AP DL 213 Drywall Acoustical Ceilings (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Identifies the materials and methods used for the installation of acoustical ceilings. Seismic codes, materials, and requirements are also reviewed. Installation for various grid systems will be discussed. Students will use the skills presented to complete an acoustical ceiling project as part of this course.

AP DL 214 Door/Door Frames (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Introduction to the basic installation of door frames and various types of doors. Lock sets, closures, hinges, panic hardware, and door sweeps will be discussed and demonstrated.

AP DL 215 Exterior Insulation Finish Systems (EIFS) (1.5)
1 hour lecture - 1½ hours laboratory
Note: *Cross listed as AP PL 215; may be taken 2 times*
Introduction to the basic working knowledge and technical skills needed to successfully install Exterior Insulation and Finish Systems EIFS (foam products) to meet industry specifications and standards. Introduction to the proper usage of products and materials will be discussed and used.

AP DL 216 Firestop/Fireproofing Procedures (1.5)
1 hour lecture - 1½ hours laboratory
Note: *Cross listed as AP PL 216; may be taken 2 times*
Emphasis on the correct methods, technical skills and firestop materials required to complete a Firestop System. Firestopping is a complete fire containment system designed to prevent the passage of fire, smoke and hot gasses from one side of a rated wall/ceiling assembly to another.

AP DL 217 Free-Form Lathing (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Introduction to the techniques and skills needed for construction of freeform lath projects. Layout techniques using grids and projection overlay will be presented. Methods for bending and shaping of rebar and pencil rod, lath handling and tying along with welding and cutting techniques will be demonstrated and applied.

AP DL 218 Automatic Finishing Tools (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Advanced instruction in blueprints, finish schedules, and machine parts identification, as well as proper use, assembly and breakdown of tools.

AP DL 220 Drywall Installation/Finish Trims (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Instruction in the basics of gypsum board application and finish trims.

AP DL 221 Advanced Hand Finishing (1.5)
1 hour lecture -1½ hours laboratory
Note: *May be taken 2 times*
In depth instruction in hand tool use. The different operations, phases, and materials to be used in order to have information of what a finished product should look like.

AP DL 222 Advanced Automatic Finishing Tools (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Instruction in the proper methods and sequences of the "bazooka," flat boxes, nail spotters and angle boxes.

AP DL 223 Advanced Lathing (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
This course will distinguish advance lathing methods and styles from basic application techniques for lath and trim products used on exterior-interior metal framing. Metal framing elements, various bead styles, lathing types and substrates will be covered in both discussions and lab activities. Proper leveling and finishing methods will be demonstrated. Students will apply lath and trim using the techniques presented to complete course projects.

AP DL 224 Ceiling and Soffit Finishing (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Designed to provide an advanced level of finishing skill for applications with architecturally detailed ceilings and soffits. Guided practice with a combination of hand and automatic tool techniques will promote the level of manipulative ability required for a successful result. A variety of finish trims will be integrated into each method of finish. Training will conclude with inspection criteria for evaluating finish levels.

AP DL 225 Wet Wall Finishes (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Presents the industry use, application methods, and product mediums typically used for wet wall finishes. The techniques and procedures used to achieve a level five finish to industry standards requires base and top coating of interior surfaces for inspection purposes. Selection and use of painting equipment and coatings will be included in the training.

AP DL 226 Reinforced Substrate Installations (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Presents the applications techniques and product considerations typical of reinforced substrate installations. The training will focus on Glass Fiber Reinforced Gypsum and Glass Fiber Reinforced Concrete (GFRG) & (GFRC) products. The lab project will include layout, cutting and handling practices, attachment methods, alignment and various related installation methods.

AP DL 227 Decorative Trims and Textures (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Provides advanced hand and automatic tool finishing techniques used in the application of decorative trims and special surface textures. Training includes product information for metal, paper, plastics and art beads. Special attention will be given to coating and sanding sequence of field and butt joints for selected surface textures.

AP DL 228 Drywall Applications (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
Focuses on the needed skills to properly handle and install drywall used in specialized applications including fire resistance, sound control, and life safety. Layout, cutting, attachment procedures and productivity techniques will be discussed and practiced under jobsite conditions. Drywall finishing methods will be incorporated into the hands-on activity.

AP DL 229 Advanced Metal Framing (1.5)
1 hour lecture - 1½ hours laboratory
Note: *May be taken 2 times*
A quick review of basic metal framing will be followed by detailed procedures for framing curved, serpentine, and elliptical non-load bearing partitions. Using standard light-gage components and other materials, the course project will emphasize advanced techniques to expedite work processes.

Electrician (AP E)

A five-year apprenticeship program. Applications for Riverside/San Bernardino/Mono/Inyo counties should apply to the Riverside and San Bernardino Joint Electrical Apprenticeship Training. Committees, 1855 Business Center Drive, San Bernardino, CA 92408. Telephone: (909) 890-1703.

A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		Units
AP E 101	Electrical Trade/Industry/DC/Conduit	4
AP E 102	Electrical Theory/Practice/Blueprint Reading	4
AP E 103	Inductance/Capacitance Theory	4
AP E 104	Transformers/Code Calculations/Conduit	4
AP E 105	Electronic/Industrial Blueprints	4

AP E 106	Grounding/Electrical Services/Connection	4
AP E 107	Motor Control/Pilot Devices/Starters	4
AP E 108	Digital Electronics	4
AP E 109	Mgmt/Alarms/Testing/Wiring	4
AP E 110	Programmable Logic Controllers	4
AP WE 113	Electrician Work Experience	16
TOTAL UNITS		**56**

COURSE OFFERINGS

AP E 101 Introduction to the Electrical Trade and Industry, DC Theory and Conduit Bending (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *Completion of the following: (1) One semester of Algebra 1 with a grade of 'C' or better; (2) Designated tests with a passing grade determined by the appropriate committee; (3) Indentured apprentice to the San Diego Electrical Joint Apprenticeship and Training Committee or the Riverside and San Bernardino Joint Electrical Apprenticeship Training Committee.*
Note: *May be taken 2 times*
Orientation to the electrical industry; introduction to the electrical code fundamentals of wiring methods, fastening devices, electrical conductors, circuits, and voltage.

AP E 102 Electrical Theory, Practice and Blueprint Reading (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 101*
Note: *May be taken 2 times*
Study of floor and plot plan; basic blueprint reading and circuit drawing; theory of magnetism; DC and AC generators; motors and transformers; on-the-job safety and first aid, and the electrical code.

AP E 103 Inductance and Capacitance Theory and Codeology (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 102*
Note: *May be taken 2 times*
Review of the International Brotherhood of Electrical Workers constitution and local union by-laws. Study of the effects of inductance and capacitance on current and voltage. Application of phase angle calculation and the National Electric Code. Overview of workplace problems due to drug abuse.

AP E 104 Transformers and Code Calculations, Conduit Bending and Blueprints (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 103*
Note: *May be taken 2 times*
Study of transformers theory, installation, connection and distribution systems. Performing short circuit calculations, selecting of building wire for specific applications, calculating loads for residential and multifamily loads and service feeders. Applying conduit bending principles using mechanical benders to fabricate segmented concentric bends.

AP E 105 Introduction to Electronics and Industrial Blueprints (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 104*
Note: *May be taken 2 times*
Introduction to basic electronics including examination of semiconductor devices, current and voltage manipulation, applications, and blueprint reading.

AP E 106 Grounding, Electrical Services, and Transform Three-Phase Connections (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 105*
Note: *May be taken 2 times*
Study of requirements for electrical services installation. Study of electrical grounding including merits, impact on safety, ground fault protection, and identification of grounding system elements and functions.

AP E 107 Electrical Motor Control, Pilot Devices, Starters and Relays (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 106*
Note: *May be taken 2 times*
Study of controls and circuits, pilot devices, starters, and relays. Includes the analysis and development of circuits, the installation and service of electrical equipment, and the electrical code.

AP E 108 Digital Electronics (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 107*
Note: *May be taken 2 times*
Introduction to digital electronic technology and electronic equipment. Instruction includes basic digital systems, binary and decimal numbering systems, decision-making logic circuits, Boolean Algebra, flip-flops, counters, shift registers, encoders, decoders, ROMs, DC to AC converters and organization of these component blocks to accomplish manipulation of data.

AP E 109 Management, Fire Alarms, High Voltage Testing, and Telephone and Security Wiring (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 108*
Note: *May be taken 2 times*
Introduction to management and marketing practices, installation of fire alarm systems and the National Electric Code as it relates to alarm installation and high voltage of telephone wiring and security systems.

AP E 110 Programmable Logic Controllers (4)
3 hours lecture - 3 hours laboratory
Prerequisite: *A minimum grade of 'C' in AP E 109*
Note: *May be taken 2 times*
Introduction to basic input/output hardware, processors and memory numbering systems associated with programmable controllers. Instruction includes use of personal computer to create and modify ladder diagrams and relay instructions, using solid state logic elements, counters, and shift registers. Principles of process control are explained and principle components are identified.

AP E 197 Electrical Topics (.5 - 4)
Units awarded in topics courses are dependent upon the number of hours required of the student. Any combination of lecture and/or laboratory may be scheduled by the department. Refer to Class Schedule.
Prerequisite: *Indentured apprentice to the San Diego Electrical Joint Apprenticeship and Training Committee or the Riverside and San Bernardino Joint Electrical Apprenticeship Training Committee*
Note: *May be taken 4 times*
Concentrated courses on electricity. Course title will designate subject covered.

Inside Wireman (AP IW)

A five-year apprenticeship program. Study of technical course development and delivery techniques for the electrical trade, utilizing classroom-proven techniques. The student will familiarize him/herself with classroom management, testing and assessment techniques, curriculum development and material presentation based on industry-standard and college level instructional methodologies. Applications for this program should be directed to the San Diego Electrical Training Trust, 4675 Viewridge Avenue, Suite D, San Diego, CA 92123. Telephone (858) 569-6633, ext. 111.

A.A. DEGREE MAJOR OR CERTIFICATE OF ACHIEVEMENT

Program Requirements		**Units**
AP IW 101	Introduction to the Electrical Trade	4
AP IW 102	Electrical Theory, Practice and Blueprint Reading	4
AP IW 103	Inductance and Capacitance Theory	4
AP IW 104	Transformer, Motors, and Motor Controls	4
AP IW 105	Special Electrical Systems	4
AP IW 106	Specialized Electrical Applications	4
AP WE 113	Electrician Work Experience	16

To satisfy a prerequisite, the student must have earned a letter grade of A, B, C or CR in the prerequisite course, unless otherwise stated. See Catalog addendum at http://www.palomar.edu/catalog/2011/ for updates and new program approvals.