

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 105 Introduction to Digital Electronics
and Signaling Devices

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 104

COREQUISITE: None.

RECOMMENDED PREPARATION: None.

SCOPE OF COURSE:

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.

SPECIFIC COURSE OBJECTIVES:

The student will be able to:

1. Justify the advantages of using digital technology.
2. Identify the major application of digital techniques in electrical and electronics equipment.
3. Apply the principles of the numbering system and make conversions between decimal and binary number systems.
4. Explain the functioning of digital logic gates.
5. Identify the major components used in implementing digital circuits and explain how they operate.

6. Identify the most frequently used combination logic circuits and explain their operation.
7. Anticipate problems and how they may be resolved through the application of understanding digital system organization and sequencing schemes.
8. Identify types of data conversion and explain how they function, giving examples of their operation.
9. Explain functioning of a programmable logic control system.
10. Apply principles of programming logic and create sample programs.
11. Identify eight basic functions of a typical telephone set.
12. Construct and troubleshoot a multimeter.
13. Construct and troubleshoot a telephone set.
14. Identify the basic loop circuit between the central office switching equipment and the subscriber's telephone.
15. Analyze the proper methods of differentiating between telephone set, line and central office problems.
16. Identify the various methods of networking through various telephone exchanges.
17. Evaluate and diagnose problems in the signal levels of a typical telephone system.
18. Identify how multiplexing is used to carry more than one data/voice communication through a local loop.
19. Diagnose signal levels using the power level decibel formulas and appropriate test equipment.
20. Evaluate and troubleshoot dial and tone pulses as found in common telephone set.
21. Select and use the proper tools and test equipment when troubleshooting telephone sets, lines and switching equipment.
22. Identify the basic features and functions of a microcomputer telephone set to the block diagram level.
23. Install telephone patch panels and terminal blocks per industry specifications.
24. Identify the basics of digital telephone transmission circuits and techniques.
25. Identify the basics of voice and data integration in a typical telephone system.

26. Identify the past, present and future projections of Local Area Networks (LANs).
27. Identify the Ethernet network architecture.
28. Identify the Institute of Electrical and Electronics Engineers (IEEE) 802.1,.2,.3,.4,.5 standards in LAN design and interconnections.
29. Identify Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access schemes.
30. Identify polling, slotted loop access and other miscellaneous access schemes.
31. Identify the Token Ring and Token Bus configurations.
32. Identify the Broadband LAN's using Frequency Division Multiplexing (FDM).
33. Identify the various backbone cable distribution systems in use with LAN's.
34. Identify the various common protocols of hardware and software to ensure accurate transmission of data.
35. Identify and connect various common printers, modems, terminals, computers, etc., to Local Area Networks.
36. Utilize specialized test equipment to diagnose problems in the transmission of data throughout LAN's.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

I. Safety

II. Digital Basics

- A. Electronics: analog and digital
- B. Numbering systems and codes
- C. Logic gates
- D. Logic circuit simplification with boolean expressions
- E. Integrated circuit construction
- F. Bipolar and mos integrated circuits
- G. Troubleshooting logic gates

III. Digital Circuits

- A. Decoders and encoders
- B. Multiplexers, demultiplexers, comparators and parity circuits
- C. Set-reset and data-type flip-flops
- D. JK flip-flop and timer circuits
- E. Registers
- F. Counters
- G. Arithmetic operations and circuits
- H. Memory circuits and programmable logic devices
- I. Analog and digital signal converters

IV. Telephony

- A. Eight basic functions of a typical telephone set
- B. Troubleshooting a telephone set
- C. Loop circuit
- D. Telephone exchange networking
- E. Typical signal level on telephone system

REQUIRED READING:

Cook, Nigel. Introduction to Digital Technology. Columbus, OH: Merrill Publishing Co., 1993.

Cook, Nigel. Introductory DC/AC Electronics. 2nd edition. Englewood Cliffs, NJ: Prentice Hall, 1992.

Lee, Frank. ABC of the Telephone/Station Installation and Maintenance. Geneva, IL: ABC Teletraining Inc., 1986.

Lee, Frank. Telephone Theory/Principles and Practice Volume 1. Geneva, IL: ABC Teletraining Inc., 1988.

SUGGESTED READING:

None.

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 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: 58161-1-C

CONTACT PERSON: Director, Vocational Programs, Ext. 2286