

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 E 106 Grounding, Electrical Services, and Transform Three-Phase Connections.

UNIT VALUE: 4

MINIMUM NUMBER OF SEMESTER HOURS: 96

BASIC SKILLS REQUIREMENTS:

Appropriate language and computational skills.

ENTRANCE REQUIREMENTS

PREREQUISITE: Apprenticeship Electrician 105.

COREQUISITE: None.

RECOMMENDED PREPARATION: None.

SCOPE OF COURSE:

Study of requirements for electrical services installation. Study of electrical grounding including merits, impact on safety, ground fault protection, and identification of grounding system elements and functions.

SPECIFIC COURSE OBJECTIVES:

The student will be able to:

1. Identify correct code application in the design of electrical system grounding when size of conductors and application procedures are of paramount concern.
2. Identify and explain the purpose and requirement for ground fault protection when electrical systems are installed.
3. Explain the requirements for dual services in a single building.
4. Calculate service feeders sizes for building with industrial loads.

5. Make transformer connection for 3 phase transformer in WYE and Delta schemes.

CONTENT IN TERMS OF SPECIFIC BODY OF KNOWLEDGE:

- I. Grounding
 - A. Intro to Article 250 NEC
 - B. Grounding Safety
 - C. Electrical Theory and Grounding
 - D. Faults
 - E. Grounding Electrode System
 - F. Grounding Electrode Conductor
 - G. System Circuit Grounding
 - H. Main Bonding Jumper and Equipment Grounding Conductor
 - I. Equipment and Enclosure Bonding
 - J. Equipment Grounding
 - K. Grounded Circuit Conductor
 - L. Ground Fault Protection
 - M. Separately Derived Systems
 - N. Earth Testing Principles and Methods
- II. Transformers
 - A. Theory and 3 Phase Connections
 - B. Overcurrent Protection
- III. Services
 - A. Services and Service Feeders
 - B. Branch Circuits
 - C. General Lighting
 - D. Outside Branch Circuits Feeders
- IV. National Electric Code
 - A. General Wiring Methods
 - B. Overcurrent Protection
 - C. Fuses and Circuit Breakers

REQUIRED READING:

- Applied Codeology. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1991.
- Cox, Richard A. Conduit Bending. 2nd edition. Spokane, WA: Pend Orielle, 1982.
- Hart, George V. Ugly's Electrical References. Houston: United Printing Arts, Inc., 1986.
- Herman, Stephen L. Delmar's Standard Textbook of Electricity. Albany, NY: Delmar Publishers, Inc., 1995.

Mathematics Essential for NJATC Courses. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1994.

National Electrical Code. Quincy, MA: National Fire Protection Association, 1993.

NJATC Blueprint Reading. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1993.

NJATC Code Calculations. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1993.

NJATC Manufacturing Plant Industrial Print Set. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1993.

NJATC Residential Print Set. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1993.

NJATC Test Instruments. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee, 1991.

O'Riley, Ronald O. Electrical Grounding. Third edition. Albany, NY: Delmar, 1993.

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

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

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.

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):

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 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