit Evaluation Committee (CEC) either approves or denies the application.
3. Upon approval, *APT* will assign a support instructor as an academic advisor.
4. The student and instructor determine project scope and the means for demonstrating learned outcomes. The instructor may assign reading material, research, project report, etc. to satisfy the academic requirement
5. Student must submit weekly progress reports or attend periodic meetings with the instructor.
6. A log shall be kept by the student and readily available for view by *APT* staff upon request.
7. The student must complete an exit survey/evaluation regarding the course program and its benefit to the student

Requirements

1. Student must be enrolled in an *APT* degree program
2. The project must be within the intended scope of degree program.
3. Students are required to have a cumulative GPA of 2.5 or better.
4. Students must complete a minimum of 135 hours of independent study for three (3) credit hours. The course must be completed in 3 months or less.
5. Students must complete a minimum of 90 hours of independent study for two (2) credit hours. The course must be completed in 3 months or less.
6. A minimum of 15 hours per week of independent study is required for three (3) credit hours and 10 hours per week for 2 credit hour courses.
7. Students may enroll in only one Independent Study course in the Associate's Degree program.
8. Student's conduct must be professional and responsible.

INTERNSHIP PROCEDURES AND REQUIREMENTS

APT offers up to three (3) credit hours for participating in an internship program. Students that have the opportunity to work with an established company in their field of study (i.e., sponsor) can advance their learning experience while receiving course credit. *APT's* internship program has both work related and academic components. 135 hours of independent study is required. (A 2 unit option is available requiring 90 hours of study)

Procedures

1. Student submits *APT's* Internship application with sponsor information and resume.
2. A representative from *APT's* Credit Evaluation Committee (CEC) will contact the student's sponsor to discuss work scope, type, scheduling, and student expectations.
3. The student might be asked to submit a current doctor's physical exam report that includes illegal drug testing.
4. *APT's* Credit Evaluation Committee either approves or denies the application.
5. Upon approval, *APT* will assign a support instructor as an academic advisor.
6. The CEC or instructor may assign research, project report, etc. to satisfy the academic component of the course.
7. Student must submit weekly progress reports or attend scheduled meetings with the instructor.
8. A log shall be maintained by the student and immediately available upon request.
9. The sponsor may be asked to provide a written evaluation of the student's performance during the internship.
10. Instructor evaluates the student based on fulfillment of both work and academic components of the course.
11. The student must complete an exit survey/evaluation regarding the course and its benefit to the student
12. The instructor may conduct regular or surprise visits to verify progress, accomplishments and intellectual growth.

Requirements

1. Student must be enrolled in an *APT* degree program
2. Students are required to have a cumulative GPA of 2.5 or better.
3. Students must complete a minimum of 135 hours of actual work under the supervision of a sponsor for three (3) credit hours. The program must be completed in 3 months or less.
4. Students must complete a minimum of 90 hours of actual work under the supervision of a sponsor for two (2) credit hours. The program must be completed in 3 months or less.
5. Fifteen hours per week of work related activities are required for 3 credit hours and ten hrs/wk for 2 credit hours.
6. Student's conduct must be professional and responsible.

GENERAL EDUCATION

A minimum of ***Eighteen (18) units*** of General Education courses are required by state and federal rules and regulations to complete the degree. (This is a California requirement.) One course must be selected from each of the following areas: (A list of acceptable course titles for each category is available in *APT's* catalog.)

General Education Courses:	Units
English Composition	3
Communications/Analytical Thinking	3
Natural Sciences (Life or Physical, not both)	3
Humanities	3
Social Sciences	3
Extra course chosen from any of the above	3

APT accepts ***transfer credit*** and ***CLEP testing*** for all 18 general education units. *APT's* Credit Evaluation Committee (CEC) must approve all transfer and ***CLEP*** credits.

GENERAL EDUCATION COURSES CATEGORIES

General Education (GE) courses should contribute to the broad education of career technical and transfer students as they affect one's interaction with the diverse local and global communities.

A minimum of ***eighteen (18) units*** are required by state and federal rules and regulations.

One course must be selected from each of the following categories:

Communication and Analytical Thinking: (3 units)

These courses develop one's logical thought process to communicate and express results. Courses include oral/written/computer communications, mathematics, logic, computer languages/applications/programming, statistics, and related disciplines.

Humanities: (3 units)

These courses develop one's awareness of the ways people throughout the ages and in different cultures responded to themselves/each-other through cultural awareness, diversity awareness, and team interaction. Courses include cultural activities, artistic expressions, and development of aesthetic understanding/expression through foreign languages, literature, philosophy, and religion.

Social and Behavioral Sciences: (3 units)

These courses focus on people as members of society and promote one's appreciation of how societies/subgroups operate and stimulate critical thinking about ways people act in response to their societies. Courses include cultural anthropology, cultural geography, economics, history, political science, psychology, sociology, ethics, and related disciplines such as interpersonal skills, leadership, conflict resolution, and civics.

English Composition: (3 units)

These courses develop one’s principles and applications of language towards logical thought, clear and precise expression and critical evaluation of communications. Courses include written/oral composition to include both expository and argumentative development.

Natural Sciences (Life or Physical): (3 units)

These courses help develop one’s appreciation and understanding of the relationships between science and human activities. Courses include astronomy, biology, chemistry, general physical science, geology, meteorology, oceanography, physical geography, physical anthropology, physics and other scientific disciplines.

GENERAL EDUCATION COURSES

The following courses meet *APT’s* General Education requirements for the AS Degree:

General Education Category	APT Course Number	APT Units	TUI-U Course Number	TUI Units
Communications/Analytical Thinking	CAT101 MATH 101 CAT102	3	ACC 201, ACC 202, MAT 101, MAT 201, MAT 202, MAT 275	4
Humanities	HUM101	3	ART 101, HIS 101, PHI 201	4
Social Sciences	SOSC101 SOSC102 SOSC103	3	BUS 205, ECO 201, ECO202, POL 201, PSY 101, SOC 201	4
English Composition			ENG 101, ENG 102, ENG 201	4
Natural Sciences (Life or Physical)			SCI 201, SCI 202, SCI 204	4

Note: *APT* accepts transfer credit from accredited institutions and qualifying *CLEP* testing for general education credit. *APT’s* Credit Evaluation Committee (CEC) must approve all transfer and *CLEP* credits applications. Contact *APT* or refer to course catalog for more information.

COMMUNICATIONS/ ANALYTICAL THINKING

APT-CAT101 (3 units)

Computer and Network Information Literacy

This course covers the basic concepts and skills of office automation and computer literacy needed in business. Specific topics include general computer operation, and practical application of word processing, spreadsheet, and presentation tools. This course is specifically designed for those who have little formal computer experience, as the basic concepts are presented.

APT-MATH101 (3 units)

Mathematics for Applied Sciences

This course covers the basic concepts and skills of mathematics needed for electronics and telecommunications. Specific topics include basic math, algebra, trigonometry, AC and DC circuit equations, network analysis and network theorems, functions and limits of functions, graphing, linear equations, and exponential and logarithmic functions.

APT-CAT102 (3 units)

Communications and Presentations

This course covers the application of communication theory and practice in business. Specific topics include writing, listening, public speaking, and electronic communications.

TUIU-ACC201 (4 units)

Financial Accounting

A review of financial statements prepared for users outside the organization. This course examines these statements from the perspective of the user of the statements rather than from the perspective of the preparer. The basic concepts and conventions of financial statements will be studied with a review of International Accounting Standards.

TUIU-ACC 202 (4 units)

Managerial Accounting

A survey of financial information for internal decision making for organizations of all types. This course examines the sources and relevance of traditional financial information that is used in internal decision making. Special emphasis given to contribution margin approach to decision making.

TUIU-MAT 101 (4 units)

College Mathematics

This course covers the basic concepts and skills of mathematics needed in business administration and health sciences. Specific topics include finite mathematics, sets of numbers, functions and limits of functions, graphing, linear equations, and exponential and logarithmic functions. This course is specifically designed for those who have not taken a math class in a long time, as the basic concepts are highlighted and taught.

TUIU-MAT 201 (4 units)

Basic Statistics

This course covers the basic concepts and skills of statistical analysis needed in business administration. Specific topics include measures of central tendency, probability distributions, sampling theory, estimation, hypothesis testing, simple regression and correlation, analysis of variance, multiple regression, and introduction to non-parametric testing.

TUIU-MAT 202 (4 units)

Advanced Mathematics

This course has a heavy emphasis on calculus, which is widely used in the social and natural sciences for a wide variety of purposes. One of the main topics is the derivative, which is used for optimizing various problems including maximization of profits or increasing efficiency of various mechanical operations. Another topic is integration, which has numerous real world applications as well.

TUIU-MAT 275 (4 units)

Linear Algebra

This class will cover the basics of linear algebra, with the emphasis on applications towards business and technology management. Specific topics covered include matrix operations, systems of equations, determinants, Cramer's Rule, Eigen values, and eigenvectors. Case assignments will focus on mathematical problems and concepts. A session long project will be required that emphasizes a specific application of linear algebra.

HUMANITIES

APT-HUM101 (3 units)

Public Humanities

The course focuses on equal opportunity in the workplace. Topics include equal opportunity orientation, affirmative action, diversity awareness, discrimination, and harassment.

TUIU-ART 101 (4 units)

Art History

This course traces the development of art from the early renaissance to the present time. Painting, sculpture, and architecture will all be explored. Special attention will be paid to the role art plays in society and how it can be used as a tool for historical analysis and a vehicle for better understanding the social conditions of the people at that time.

TUIU-HIS 101 (4 units)

Modern World History

This course traces the evolution of the human experience since the industrial revolution in the early 19th century. The nature of social systems, cultures, economic transformations, the role of religion, education, and criminal justice in the development of modern cultures will be explored. Particular attention will be paid to the methods of 'doing' history. Students will learn to analyze and interpret historical facts and critically assess the views of different historians and philosophers of history.

TUIU-PHI 201 (4 units)

Introduction to Philosophy

This course will explore the main branches of philosophy through the writings of western philosophers. The works of Plato, Aristotle, Spinoza, Descartes, Hegel, Kant, Marx, Mill and more, will be used as a springboard for critical thought about the basic questions facing humanity. Epistemology, the study of knowledge, metaphysics, the study of reality, and ethics, the study of proper human interaction, will be examined through the texts of the philosophers who wrote about them.

SOCIAL SCIENCES

APT-SOSC101 (3 units)

History and Evolution of Telecommunications

This course traces the history of the telecommunications from the 19th century to the information age. The evolution of technological advances and industry development will be explored. Particular attention will be paid to the technologies and trends that drive the modern telecom industry.

APT-SOSC102 (3 units)

Industrial Compliance

This course focuses on business legal and regulatory compliance. Topics include business ethics, workplace safety, the Fair Labor Standards Act and Family Medical Leave Act.

APT-SOSC103 (3 units)

Psychology at Work

This course focuses on the personal skills associated with the leadership and group supervision. Topics include interpersonal communications, developing others, coaching & counseling, and performance management.

TUIU-BUS 205 (4 units)

Business Law

An introduction to the law as it relates to business transactions including the law of contracts, agency and employment, the law of sales, the Uniform Commercial Code, consumer law, commercial papers, partnerships, corporations, antitrust, labor, environmental, secured transactions, bankruptcy, insurance and administrative law.

TUIU-ECO 201 (4 units)

Microeconomics

Principles of Microeconomics are an introductory course in microeconomics, or price theory. This foundation course concentrates on the economic behavior of consumers, producers, and owners of economic resources. You will study their behavior in the markets for goods and services, primarily as that behavior determines the allocation of resources and the distribution of commodities. You will learn the basic theories of supply and demand, including the concepts of price and income elasticity. You will study in depth producer behavior in the various market structures. Finally, you will study the operation of the factor market and the process of product distribution. The focus of microeconomic analysis will allow you to examine the relevant concepts in an integrated manner.

TUIU-ECO 202 (4 units)

Macroeconomics

This course examines the basics of national economic theory, policy and practice. Specific topics include: aggregate production and expenditures, employment and inflation, monetary theories and policies, fiscal policies, business cycles and growth. Emphasis is placed on measuring and interpreting macroeconomic conditions and policies.

TUIU-POL 201 (4 units)

Global Politics in the Modern World

This course will provide students with an overview of modern global politics. From the beginnings of the industrial revolution to the end of the cold war and the new millennium, the development of modern political systems and their inter-relation on the global scene will be explored. Close attention will be paid to the nature of the different types of governments that have evolved in Europe, North America, Africa and Asia, and how they relate to the evolution of the larger economic systems.

TUIU-PSY 101 (4 units)

Introduction to Psychology

This class will provide a basic introduction to the history and practice of psychology - the study of human behavior. We will examine the history of psychological theory from Freud to the present day. Some emphasis will be placed on the biological elements of psychology such as sensation, perception, learning, and memory. However, the majority of course time will be spent on social psychology and understanding the needs and challenges of the individual in society. Human relationships and interpersonal qualities such as marriage and intimacy, attitudes, aggression, group psychology, and self-perception will be explored.

ENGLISH COMPOSITION

TUIU-ENG 101 (4 units)

English Composition

Introductory writing skills. Emphasis will be on sentence structure, chronological and spatial paragraph development, and general writing skills. Students will have at least two graded writing assignments each module.

TUIU-ENG 102 (4 units)

English Composition II

Introductory writing skills, continued. Students will develop skills in various types of writing, including descriptive writing, expository writing, narrative writing, discursive writing, and argumentative writing. Students will have at least two graded writing assignments each module.

TUIU-ENG 201 (4 units)

American Literature

This course will focus on the impact of social and technological change on the American people as expressed through American Literature. Authors like Hemmingway, Henry Adams, Stephen Crane, Ralph Waldo Emerson, and more will be examined in order to help students get a better understanding of how the American people relate to advancements in technology and social policy.

Natural Sciences (Life or Physical, not both)

TUIU-SCI 201 (4 units)

Applied Physics I

This is the first in a sequence of two general physics courses. In these two courses, the basic principles of physics will be presented without the use of calculus. MAT101 and MAT201 are the math prerequisites. This course covers the topics of Mechanics, Fluid Dynamics and Thermodynamics. Assignments are a combination of applied problem sets and virtual laboratory exercises.

TUIU-SCI 202 (4 units)

Applied Physics II

This is the second in a sequence of two general physics courses. In these two courses, the basic principles of physics will be presented without the use of calculus. MAT101 and MAT102 are the math prerequisites. This course covers the topics of Electricity (electric charges, currents, ac and dc currents) and Magnetism, Sound, and Light. Assignments are a combination of applied problem sets and virtual laboratory exercises.

TUIU-SCI 204 (4 units)

Applied Scientific Theory

This course covers two major subject areas. The first area covers the basic physical and mathematical principles that underpin computer and communication hardware. Topics include semiconductor physics, Boolean algebra, digital electronics, integrated circuits, input and output devices, memory devices, and communication devices. The second area covers some important design and problem-solving techniques such as scientifically-based system design, simulation, prototyping, and system testing

PROFESSIONAL CERTIFICATE PROGRAMS

A Professional Certificate Program is a grouping of courses in a single subject within an industry, profession, academic discipline or interest area. *Applied Professional Training* offers professional certificate programs in Telecommunications and Electric Power. Successful completion of an *APT* Professional Certificate Program requires proficiency in the subject matter presented.

TRANSFER TO DEGREE PROGRAMS

APT's certification courses, in most cases are reduced versions of the degree program courses. Certification courses focus on industry certifications. However, *APT's* Credit Evaluation Committee (CEC) may approve transfer credit into degree program courses. The CEC may require the student to complete special projects, take written final exams, make presentations, etc. to validate the knowledge meets the requirements of the degree level courses.

Degree candidates can obtain professional certificates as they progress through their degree program.

ENROLLMENT PROCEDURES

Students must complete an *APT* enrollment form. All tuition must be paid by the first day of each class. A student can enroll online or mail or fax a printed version of the enrollment form. The enrollment form is available via the *APT* website: www.aptc.edu or fax from the office (call the office (800) 431-8488).

- *APT's* vocational/certification program is open to applicants over the age of 18.
- The *APT* vocational/certification programs do not provide for the transfer of college credit hours (units) toward course completion requirements. Special projects may be required to achieve college credits.
- The *APT* vocational/certification programs do not provide for the awarding of experiential credits toward course completion requirements.
- Students need not be enrolled in a certificate program to take any of these courses.

GRADING SYSTEM – CERTIFICATE PROGRAM

Successful completion of the course will be based on points issued as follows:

Distance Learning Assignments (based on percentage completed)	40 points
Attendance (minimum 70% to earn full credit)	20 points
Hands-on (required)	15 points
<u>Final Exam</u> (required with passing grade of 70% or better)	<u>25 points</u>
Total	100 points

PROFESSIONAL CERTIFICATE PROGRAM: TELECOMMUNICATIONS TECHNOLOGY

APT has assembled a series of courses leading to a Certificate in Telecommunications Technologies.

This certification program consists of three core classes and two electives. *APT* courses are designed to provide the graduate a comprehensive understanding of the modern technologies used in the telecommunications industry. The graduate can demonstrate the essential skills that are necessary to be competitive in this technical field. They learn to design, install operate and maintain modern high speed data networks on the fast track! Receive college credits, international and industry renowned certifications and Federal Communications Commission licenses. This program is a must for serious telecommunications workers interested in keeping pace with the industry and promoting their future.

The telecommunications program components are described below. The program certificate will be presented upon completion of all **three (3) required courses, plus two (2) electives**. A student may submit proof of completion of one of the required courses, and/or one of the elective courses to obtain credit towards the program certificate. The student **must** complete a minimum of two (2) required courses and a minimum of one (1) elective course with *APT* to qualify for the Professional Certificate.

In addition to the *APT* professional certification, successful completion of these professional programs gives students the level of mastery to qualify for testing for several national/international certification programs: Federal Communications Commission, Fiber Optics Association and the Association of Communications & Electronics Schools, International. *APT* can arrange for taking these affiliate exams or proficiency verification.

The certificate courses require few hours than the degree courses. These courses are geared towards industry certifications. Students can transfer *APT* certification courses for college degree courses; however the Credit Evaluation Committee (CEC) will require special projects, final exam or other activity to earn college credit.

COURSE REQUIREMENTS

Some of APT's courses have been modified to reflect industry standard certification requirements. Those courses are designated by having "PC" after their title. Degree courses require additional study. Degree courses can be used to satisfy the certificate program requirements. If all courses are taken at the degree level, then a degree candidate can achieve a certificate along the way.

<u>Course Title</u>	<u>Clock Hours</u> Total/Resident/Distance	<u>Price</u>
Core Classes (All 3 required)		
PCT102 Basic Electronics	100 / 40 / 60	\$1395
PCT104 Data Communications Series (Parts I & II)	100 / 40 / 60	\$1395
PCT105 Fiber Optics Communications	100 / 32 / 68	\$1295
Elective Classes (Two required)		
PCT115 Voice over Internet Protocol	100 / 32 / 68	\$1295
PCT120 Internet Protocol TV	100 / 32 / 68	\$1295
PCT125 Multi-Media Universal Technician	100 / 32 / 68	\$1295
PCT130 Broadband Services Technologies	100 / 32 / 68	\$1295
PCT135 Data Cabling Installation	100 / 32 / 68	\$1295
PCT140 Wireless Communications Technologies	100 / 32 / 68	\$1295
PCT205-I Central Office Telecommunications Part I	100 / 32 / 68	\$1295
PCT205-II Central Office Telecommunications Part II	100 / 32 / 68	\$1295
PCT240 FCC General Radiotelephone Operator License	100 / 32 / 68	\$1295
PCT250 Solar Power for Telecommunications Applications	100 / 32 / 68	\$1295
PC265 High Voltage Protection for Telecommunications	40/16/24	\$895

(Note: Degree course may apply toward meeting certificate program requirements.)

COURSE DESCRIPTIONS

PCT102 Basic Electronics

The curriculum includes a math review, basic electronics principles and concepts, utilization of number relations and numbering systems and digital logic as related to computers and digital communication systems. Topics include Ohm's Law, resistors, capacitors, inductors, basic electronic circuits, integrated circuits, AC/DC voltage, current and power equations. Course includes hands-on activities.

PCT104 Data Communications Series

Part I gives students a basic understanding of modern data communications technologies used in the telecommunications industry. The student learns about Central Office Hierarchy, Central Office Services and connectivity, computer systems, modem and fax standards, and data representation. Part II covers the major components of data networks from the user PC, through LAN switches and routers, and backbone data switches. Topics include LAN and WAN topologies and architectures, protocol models including OSI and TCP/IP, ATM, Frame Relay and SONET interface equipment, such as routers, CSU/DSU, wiring, etc. Course includes extensive hands-on and optional in-class ETA certification!

PCT105 Fiber Optics Communication Series

This comprehensive course in fiber optics includes theory, applications, standards with extensive hands-on splicing, epoxy connectors and testing lab experience. The curriculum covers how voice, data and video signals are composed, multiplexed and transmitted over fiber optic systems. Major topics include optical fiber construction, PONs and FTTx architectures, Total Internal Reflection, Optical light sources, optical modulation and multiplexing, and the SONET Standard. Course includes optional in-class ETA, ACES and the FOA certifications!

PCT115 Voice over Internet Protocol (VoIP or TIA's CTP)

Get an in-depth understanding of IP based networks. Primary topics include LAN architecture, TCP/IP Protocols, SIP messaging Protocol, Real Time Protocol (RTP) network integration, function and configuration of network elements (such as Proxy servers and VoIP Gateways) and end user devices (such as IP phones, Analog Telephone Adapters, and Soft Phones). Various technical and regulatory challenges between IP Networks and "Toll Quality" Circuit Switched networks are discussed. Plus discussions of competitive technologies such as traditional dedicated voice services, VoATM, and Wireless alternatives. Course includes extensive hands-on activities and optional in-class ETA and or TIA CTP certification.

PCT120 Internet Protocol Television

Get an in-depth understanding of emerging IP Centric Services over Broadband Networks including IPTV, VoIP, IMS and Network Architecture. Individuals with some previous data communications knowledge such as TCP/IP, principals of digital communications, or fiber optics will gain additional insight about how those technologies play a vital role in IPTV and other future services. Course includes interactive demonstrations.

PCT125 Multi-Media Universal Technician

Course covers structured wiring in residential installations using TIA/EIA 570A standards. These concepts include fiber optics (FTTX, FTTP), Wireline (DSL, twisted pair), coax cable (CATV), and Satellite. Multimedia content types (HDTV, SDTV, Internet, Telephony, Security and others) are discussed. General OSHA safety procedures and Low Voltage National Electric Code (NEC) rules and regulations are covered. Extensive hands-on

exercises include tools and test equipment for installation, troubleshooting and testing to the competency of ETA's Residential Electronics Systems Integrator (RESI) certification offered in-class.

PCT130 Broadband Services Technologies

This course provides knowledge of residential, light commercial installations and computer networking for broadband services including wiring standards, fiber optic connectors, and common computer cabling and connectors such as USB standards. General computer networking interface components; wire hubs, switches, gateways, routers, modems, firewalls and Network Interface Cards. Troubleshooting TCP/IP protocols and networks that are reinforced with hands on lab.

PCT135 Data Cabling Installation

Course provides excellent experience in basic Telephone, Video, CableTV and Data Network installations. The student learns basic theory, installation requirements, industry standards and proper cabling documentation. The course covers configurations used in inside and outside plant facilities. The electrical and mechanical characteristics of twisted pair and coax cable are discussed. Course includes extensive hands-on activities and optional in-class ETA and ACES certification.

PCT140 Wireless Communication Technology

This course provides a fundamental understanding of modern wireless communications technologies and equipment for both voice and data. This course covers fixed wireless applications, such as Wireless LANs, Local and Metropolitan Multipoint Distribution Systems, PCS, cellular phone technology, wireless PDA's one and two-way pagers, etc. It covers popular protocols such as, Frequency Hopping Spread Spectrum, Direct Sequence Spread Spectrum, Time Division, Bluetooth, IrDA, RFID, 802.11a/b/g/n, WiMAX, 3G, etc.

PCT205-I Central Office Telecommunications Part-I

The student gets a comprehensive overview of how data and voice services work through the central office and outside plant infrastructure, with emphasis on the Central Office. Major equipment (i.e., class 4 & 5 switches, ATM & Frame Relay, DSLAMs, T1 Channel Bank, DSX, Office Repeaters, Network Interface Units, etc.) used in the CO to provide Data and Voice services, transmission media (i.e., fiber optics, coax, twisted pair, etc.), transport services and testing plus wiring practices/concepts are covered. Basic regulatory terminology and regulations are discussed.

PCT205-II Central Office Telecommunications Part-II

This hands on course follows Central Office Telecommunications Part-I. The extensive hands-on activities provided in this course will greatly enhance the learning experienced in Part-I. Students will actually provision, test and troubleshoot analog and digital circuits using industry standard documentation, components, hand tools, and test equipment. Students have the opportunity to learn from highly qualified/experienced instructors.

PCT240 FCC General Radiotelephone Operator License

This course provides a valuable insight into wireless radiotelephone communications fundamentals including rules & regulations, basic radio circuits, antenna theory and wave propagation characteristics. The license is required by most aviation, communications and maritime companies and organizations to maintain and operate radio communications equipment. **APT** administers actual FCC licensing exams in the course!

PCT250 Solar Power for Telecommunications Applications

This course is intended for the solar photovoltaic installer or technician in the telecommunications industry that wants to gain an in depth knowledge of PV systems, design techniques, equipment module functionality as well as installation requirements and practical grid-tie and off grid battery interconnection methods. This course includes "hands on" solar PV equipment activities to demonstrate skills learned. This course is for those students interested in acquiring a working knowledge in solar PV installations used for telecom equipment with references to industrial and residential rooftop and pedestal structures. This course includes the necessary steps needed to design, install and test a high quality and efficient performing PV systems. This course is designed to prepare the student for NABCEP's Certificate.

PC265 High Voltage Protection for Telecommunications

This course trains students on the technical issues, industry standards, and proper installation practices regarding the use of High Voltage Isolation equipment for reliable critical telecommunication circuits interfacing high voltage environments such as substations, power plants and cell sites on power structures. Topics include Ground Potential Rise from lightning and power faults, interruption of critical communications circuits with possible equipment damage injury.

PROFICIENCY CERTIFICATE PROGRAM: ELECTRIC POWER SYSTEMS

Applied Professional Training's (APT's) Proficiency Certification program in Electric Power Systems provides the employer confidence in workforce development through validated levels of proficiency. Students earn valuable industry knowledge that is applicable to the current needs of electric power industry. This proficiency certification program and its strategic specializations were carefully designed by industry experts to produce well trained individuals ready for the challenges and demands of today's electric power industry. Each specialization has two levels; **Level 1** achieves "competency" and **Level 2** achieves "proficiency". There are approximately 200 contact hours in each specialization. *APT's* goal is to increase our customers' business productivity by helping educate personnel in modern technology through high quality training in various formats including instructor-led, online, and correspondence programs. These programs are continuously updated and taught by highly experienced industry leaders.

Applied Professional Training's Professional Certificate program in Electric Power Systems Operations provides students the opportunity to obtain valuable industry knowledge while earning North American Electric Reliability Council (NERC) Continuous Education Hours (CEHs) or International Association of Continuing Education and Training (IACET) Continuing Education Units (CEUs). *APT* is a NERC approved training provider (ID# APT_016).

SPECIALIZATION AREAS

Specialization areas provided students the option to focus on an education path within the electric power industry. The specialization areas are listed below:

- System Operator (Including Reliability, Balance and Transmission)**
- Power Generation**
- Distribution System Operation (Including Operators and Dispatchers)**
- Substation Operation and Maintenance**
- Monitor, Control and Communications**
- Design & Management**

The required courses to complete *APT's* Proficiency Certificate program (PC) in Electric Power Systems are listed in the matrix below. Note all of the specialization areas have a set of common core classes. Following the matrix are course descriptions.

Proficiency Certification Matrix with Specialization Areas

Proficiency Certification Courses		Specialization						
Courses	Hours	System Operator (with NERC CDR's)	Power Generation (with NERC CDR's)	Distribution System Operation	Substation Operations and Maintenance	Monitor, Control and Communications	Design and Management	
Class Title	Level	Level	Level	Level	Level	Level	Level	
PC100: Electric Power System Fundamentals	24	1	1	1	1	1	1	
PC101: Power System Equipment	16	1	1	1	1	1	1	
PC102: Distribution Systems	24	1	1	1	1	1	1	
PC103: Safety Grounding and Switching	16	1	1	1	1	1	1	
PC104: Protection Principles	16	1	1	2	2	2	2	
PC105: Monitoring & Control	16	1	1	1	2	1	2	
PC110: Power Calculations	16				2		1	
PC115: Electrical Print Reading	16				1			
PC120: Power Plants	16		1	1			1	
PC130: Power Quality	16			2			2	
PC140: Maintenance Test Instruments & Procedures	16				2			
PC150: Communications and Telecommunications	8	1		1				
PC200: Principles of Generation Operations	24	2	2					
PC205: Monitoring & Control - II	8				2		2	
PC210: Power System Planning	16							
PC215: Interconnected Systems	16	2	2				2	
PC220: Reliability & Security (Including Cyber Security)	16	2		2			2	
PC230: Voltage Control & Collapse	16	2	2	2			2	
PC240: Emergency Operations (with restoration)	16	2	2	2				
PC245: Emergency Operations - II (with restoration)	16	2	2	2				
PC250: Situational Awareness	8	2	2	2				
PC255: Situational Awareness - II	8	2	2					
PC260: Utility Telecommunications Systems	16				2	2	2	
PC265: High Voltage Protection for Telecommunications	16				2	2		
Required in all specializations	Total Contact Hours	240	240	208	216	184	224	
	Total Contact Days	30	30	26	27	23	28	

COURSE DESCRIPTIONS

PC100 Electric Power System Fundamentals

This course introduces students to the electric power industry. The course includes history, agencies (such as PURPA, NERC, FERC), Energy Policy Act and Rates/Tariffs. Terminology and the fundamental electrical theories, concepts and equipment are presented to give students an understanding of generation, substations, transmission, distribution, protection and utility telecommunications. Basic formulas and components used in electric power are introduced to give the student a complete overview of the fundamentals of electric power systems. This course is essential before entering the specific courses that follow.

PC101 Power System Equipment

This course covers high voltage equipment used in substations and transmission lines. The topics include substation transformers, circuit breakers, switches, arresters, capacitors, inductive reactors and other equipment. The transmission line equipment topics include design characteristics, maintenance, vegetation and underground facilities. System operating limits, including derivation are also discussed.

PC102 Distribution Systems

This course discusses standard designs of overhead and underground electric power distribution systems. Topics include single and three phase Delta and WYE systems, insulation requirements, protection, switching and tagging procedures, lightning performance, voltage regulation, environmental concerns and other important topics relative to distribution. Standard residential, commercial, industrial service connections and electrical consumption (including metering), are discussed in working knowledge detail. Special topics are discussed such as load balance, service reliability, power quality and

distribution automation.

PC103 Safety Grounding and Switching

This course provides a comprehensive understanding of the theory, application and procedures for working near energized and de-energized high voltage equipment to minimize the risk of injury. Both overhead and underground systems are discussed. The theory and proper procedures for "Single Point" or "equipotential" grounding are also discussed. The course starts with a general discussion of regulatory requirements including NEC, NESC and OSHA. Students learn the concepts of Ground Potential Rise, Touch and Step potentials and personal protective equipment (PPE). Switching and tagging procedures are covered along with PPE testing processes and vehicle safety.

PC104 Protection Principles

Basic and advanced system protection schemes using fuses, solid state and electromechanical relays to protect equipment from faults and other undesirable conditions are discussed in this course. This course is designed to aggregate the important concepts of power system protection. This course covers distribution, transmission and substation protection schemes. DC control circuits are discussed also.

PC105 Monitoring and Control

This course explains how electrical power systems are monitored and controlled from a system control center. The functionality and purpose of the Energy Management System, Control Center and Remote Equipment, and SCADA are discussed. The concepts of eTagging, reporting, and alarm processing are covered. Special topics are also covered such as Time Error Correction, Time Calibration and others.

PC110 Power Calculations

This course is designed to give students a working knowledge of basic power system calculations. The topics include circuit analysis of integrated 3-phase power systems, High-Voltage issues, and High Current issues. Voltage drop, fault calculations and an introduction into symmetrical components is presented for the student to be able to effectively communicate with fellow workers in the engineering and operations departments.

PC115 Electrical Print Reading

The students learn how to recognize and associate standard power system symbols used on one-line diagrams, 3-line drawings and wiring diagrams. Comprehensive print reading is an essential ability with working with as-built drawings, DC control circuits, and other equipment connections during, construction, maintenance, normal and emergency situations. Equipment standards are also discussed in this class.

PC120 Power Plants

The conversion of the various energy resources into electrical energy is a main subject in this course. The different generation power plant types used in large scale power systems are explained. The differences in performance, efficiency, environmental impact and cost are discussed. The major water, steam, cooling heating systems used in power plants to move turbines are discussed in this course. The major equipment used in power plants are also discussed. The concepts of "distributed generation" are covered in this class. All topics are discussed in enough detail for the student to have a working knowledge of their purpose, operation and ratings.

PC130 Power Quality

This course provides a good overview of power quality issues, concerns and performance standards. Certain system configurations, maintenance aspects, and/or equipment operations can cause power quality problems for consumers or the utility. Common problems such as; stray voltages and currents, radio/television interference, ferroresonance and problematic voltage conditions are covered in this class. The student learns the common methods used to recognize, diagnose, test, monitor and trouble-shoot situations for problem situations.

PC140 Maintenance Instruments and Procedures

The common test instruments (i.e., Megger, Hi-Pot, Dissolved Gas Analysis, etc.) used to analyze equipment problems are explained in this course. Examples of maintenance test procedures (i.e., batteries, earth resistivity, etc.) are discussed in this class. Safety precautions during maintenance procedures are also discussed; such as PCB handling and Lead Awareness.

PC150 Communications and Telecommunications

This course discusses effective communications procedures needed between power system control centers, reliability coordinators, interconnected entities and regulatory agencies. This course also covers required inter-departmental communications for effective and reliable system operations during normal and emergency conditions. The fundamentals of telecommunications systems are discussed in this course. Topics include circuit classes, system types and required reliability constraints.

PC200 Principles of Generation Operations

This course covers the interconnected system generation principles, characteristics and constraints to maximize the transfer of power under stabilized and emergency operations. The impact frequency, generator

droop, automatic generation control, regulating reserves, unit sharing have on power system stability are covered. Then, demonstrate all the above concepts through extraordinary simulator activities.

PC205 Monitoring and Control – II

Ga This course explains how the various communications links (fiber, microwave, powerline carrier, etc.), communicate information between Energy Control Centers and Remote Terminal Units. Point to point connectivity, transducers and scale factors, special interface relays and calibration procedures are covered to give the student a working knowledge in testing and troubleshooting telecommunications systems. Cyber security with respect to telecommunications is also covered.

PC210 Power System Planning

This course explains how interconnected power system are planned for growth and reliability. Course topics include load growth and load shed studies, strategies to improve reliability, new business studies, project scoping documents, and revenue requirements studies.

PC215 Interconnected Power Systems

The concepts of how major power utility systems operate as an interconnected grid is discussed in this course. The course includes administrative as well as operative procedures. System dynamics and protection are covered to maximize reliability, stability and disturbance minimization.

PC220 Reliability and Security

This course explains how interconnected electric power systems operate under normal and abnormal conditions. The student is introduced to system reliability concepts, reliability awareness and readiness, and how maintenance affects system reliability. The student is introduced to cyber security issues such as; vulnerability, threat analysis, data communications security protocols and network

penetration.

PC230 Voltage Control and Collapse

The concepts of how resource balancing of generation, reactive support, regulator operation, and static Var compensators help control voltage and improve system performance are covered in this course. The importance of system and equipment operating limits on voltage control is discussed. The adverse affects of the lack of voltage control, such as automatic load shedding and system stability constraints, early warning signs and operational policies and procedures give students a working knowledge.

PC240 Emergency Operations

This course is designed to give students a fundamental understanding of reliable system operation during normal and emergency conditions. The various system operator positions are discussed for the student to know the division of responsibilities. The basic concepts of load shedding, and restoration and disturbance avoidance are discussed. The tools, technologies including backup control centers available to manage emergency conditions in all situations are discussed. Other related topics discussed include sabotage and responses, congestion management, and applicable NERC standards are covered in this course.

PC245 Emergency Operations - II

This course is designed to give students a working knowledge in reliable interconnected system operation. This course covers essential advanced topics such as Area Control Error (ACE), islanding and system restoration under severe conditions that includes black start. Simulator activities provide students the experience needed to operate real time contingency scenarios. The essential NERC operating topics are discussed and practiced with simulators.

PC250 Situational Awareness

Situational awareness and analysis techniques are presented to students to help them recognize adverse or imminent situations requiring corrective action in a timely manner. The student learns how to effectively communicate and manage situations to help control operations during emergency situations. System control operating tools and best practices are covered. Available tools and techniques are discussed.

PC255 Situational Awareness - II

Advanced situational awareness and analysis techniques are discussed to help students recognize system critical conditions. The student learns how to identify system voltage and frequency operating violations, minimum MW and MVAR reserve requirements, and interconnected system operating limits to assure reliable operations. Forecasting, contingency analysis, disturbance control standards and other warning signs are discussed with students to assure reliable system operations.

PC260 Utility Telecommunications Systems

The various telecommunications systems used by electric utilities for electric operations, services and third party revenue generation are discussed in this course. Communications fundamentals are covered in enough detail to compare the capabilities, advantages and disadvantages of using the various transport services such as fiber optic, microwave, power line carrier, wireless, satellite and wireline communication systems. Substation and distribution automation and control devices are discussed, such as auto-transfer switches, Programmable Logic Controllers (PLC), Intelligent Electronic Devices (IED), outage notification devices and others. The fundamentals of communications protocols linking these devices are discussed, such as Ethernet, ATM, SONET, Internet Protocol, and standard Utility Communications Architecture (UCA).

PC265 High Voltage Protection for Telecommunications

This course trains students on the technical issues, industry standards, proper installation practices of High Voltage Isolation equipment for reliable critical telecommunication circuits interfacing high voltage environments such as substations, power plants and cell sites on power structures. Topics include Ground Potential Rise from lightning and power faults, interruption of critical communications circuits with possible equipment damage & injury.

PC270 Solar Photovoltaic Systems Introduction and Installation

This course provides students with a working knowledge of Solar Photo Voltaic (PV) systems. This introductory course is for individuals wanting to gain an in depth knowledge of PV systems, design techniques, equipment module functionality as well as installation requirements and methods. Students interested in clean, green, renewable energy for clean environmentally friendly applications will benefit from this NABCEP approved solar training. This solar course has some "hands on" installation activities in a lab environment to apply skills learned including the different roofing material and modules. This is for the new or intermediate installers to gain the required higher level of working knowledge for PV installations and provides the in depth step by step procedures needed to install a high quality and excellent performing PV system.

PC272 Solar Photovoltaic Advanced Installer

This course is intended for the experienced installer wanting to gain further details of design, site evaluations and National Electrical Code (NEC) guidelines to prepare for the NABCEP PV INSTALLER Certification exam. The course has "hand on" in lab environment and site visits for evaluation of design techniques. This course covers the techniques and procedures involving the verification of system designs,

including electrical codes, safety standards, accepted industry practices and task analysis. This requires the installer to have adequate documentation, including manuals for major components, electrical and mechanical drawings and instructions.

PC275 Wind Power Design & Installation

This course covers the design and installation of clean green energy wind turbines in sizes up to 20kW. The electrical energy output of such wind turbines at various speeds is covered in this course. Wind turbine size designs for residences, farm use, businesses, schools and other larger facilities are discussed in this course. The student learns safety procedures, basic electricity generation and connections, grounding requirements, sizing formulas, etc. to meet customer energy demands. The course covers the various component parts and functions of wind turbines to help explain how to troubleshoot and repair certain turbines and equipment. The student learns how to perform site evaluations and placement of towers with the proper formulas to gain ultimate energy efficiency from the turbines. Footing foundations, tower and turbine assembly, safety for the various construction and installation types are all discussed in this course.

PC290 NERC System operator Certification Exam Preparation

This course will concentrate on NERC Reliability Standards and the relevant power system fundamentals in preparation for any one of the NERC System Operator Certification Exams. This course is targeted at power system operating personnel who need their initial NERC System Operator certification. We will present the NERC Reliability Standards in the context of power system fundamentals. This method improves the understanding of the Standards and makes the power system fundamentals more relevant. The use of simulation exercises increases the understanding and retention of the material. The course covers typical exam questions.

SPECIALIZED TECHNICAL CERTIFICATES: ELECTRIC POWER SYSTEMS SPECIALIST

SPECIALIZED TECHNICAL CERTIFICATE

A Specialized Technical Certificate includes a grouping of self study learning modules within a specific industry classification that are geared towards skills oriented apprenticeship and journeyman job positions. *APT's* Specialized Technical Certificate training programs includes the necessary self study training courses for the standard industry classifications listed below:

- ✓ Lineman
- ✓ Substation Electrician
- ✓ System Electrician
- ✓ Electric Inspector
- ✓ Serviceman
- ✓ Cable Splicer
- ✓ Meterman
- ✓ Meter Tester

SELF PACED DISTANCE LEARNING MODULES

APT's Electric Power System Specialist certificate program consists of a set of self-paced distance learning courses that are broken down into independent study modules. These self-paced learning modules are ideal for students interested in learning the technical skills associated with the industry classifications listed above. These modules do not include hands on skills oriented resident training.

Verification and evaluation of hands on skills performance would be conducted by an electric power company employee or through an outside electric power training facility. Students do not need to be enrolled in a certificate program to take *APT's* distance learning modules.

Appendix A lists the courses and associated self-paced distance learning modules.

Contact *APT* for more information about this program.

ADMINISTRATION

SCHEDULE OF CLASS SESSIONS

APT's classes are located throughout the USA. The classes are scheduled based on student or company need. Classes are normally offered Monday through Saturday. Day, afternoon and evening classes can be arranged. If you are interested in *APT's* program and do not see classes scheduled in your area, contact *APT*. Not all classes are shown on the website.

HOLIDAYS OBSERVED

Classes are not scheduled on New Year's Day, Martin Luther King Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving, and Christmas Day. The school does not close for student holiday schedules or recess.

CLASS SIZE

The maximum class size is twenty (24) students. Average class size is ten to fifteen students. Any variation to the maximum class size policy must be approved by the School Director and should be on rare occasions with specific reasons justifying a variance to this policy.

FACILITIES AND EQUIPMENT

Most classes are taught at the employers' training locations, labor union hall or appropriate hotel banquet room. These facilities are generally located in various modern office buildings, usually with minimum 2500 square feet of space. Each classroom is equipped with various audio-visual and specialized hands-on instructional equipment when required.

TUITION POLICY AND CLASS FEES

All tuition fees must be paid by the first day of each class.

The tuition fee is generally all inclusive. Meaning, tuition, study guides, lab fees and equipment costs are included in the price. Exceptions will be disclosed on the class flyer and website. Housing and transportation fees are the student's responsibility.

DESCRIPTION OF RESIDENT LEARNING

Classroom atmosphere where the instructor is at the head of classroom with all students sitting behind tables. Instructor uses dry erase board with colored markers and overhead projector. Instructor provides demonstrations, including sample products and system configuration experiments. The instructor encourages full class participation. Evaluation sheets are used after each class to obtain valuable feedback for improving future classes.

CREDIT FOR PREVIOUS EDUCATION AND TRAINING

Degree Programs

APT will accept course credit from other accredited institutions, qualified work experience and CLEP testing according to the maximum limits.

Experiential credit may qualify for up to 12 units of elective credit. *Transfer credit* may qualify for up to 12 units of elective credit. A combined maximum of 18 units of transfer credit plus experiential credit may be used for elective credit. CLEP testing is not permitted for elective courses. APT's Credit Evaluation Committee (CEC) must approve all applications for transfer and/or experiential credit.

Transfer Credit or units from another accredited institution, college or university may be applied toward APT's associate's degree. The institution must be nationally or regionally accredited in the U.S.A., recognized by the Dept of Education and the course title, description and learning outcomes must closely match that of APT's courses specified in the degree program being pursued. APT's Credit Evaluation Committee (CEC) will review all applications for acceptance based on strict guidelines.

Experiential Credit will be considered for course credit towards APT's AS degrees. Qualified work experience may consist of past and present related work responsibilities, internship in the degree area, and/or military experience. APT's CEC will review all work experience applications for acceptance based on the four guidelines listed below:

1. The student must complete a sufficient number of units to establish evidence of a satisfactory learning pattern before experiential credit will be considered. A minimum of 12 units must be completed at APT for credit to be considered.
2. Credit for prior experiential learning is awarded for no more than 18 semester units, or the equivalent, toward the Associate Degree. Credit is awarded only for documented learning, which ties prior experience to the theories and concepts of the relevant academic field.
3. Credit is awarded only in areas that fall within the regular curricular offerings of APT programs and must be part of the instructional program the student completes.
4. APT may choose to use solely or a combination of documentation, interviews, examinations, special projects and/or demonstration that the documentation provided to APT assures equivalency to credit earned by APT courses.

The committee will look for key skill outcomes that apply directly to APT's associate's degree objectives. The student will be required to submit supporting documentation consisting of detailed essays, letters of recommendations, industry certifications and other requests as seen appropriate by the CEC.

CLEP (College Level Examination Program) testing will be considered for course credit. CLEP testing verifies knowledge in specific areas. APT will consider CLEP testing outcomes towards satisfying general education requirements only. CLEP will not be allowed for Core or Elective credit.

Certificate Programs

A student may receive credit for *APT's* Basic Electronics course for the certificate program provided s/he shows proof of completion of a similar class and passes *APT's* BE class challenge exam.

A student may receive credit for *APT's* Fiber Optics course for the certificate program provided they show proof of holding an active Certified Professional Fiber Optics Installer certificate.

A student may receive credit for *APT's* Data Cabling course for the certificate program provided they show proof of holding an active Certified Professional Data Cabling Installer certification.

A student may receive credit for *APT's* VoIP course for the certificate program provided they show proof of holding an active Broadband-VoIP industry certification.

ATTENDANCE, ABSENCE & TARDINESS POLICY

APT maintains attendance records on each student for the resident study classroom sessions. The school requires a minimum of seventy (70%) attendance in order to receive a certificate of completion from the course. A student terminated for lack of attendance or lack of progress may be considered for re-admission. Any re-admitted student must start the course from the beginning. No credit is granted for partial attendance.

Absence: Absence will be considered excused under the following circumstances: illness, death, or child birth in the immediate family, and other valid reasons substantiated in writing and at the discretion of the School Director. All other absences will be considered unexcused.

Tardiness: Tardiness is a disruption of a good learning environment and is to be discouraged. Tardiness without legitimate reason on two occasions in one class will be considered as an unexcused absence.

Interruption for Unsatisfactory Attendance: Regular attendance and class participation is a crucial element of the learning experience. Any student who misses more than three regularly scheduled class sessions will be withdrawn and required to re-enroll at a later class offering. Students may appeal for re-admission in the case of extenuating circumstances at the discretion of the school director. **For students receiving Veterans Education benefits:** APT will notify the VA to terminate benefits upon the forth absence. Refer to Class Progress, Unsatisfactory Class Progress, and Degree Program Progress Policies.

Class Cuts: Cutting classes is an unexcused absences.

Make-Up Work: Make-Up work may be required for any absence. However, hours of make-up work will not be accepted as hours of class attendance.

Leave of Absence: Written requests for leaves of absence will be considered and such leaves may be granted to students at the discretion of the School Director.

CLASS PROGRESS POLICY

The school’s grading system for each class is based on a points system. Students must complete the curriculum with at least 70 combined points to receive a class certificate of completion. Students are required to complete the hands-on activities (if applicable) and pass the final exam (70% or better grade) are mandatory for all students, regardless of their point totals.

Certificates of class completion will be issued ONLY after required assignments have been received at the school’s office. Credit for distance learning assignments is given for passing grades of 70% and greater for each completed assignment.

GRADING SYSTEM – DEGREE PROGRAM

Successful completion of the course will be based on points issued as follows:

Class Points:

Attendance (minimum 70% to earn full credit)	20 points
Distance Learning Assignments (based on percentage completed with passing grades)	40 points
Quizzes	10 points
Hands-on (required)	15 points
Final Exam (required with passing grade of 70% or better)	15 points
Class Project (optional; at discretion of faculty or school)	10 points
Total	110 points

Class Points and Letter Grade conversion:

Points	Grade
98-100	A+
93-97	A
90-92	A-

Points	Grade
87-89	B+
83-86	B
80-82	B-

Points	Grade
77-79	C+
73-76	C
70-72	C-

Points	Grade
67-69	D+
63-66	D
60-62	D-
0-59	F

Semester Grade and Grade Point Average

Points	Grade
4.0	A
3.0	B
2.0	C
1.0	D
	F, I or W

“I”: An incomplete (I) grade may be issued when a student fails to complete all course requirements in the allotted time.

“W”: A withdrawal (W) grade may be issued when a student officially withdraws from a class with a passing standing.

DEGREE PROGRAM PROGRESS POLICY

APT recommends that a student complete the degree program in two years. However, *APT* will not recognize courses that were completed more than ten years from the completion date of the last course in the program. Re-Entrance Progress Policy

A student may be granted permission to re-enter *APT's* degree or certificate programs provided they agree to the minimum standards as outlined below:

- The student must show proof that all tardy assignments have been completed.
- The student agrees to continuously meet the minimum attendance requirements and understands that permanent dismissal from the program will result if the policy is not met.
- The student agrees to continuously meet the minimum progress requirements and understands that permanent dismissal from the program will result if the policy is not met.
- The student and the School Director will sign a Letter of Understanding prior to re-entrance.
- The student must have the School Director's signature on the re-enrollment form.

Failure to meet the above criteria will bar the student from re-entry for a minimum of one full year.

ENROLLMENT AGREEMENT / POLICY

The student is required to complete and sign an *APT* enrollment agreement. Their signature on this agreement acknowledges that they have been given reasonable time to read and understand the conditions of the enrollment agreement. This agreement verifies the student understands *APT's* refund policy, educational services to be provided, attendance requirements and progress requirements. The student also recognizes proper conduct and student responsibilities are required at all times.

The student is instructed to contact *APT* or BPPVE concerning any questions or problems regarding enrollment issues that have not been satisfactorily answered or resolved by *APT*.

UNSATISFACTORY CLASS PROGRESS POLICY

Should progress stop or slow down to an unacceptable level for any reason, the student could be placed on academic probation by *APT*, dismissed from attending the remainder of the course and/or dropped from the program entirely. This condition of unsatisfactory performance will be based on the student's continuing to accomplish a minimum of 70% of expected progress in points that is prorated during the course and/or program.

For example; if the specific class is at the 50% completion state (according to the class scheduled agreed upon during enrollment) and a student falls below 70% of possible points available to date (e.g., 50% points possible to date), then the student will be placed on academic probation.

Note: A student will be permitted two probationary periods while achieving a degree or certificate program. The student will be dropped from the school program should they fall under acceptable progress for the 3rd time. The student will have to reapply into the program.

RE-ENTRANCE PROGRESS POLICY

A student may be granted permission to re-enter *APT's* degree or certificate programs provided they agree to the minimum standards as outlined below:

- The student must show proof that all tardy assignments have been completed.
- The student agrees to continuously meet the minimum attendance requirements and understands that permanent dismissal from the program will result if the policy is not met.
- The student agrees to continuously meet the minimum progress requirements and understands that permanent dismissal from the program will result if the policy is not met.
- The student and the School Director will both sign a Letter of Understanding prior to re-entrance.
- The student must have the School Director's signature on the re-enrollment form.

Failure to meet the above criteria will bar the student from re-entry for a minimum of one full year.

STANDARD OF PROGRESS, GRADING & GRADUATION REQUIREMENTS

Degree Program applicants will receive a grade report upon completion of each class. This grade report will contain the grade for the course as well as a cumulative grade point average. Diplomas will not be awarded until the successful completion of the program.

Certificate Program applicants will receive a grade report for the course as well as a certificate of completion upon successful completion of the course.

RECORD RETAINMENT

APT will maintain records for each student, whether or not the student completes the educational service, for a minimum of five years after class completion. *APT* maintains a comprehensive database on all students and courses. All information is archived after 10 years and kept at an offsite storage facility.

CONDUCT POLICY

Students, *APT* instructors and *APT* staff are expected to conduct themselves in an appropriate manner at all times. *Applied Professional Training* has adopted the DETC Code of conduct as hereby described. Violation of this policy is a just cause for dismissal from our training program.

As a student of a DETC accredited distance education institution, I recognize that in the pursuit of my educational goals and aspirations I have certain responsibilities toward my fellow distance learners, my institution, and myself. To fulfill these responsibilities, I pledge adherence to this Code of Conduct.

I will observe fully the standards, rules, policies, and guidelines established by my institution, the Accrediting Commission of the Distance Education and Training Council, BPPVE, and other appropriate organization serving an oversight role for my institution.

I will adhere to high ethical standards in the pursuit of my education, and to the best of my ability will:

- ✓ Conduct myself with professionalism, courtesy and respect for others in all of my dealings with the institution staff, faculty and other students.
- ✓ Observe the institutional policies and rules on submitting work, taking examinations, participating in online discussions and conducting research.
- ✓ Never turn in work that is not my own, or present another person's ideas or scholarship as my own.
- ✓ Never divulge the content of or answers to quizzes or examinations to fellow students.
- ✓ Never improperly use, destroy, forge, or alter my institution's documents, transcripts, or other records.
- ✓ (When applicable) Never divulge my online username or password.
- ✓ Always observe the recommended study schedule for my program of studies.
- ✓ Always report any violations of this Code of Conduct to the appropriate institution official, and report any evidence of cheating, plagiarism or improper conduct on the part of any student of the institution when I have direct knowledge of these activities.

EEO POLICY

Harassment/discrimination on the basis of an individual's race, religion, color, national origin, ancestry, physical disability, medical condition, marital status, sex, age, citizenship, veteran status, sexual orientation or any other basis prohibited by federal/state/local law is an unlawful employment practice under Title VII of the Federal Civil Rights Act of 1964. Any form of discrimination and/or harassment will not be tolerated by *APT*. Such behavior may be used as grounds for disciplinary action up to and including dismissal.

PLACEMENT ASSISTANCE / FINANCIAL ASSISTANCE

APT does not provide financial or placement assistance.

COUNSELING & ADVISING

Students who feel a need for counseling or advisement may feel at ease doing so with their instructor or School Director. Counseling and advising are conducted on an informal and open door policy.

COURSE WITHDRAWAL POLICY

To withdraw from a class, please submit a written notice to APT via email, fax, or letter, “ATTN: Admissions and Records” stating the student’s full name, date of birth, last four digits of his or her Social Security Number, email address, and course number from which the student wishes to withdraw. Once this request is processed, the student will receive a Course Withdrawal Letter and refund within 30 days pursuant to the Refund Policy. Specific fees paid for non-APT published materials may not be refunded if the materials are damaged. A grade of “W” will be assessed for any student withdrawing from the course after the start of class.

REFUND POLICY

Students have the right to withdraw from any current or upcoming course and may be eligible for a refund less the \$100 Registration Fee.

Resident Courses

- 100% refund less the registration fee* – requests submitted prior to the start date of class
- 90% refund less the registration fee – requests submitted on or after the first day of class but before the second day of class
- 75% refund less the registration fee – requests submitted after the first day of class but before 25% of class completion
- 50% refund less the registration fee – requests submitted after 25% of but less than 50% of class completion
- No refund - Withdrawal requests submitted at or after 50% of course completion are ineligible for a refund of tuition.

A student may be administratively dropped from the course on the first day of class for non-attendance. A 100% refund less the registration fee may be assessed.

**Withdrawal requests submitted within five (5) days of registration but before the first day of class are eligible for a 100% refund including the Registration Fee.*

Online Courses

If a student withdraws from a computer-taught course within the first five (5) days of registration,

the student is eligible for a full refund including the Registration Fee. After the five (5) day cooling off period has elapsed, where the student withdraws after completing at least one lesson assignment but less than 50 percent of the total course assignments, APT may retain the non-refundable Registration Fee plus a percentage of tuition based on the ratio of completed required lessons APT has received to the total lesson assignments required for course completion, which shall not exceed the following:

- Up to and including 10 percent of the course, 10 percent of the refundable tuition (tuition charges remaining after subtracting the non-refundable fee already retained). (90% student refund)
- Between 10 percent and 25 percent of the course, 25 percent of the refundable tuition. (75% student refund)
- Between 25 percent and 50 percent of the course, 50 percent of the refundable tuition. (50% student refund)
- After the student completes more than half the course, the institution shall be entitled to retain the entire total course tuition. (0% student refund)

COMPLAINT / GRIEVANCE PROCEDURE

Differences in interpretation of school policies and/or course content can arise among students, faculty and/or the administration. When such differences arise, usually a miscommunication or misunderstanding is a major contributing factor. For this reason, the Director of the school urges both students & staff to communicate any problems that arise directly to the individual(s) involved. If the problem cannot be resolved in this manner, the Director of the School should be contacted. Normally, the informal procedure of discussing the difference will resolve the problem. If the complaint cannot be resolved after exhausting the institution's grievance procedure, the student may be directed to the State of California, Department of Consumer Affairs, located at 1625 North Market, Sacramento, CA 95834, (916) 574-7720.

MESSAGE FROM THE EDUCATION DIRECTOR

Applied Professional Training takes pride in building long-term business relationships with its students. We listen, understand and track student input to establish strategies to take our students where they want to go now and in the future. *APT* is proud of the success our students have obtained as a result of our training. We look forward to providing you with useful technical skills that will improve your efficiency, effectiveness and overall technical capabilities.

CATALOG APPROVAL

All information in the content of this school catalog is current and correct and is so certified as true by Steven W. Blume, Education Director/Owner.



Steven W. Blume, Education Director

APPENDIX A

ELECTRIC POWER SYSTEM SPECIALIST

COURSE AND MODULE INFORMATION

Code	Electric Module	Description	Hours
Course 1: Electric Power Systems Introduction (#PWRCD-EPSI)			
A	ELC1021	Electrical Power Introduction	2
A2	ELC0431	Generators-Theory (Draft)	3
A4	FUN0071	Print Reading – Electrical	3
A5	FUN0563	Print Reading – Advanced	3
A6	FUN0061	Print Reading – Construction	2
AA1M	FUN0521	General Mathematics - Whole and Negative Numbers	1
AA2M	FUN0451	General Mathematics - English and Metric Conversions and Multiples of 10	1
AA3M	FUN0481	General Mathematics – Fractions	2
AA4M	FUN0441	General Mathematics – Decimals	2
AA5M	FUN0491	General Mathematics - Ratios and Percentages	2
AA6M	FUN0461	General Mathematics - Equations, Formulas and the Pythagorean Theorem	3
AA7M	FUN0471	General Mathematics - Exponents, Powers of 10, and Square Roots	3
AA8M	FUN0511	General Mathematics – Trigonometry	2
AC1	ELC0231	Electrical Circuits Introduction	3
AC2	ELC0232	Electrical Circuits – Intermediate	3
AC3	ELC0233	Electrical Circuits – Advanced	5
Sub-Total Hours			40

Course 2: Substation Equipment (PWRCD-SE)			
1B	ELC0621	Substation – Theory	2
2BC1	ELC0121	Circuit Breakers – Theory	2
2BC2	ELC0131	Circuit Breakers -Testing and Maintenance	2
2BC3	ELC1201	Reclosers - Testing and Maintenance	2
3BT1	ELC0771	Transformers – Theory	2
3BT2	ELC0671	Transformers - Connection Theory	2
3BT3	ELC1011	Transformers – Connections Three-Phase	3
3BT4	ELC0791	Transformers - Transformer Bank Installation	2
3BT5	ELC0801	Transformers - Testing and Maintenance	2
3BT6	ELC0751	Transformers - Single-Phase, Pad-Mount Installation (see ELC 0811)	2
3BT7	ELC0811	Transformers - Three-Phase, Pad-Mount Installation (see ELC 0751)	2
3BT8	ELC0761	Transformers - Single-Phase, Pole-Mount Installation	2
3BT9	ELC0741	Transformers - Pole-Mount Maintenance	2
3BT91	ELC0731	Transformers - Pad-Mount Maintenance	2
4BR1	ELC0821	Voltage Regulators – Theory	2
4BR2	ELC0981	Voltage Regulators - Line Installation	2
4BR3	ELC0831	Voltage Regulators - Testing and Maintenance	2
4BR4	ELC0471	Load Tap Changers – Theory	2
4BR5	ELC1101	Load Tap Changer and Voltage Regulator Theory (see ELC 0471)	2
4BR6	ELC1111	Load Tap Changers – Maintenance	2

5BS1	ELC0661	Switches – Theory	2
5BS2	ELC0641	Switches - Installation	2
5BS3	ELC0651	Switches - Maintenance	2
6BO1	ELC0101	Batteries – Theory	2
6BO2	ELC0091	Batteries, Chargers and Inverters	2
6BO3	ELC0081	Arresters	2
6BO4	ELC0111	Capacitors	2
6BO6	ELC0561	Substations - Equipment Installation	3
6BO7	ELC0521	Portable Substations	2
Sub-Total Hours			60

Course 3: Transmission and Distribution Facilities (PWRCD-TDF)			
1DO1	ELC0361	Electrical Power T&D System	2
1DO2	ELC0511	Poles – Installation	4
1DO3	ELC1421	Poles- Climbing Equipment	2
1DO4	ELC0151	Conductors - Overhead Installation	2
1DO5	ELC0951	Conductors - Overhead Joining and Terminating	3
1DO6	ELC0161	Conductors - Overhead Maintenance	3
1DO7	ELC0271	Electrical Line Tools	4
2DU1	ELC0072	Electric Services-Underground Installation (De-Energized)	3
2DU1	ELC0701	T&D Underground Systems – Theory	2
2DU2	ELC0171	Conduit-Theory and Installation	3
2DU3	ELC0711	T&D Underground Systems-Vault Equipment Installation	3
2DU4	ELC0181	Conductors - Underground Installation	3
2DU5	ELC0191	Conductors - Underground Joining and Terminating	4
2DU6	ELC0201	Conductors - Underground Maintenance	4
2DU8	ELC0141	Conductors Locating Underground	3
3DS1	ELC0381	Electric Services – Theory	4
3DS2	ELC0961	Electric Services - Overhead Installation	2
3DS3	ELC0971	Electric Services - Underground Installation	2
3DS4	ELC0601	Street Lighting	3
4DUN1	ELC0691	T&D Underground Systems – Network Maintenance	2
4DUN2	ELC0681	T&D Underground Systems-Network Cable Splicing	2
Sub-Total Hours			60

Course 4: Metering (PWRCD-MTR)			
E1	ELC0261	Electric Meter Theory	3
E2	ELC1551	Metering Math	2
E3	ELC0011	Nameplates and Form Numbers - Single Phase	2
E4	ELC1221	Single-Phase, Self-Contained Watt Hour Meter Testing	2
E5	ELC1231	Single-Phase, Transformer-Rated Watt-hour Meter Testing	2
E6	ELC1061	Electric Meters - Three Phase Transformer Connections	3
E7	ELC0911	Form Numbers - Poly-Phase, Self-Contained Meters	2
E8	ELC1561	Form Numbers – Poly-Phase, Transformer-Rated	2
E9	ELC1271	Three-Phase, Self-Contained Watt-hour Meter Testing	2
EB1	ELC1541	Electric Meters- Installation and Socket Connections, Self-Contained	2
EB2	ELC1281	Three-Phase, Transformer-Rated Watt-hour Meter Testing	2
EB3	ELC0351	Electric Meters - Three Phase Installation	3
EB4	ELC0931	Electric Meter - Installation and Socket Connections	3
EB5	ELC1571	Electric Meters – Installation and Socket Connections Transformer-Rated	2
EB6	ELC1141	Metering Conduit	2
EB7	ELC1131	Meter Shop Testing	2
EB8	ELC0301	Electric Meter Reading	2

EB9	ELC1181	Primary Metering	2
		Sub-Total Hours	40

Course 5: System Protection (PWRCD-SP)			
F	ELC0401	Faults	3
FP1	ELC0051	Relay Protection	2
FP2	ELC0541	Relays – Theory	2
FP3	ELC1191	Protection Schemes	3
FP4	ELC1171	Phase Analysis	2
FP5	ELC1751	Protective Tagging	3
FT	ELC1041	Live-Line Tool Testing	2
FT1	ELC0221	Diagnostic Methods	3
FT2	ELC0461	Instrument Transformers – Theory	4
FT3	ELC0451	Instrument Transformers-Testing	3
FT4	ELC1301	Voltmeter Testing	2
FT5	ELC1031	Electrical Insulating Equipment Testing	3
FT6	FUN0691	Rubber Gloves	3
FT7	FUN0111	Rubber Gloves and Other Rubber Protective Gear	3
FT8	FUN0281	Bucket and Boom Truck Insulation Testing	2
		Sub-Total Hours	40

Course 6: Telecommunications & Control (PWRCD-TC)			
G1	ELC0041	Introduction to Switching	4
G2	ELC0061	Introduction to a Substation (for Switching)	4
G3	FUN0151	Control Centers	3
G4	ELC1321	SCADA Systems – Basic	3
G5	FUN0031	Two-Way Radio Theory and Operation	3
G6	LC1291	Two-Way Radio – Installation and Maintenance	3
		Sub-Total Hours	20

Course 7: Inspection, Construction & Safety (PWRCD-ICS)			
HI1	ELC0591	Substations – Inspections	5
HI2	ELC1091	Inspector - Arrester, Battery, Charger, Inverter, and Capacitor Theory	3
HI3	ELC1391	Inspector - Construction	4
HI4	FUN0271	Hand Tools	4
HI5	FUN0261	Hoists	2
HO	FUN0331	Tailgate Meetings	2
HS1	SAF0151	Safety Rule Book	2
HS2	SAF0091	Fire Safety	3
HS3	FUN0291	Lifting and Moving Materials by Hand	3
HS4	SAF0009	Permit Required Confined Space	2
HS4	FUN0713	Ladders (see ELC 1401)	2
HS5	FUN0301	Ladders and Scaffolding	3
HS5	SAF0191	Lead Awareness	2
HS6	FUN0311	Oil Handling	3
		Sub-Total Hours	40

		Total Certificate Hours	300
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