

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 E 107 Electrical Motor Control, Pilot Devices, Starters and Relays

UNIT VALUE: 4

MINIMUM NUMBER OF SEMESTER HOURS: 96

BASIC SKILLS REQUIREMENTS:

Appropriate language and computational skills.

ENTRANCE REQUIREMENTS

PREREQUISITE: Apprenticeship Electrician 106

COREQUISITE: None.

RECOMMENDED PREPARATION: None.

SCOPE OF COURSE:

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. CSU

SPECIFIC COURSE OBJECTIVES:

The student will be able to:

1. Evaluate typical problems encountered with lightning strikes and develop grounding systems to minimize damage which might occur.
2. Compare characteristics of different types of motors, make evaluations and select most appropriate motor for specific applications.
3. Demonstrate ability to properly connect motors for different voltages and configurations.
4. Identify and explain the operation of thermal and magnetic relays.
5. Compare and contrast the different types of magnetic relays and special applications governing their uses.
6. Identify DOE/DODE symbols of timing contacts.
7. Identify and explain the purpose of all contacts on motor starter contactors.

8. Draw and identify two and three wire circuits, schematic symbols of circuit control devices, and complete wiring, conduit, and conductor diagrams.
9. Explain and draw schematic for a multiple locations push-button start stop control circuit.
10. Evaluate sequential operation of electrical control systems using schematic diagrams.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

- I. Orientation and Job Applications
 - A. Industry Pride
 - B. Lightning
 - C. Lightning Protection Devices
 - D. Introduction to Motors, Motor Constructions
 - E. Motor Nameplate Specifications
- II. Motors
 - A. Fractional Horsepower
 - B. Repulsion
 - C. Universal
 - D. Polyphase
 - E. Installation
- III. Motor Control
 - A. General Principles
 - B. Manual Starters and Magnetic Coils
 - C. Overload Protection and Magnetic Starters
 - D. Control Devices and Symbols I
 - E. Control Devices and Symbols II
 - F. 2-Wire Control
 - G. 3-Wire Control
 - H. Schematic Drawings I
 - I. Wiring Diagrams I
 - J. Reversing and Sequential
 - K. Jogging and Plugging
 - L. Schematic Drawings II
 - M. Wiring Diagrams II
 - N. SC Motors and Controls
 - O. DC Solid State Controls
 - P. Stepper Motors
 - Q. AC Motors
 - R. AC Motors Starters I
 - S. AC Motors Starters II
 - T. Wound Rotor Controls
 - U. Synchronous Motor Control
 - V. Clutches and Drives
 - W. Applications
 - X. Variable Speed Control

REQUIRED READING:

Fourth Year Student Workbook. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1996.

Herman, Stephen I and Walter N. Alerich. Industrial Motor Control. Third Edition. New York: Delmar Publishers, 1993.

National Electrical Code. Quincy, MA: National Fire Protection Association, 1996.

Shultz, George Patrick. Transformers and Motors. Carmel, Indiana: Sams, Div. of Prentice Hall Publishing, 1995.

SUGGESTED READING:

Croft T., and W. Summers. American Electrician Handbook. New York: McGraw-Hill, 1987.

National Electrical Code Handbook. Quincy, MA: National Fire Protection Association, 1992.

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.

Outside assignments include 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 X

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):

5%	Workbook	A = 90-100
10%	Participation	B = 83-89
70%	Unit exams	C = 75-82
15%	Final exam	F = 74 and below

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 IIA

CONTACT PERSON: Director, Vocational Programs, Ext. 2286