

**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 SC 103 Electrical Theory and Practices AC

**UNIT VALUE:** 4

**MINIMUM NUMBER OF SEMESTER HOURS:** 96

**BASIC SKILLS REQUIREMENTS:**

Appropriate language and computational skills.

**ENTRANCE REQUIREMENTS:**

**PREREQUISITE:** Apprenticeship Sound and Communication Systems  
Installer 102

**COREQUISITE:** None.

**RECOMMENDED PREPARATION:** None.

**SCOPE OF COURSE:**

Study of apprenticeship, electrical inductance, capacitance and reactance, including grounded conductors, branch circuits, transformer principles, RCL circuits and filters.

**SPECIFIC COURSE OBJECTIVES:**

The student will be able to:

1. Identify various types of capacitors.
2. Explain capacitance and capacitive reactance.
3. Compare and contrast pure resistive circuits with circuits containing capacitance.
4. Evaluate the effect of capacitance in alternating current (AC) circuits by performing calculations for capacitive reactance.
5. Anticipate resultant phase angle changes for discrete change in capacitance values and frequency changes.
6. Demonstrate use of an oscilloscope when working with AC circuits.

7. Identify, select and troubleshoot the major forms of filters, components and circuits.
8. Identify and demonstrate effects of inductive reactance, capacitive reactance and impedance in an AC circuit.
9. Design and troubleshoot basic series and parallel tuned circuits.
10. Analyze filters and tuned circuits by using the oscilloscope and other measuring devices.
11. Identify and demonstrate basic communication circuits including audio and simple radio-frequency circuits.
12. Identify and demonstrate basic superheterodyne radio circuits by using the block diagram and signal processing.
13. Identify, select and install broadband cabling per job specifications.
14. Identify, diagnose and repair problems due to stray static or improper grounding.
15. Identify and install line-protecting equipment found in a central office, a subscriber station, an antenna site and in distribution cabling.
16. Analyze and determine locations for a drop-wire installation based on safety and code.
17. Make unobtrusive openings in walls, floors and ceilings of buildings when installing CATV cable.
18. Identify, select and use the proper tools when installing CATV cable and protection devices.
19. Identify, select and install the proper CATV jacks and connectors per industry specifications.
20. Analyze and demonstrate the use of the specialized test equipment while diagnosing problems due to line loss, static, open or shorted lines.
21. Analyze and demonstrate fundamental safety policies and procedures applicable to the CATV systems, tools and test equipment.
22. Analyze and demonstrate the ramifications and corrections of co-channel and adjacent channel interference.
23. Identify the three major elements of a TV composite signal.
24. Identify and demonstrate the basic CATV concepts which are employed in the antenna site, the head-end, distribution system and the subscriber connection.

25. Identify, select and install the proper line amplifiers and couplers for a cable run.
26. Identify, locate and repair problems in a cable system using special CATV test equipment as well as standard meters and equipment.
27. Identify and demonstrate antenna selection and placement.
28. Distinguish cable problems from subscriber TV problems.
29. Identify and demonstrate the uses of Closed Circuit Television (CCTV) systems.
30. Identify and diagnose problems in basic CCTV system components as well as complete system installations.
31. Analyze and explain the IBEW constitution and Local Unions 440 and 477 by-laws.

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

- I. Apprenticeship Job Information
  - A. Your job and its future
  - B. Motivation and leadership
  - C. Marketing
  - D. IBEW constitution
  - E. Local union by-laws
  - F. Parliamentary procedure
- II. Electrical Theory
  - A. Alternating current
  - B. Capacitance and capacitors
  - C. Capacitive reactance, circuits
  - D. Test and applications
- III. CATV-CCTV
  - A. Broadband cabling, installation
  - B. Tool selection and safety
  - C. TV composite signal
  - D. Antenna site and the head end
  - E. Line amplifiers
  - F. Troubleshooting CATV common problems
  - G. Troubleshooting CCTV common problems

**REQUIRED READING:**

- Cook, Nigel. Introductory DC/AC Electronics. 2nd edition. Englewood Cliffs, NJ: Prentice Hall, 1992.
- Cooper, Edward. Broadband Network Technology. Englewood Cliffs, NJ: Prentice Hall, 1984.
- IBEW Constitution. Washington, DC: International Brotherhood of Electrical Workers, 1992.

Milaf, Harry. Electricity One-Seven. Indianapolis, IN: Hayden Books, 1989.

NJATC Second Year Student Workbook. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1991.

Sams, Howard. CATV Handbook. Indianapolis, IN: Hayden Books, 1989.

**SUGGESTED READING:**

Croft, Terrell. American Electrician Handbook. New York: McGraw Hill, 1987.

**REQUIRED WRITING:**

Completion of written assignments in student workbook which are at least one paragraph in length.

**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.**

Completion of reading assignments, student workbook applications and attendance at union and JATC meetings as required.

**INSTRUCTIONAL METHODOLOGY:**

Check all that apply:

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

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

Yes  No

**If yes, check all that apply.** (See guidelines for preparation for definitions.)

- telecourse
- mediated instruction
- computer assisted instruction

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

Homework/Participation	5%	100 - 90 = A
Quizzes/Workbook	30%	89 - 80 = B
Unit Exams/Final Exam	65%	79 - 75 = C
	100%	74 and below = F

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

Yes  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: 58161-1-C

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