

**PALOMAR COLLEGE**  
**COURSE OUTLINE OF RECORD FOR**  
**DEGREE CREDIT COURSE**

Transfer course     A.A. degree applicable course  
(check all that apply)

**COURSE NUMBER AND TITLE:** AP EL 102 – Electrical Lineperson II

**UNIT VALUE:** 4

**MINIMUM NUMBER OF SEMESTER HOURS:** 72

**BASIC SKILLS REQUIREMENTS:** Appropriate language and computational skills.

**ENTRANCE REQUIREMENTS**

**PREREQUISITE:** AP EL 101.

**COREQUISITE:** None.

**RECOMMENDED PREPARATION:** None.

**SCOPE OF COURSE:**

Designed to give the apprentice an overview of transmission and distribution systems (T&D), and the various components used in the utility industry. Additional topics will include high voltage AC power, study of electrical diagrams, safety in the workplace, and a section on rope, rigging, and hand signals.

**SPECIFIC COURSE OBJECTIVES:**

The student will be able to:

1. Practice standard safety procedures appropriate to the power utility industry.
2. Recognize and deal appropriately with hazardous materials in the power utility industry.
3. Describe the functions and characteristics of transmission and distribution systems and their components.
4. Apply the fundamentals of substation and switchyard equipment systems.
5. Recognize and define IID's basic transmission and distribution systems.
6. Analyze and apply basic skills in three phase power systems, and recognize delta and wye configurations, and their components.
7. Analyze basic problem solving skills in order to determine factors that may cause power loss and/or system deficiencies.

8. Describe and interpret the various electrical diagrams used in the maintenance of electrical systems.
9. Recognition and implement the various safety rules, regulations, and procedures that apply to electrical system maintenance personnel (CAL-OSHA/IID).
10. Analyze and describe the various fundamentals of overhead rigging, rope handling, and standard hand signals.

**CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:**

- I. Review of Rules and Regulations
  - A. Safety procedures
  - B. Working with hazardous waste
- II. Introduction to Transmission and Distribution Systems
  - A. Overview of transmission and distribution systems
  - B. Transmission systems and their components
  - C. Substation and switchyard equipment
  - D. Distribution systems and their components
  - E. System protection and monitoring
  - F. IID's transmission and distribution system
- III. AC Power Theory
  - A. Power and power loss
  - B. Inductance and inductive reactance
  - C. Capacitance and capacitance reactance
  - D. Resistance
  - E. Impedance
  - F. Power factor
  - G. Three phase power
  - H. Delta and wye configurations
  - I. Voltage regulator applications
  - J. Capacitor applications
- IV. Electrical Systems Diagrams
  - A. Introduction to electrical system diagrams
  - B. Construction diagrams
  - C. Specification manuals
  - D. Schematic diagrams
  - E. One-line diagrams
  - F. Plan-profile diagrams
  - G. Staking sheets
  - H. Framing diagrams
  - I. Map reading
- V. Safety in the Work Place
  - A. Review of industrial safety programs
  - B. Safety rules and regulations
    1. National Electrical Code
    2. Occupational Safety and Health Act (OSHA)
    3. Electrical Safety Code (CAL/OSHA)

- C. Safety in transmission and distribution systems
    - 1. Safety in transmission and distribution maintenance
    - 2. Electrical safety
  - D. Fire fighting - Using portable fire extinguishers
  - E. Review of CPR/First aid (Safety Coordinator)
  - F. Defensive driving (Safety Coordinator)
- VI. Rope, Rigging, and Hand Signals
- A. Introduction to rigging
  - B. Rope
  - C. Knot tying
  - D. Handlines
  - E. Block and tackle
  - F. Standard hand signals
  - G. Rigging to lift a conductor
  - H. Rigging to lift the strain from a conductor
  - I. Rigging to lift and move equipment
  - J. Using a gin pole

**REQUIRED READING:**

Electrical Lineman Training Committee. Imperial Irrigation District's Lineman Apprenticeship Training Handbook. Imperial, CA: Imperial Irrigation District, 1990.

**SUGGESTED READING:**

Kurtz, Edwin D., and Thomas M. Shoemaker. The Lineman and Cableman's Handbook. 8th edition. New York: McGraw-Hill, 1992.

**REQUIRED WRITING:**

Written homework assignments consisting of nine to ten pages in length, which involve problem-solving analyzation in construction measurements.

**OUTSIDE ASSIGNMENTS:**

**Students are expected to spend a minimum of three hours per unit per week in class and on outside assignments, prorated for short-term classes.**

Outside class assignments will include reading assigned textbooks, handouts, completion of exercises, periodic research, critiquing and analyzing problems, and attending safety meetings.

**INSTRUCTIONAL METHODOLOGY:**

**Check all that apply:**

- lecture
- laboratory
- lecture-laboratory combination
- directed study

This course may be offered as a distance learning course and meets Title 5 regulations 55370, 55372, 55374, 55376, 55378, and 55380.

Yes \_\_\_\_\_ No x

If yes, check all that apply.

- \_\_\_\_\_ Television Course (Video one-way, e.g. ITV, video cassette, etc.)
- \_\_\_\_\_ Online Course (Text one-way, e.g. newspaper, correspondence, electronic file, etc.)
- \_\_\_\_\_ Two-Way Video Conferencing (Two-way interactive video and audio)
- \_\_\_\_\_ One-Way Video Conferencing (One-way interactive video and two-way interactive audio)
- \_\_\_\_\_ Computer Assisted Instruction (A specialized form of mediated instruction relying primarily on student access to information and prepared lessons or teaching materials through a computer terminal, but not under immediate supervision of a qualified instructor.)

**GRADING POLICY AND STANDARDS** (include methods of determining whether the stated objectives have been met by students):

Augmented with a performance review to determine if all course objectives have been met –

Class Participation	20%	A = 100-90
Homework	20%	B = 89-80
Laboratory	20%	C = 79-70
Quizzes	20%	F = Below 70
Pre-test/Final exam	<u>20%</u>	
	100%	

**IS COURSE REPEATABLE FOR REASON(S) OTHER THAN DEFICIENT GRADE?**

Yes x No \_\_\_\_\_ Number of times course may be taken for credit: 2

If yes, identify specific provision of Title 5 Division 2 section(s), 55761-55763 and 58161 which qualifies course as repeatable: 58161 Part C 2A

**CONTACT PERSON:** Director, Vocational Programs, Ext. 2286

**SIGNATURES:**

SIGNATURES ON FILE