

PALOMAR COLLEGE
COURSE OUTLINE OF RECORD FOR
DEGREE CREDIT COURSE

 X Transfer course X A.A. degree applicable course

(check all that apply)

COURSE NUMBER AND TITLE: AP SC 104 Semiconductor Electronics

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 103

COREQUISITE: None.

RECOMMENDED PREPARATION: None.

SCOPE OF COURSE:

Study of solid-state electronic theory and components, diodes, transistors, SCR, triacs, diacs, IC amplifiers and operational amplifiers.

SPECIFIC COURSE OBJECTIVES:

The student will be able to:

1. Identify and demonstrate the physical makeup of semiconductor diodes including the cathode, anode and barrier region.
2. Analyze and evaluate the condition of semiconductor diodes by using common measuring equipment.
3. Identify various types of circuits which utilize diodes.
4. Compare and contrast the operation of semiconductor devices; diodes, thyristors, zenor diodes, light emitting diodes (LED), transistors, diacs, triacs and mosfets.
5. Identify and evaluate amplifying characteristics of transistor amplifiers by constructing circuits and analyzing circuit operation by taking voltage, current measurements and observing wave forms with oscilloscopes.

6. Solve novel problems in the construction of basic amplifier circuits.
7. Evaluate operational amplifier circuit operation and verify results through circuit measurements and analysis.
8. Identify and demonstrate use of basic communication circuits including audio and simple radio frequency circuits.
9. Identify and demonstrate use of basic superheterodyne radio circuits by using the block diagram and signal processing.
10. Explain the nature of soundwaves.
11. Describe the electrical representation of sound.
12. Explain phase as it pertains to sound waves.
13. Explain the basic purpose of a sound system.
14. Identify and demonstrate use of input and output transducers.
15. Design a practical model of a sound system.
16. Describe frequency response of practical audio devices, voice and instrument ranges and effects of acoustical factors.
17. Explain decibel and sound level.
18. Explain decibel calculations.
19. Explain RMS, loudness, volume level and gain.
20. Explain dynamic range and head room.
21. Explain sound propagation outdoors and indoors.
22. Identify and explain inverse square law environmental factor, feedback, boundaries, standing waves, reverberation and critical distance.
23. Identify and describe six different types of microphones; microphone design, electrical characteristics and application.
24. Identify and demonstrate use of preamplifiers and mixing consoles.
25. Demonstrate knowledge of power amplifiers.
26. Analyze and evaluate loud speakers for various directional characteristics and selection for acoustical environment.
27. Analyze and describe various types of signal processing equipment and applications.
28. Identify and demonstrate use of various sound system test equipment.

29. Identify and select proper cable and installation method for typical acoustical installations.
30. Explain basic theory of synchronization and time code.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

- I. Electronics and Electricity
 - A. Semiconductor fundamentals
 - B. Diodes
 - C. Transistors and thyristors
 - D. Basic amplifiers
 - E. Operational amplifiers
- II. Sound Reinforcement Basics
 - A. Sound waves
 - B. Phase
 - C. Adding sinewaves
 - D. Input/output transducers
 - E. Frequency response
 - F. Sound level-decibel
 - G. Dynamic range
 - H. Indoor/outdoor sound
 - I. Microphones
 - J. Mixers/preamps

REQUIRED READING:

Cook, Nigel. Introductory DC/AC Electronics. Englewood Cliffs, NJ: Prentice Hall, 1992.

Davis, Gary and Ralph Jones. Sound Reinforcement Handbook. 2nd edition. Milwaukee, WI: HP Hal Leonard Publishing Corp., 1990.

Dugger, William and Howard Gerrish. Electricity and Electronics. South Holland, IL: Goodhart-Wilcox, 1989.

IBEW Constitution. Washington, DC: International Brotherhood of Electrical Workers, 1992.

Local 440-477 IBEW. Local Union By-Laws, 1991.

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

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

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
	<u>100%</u>	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