Degree Applicable

Glendale Community College
March 2013

COURSE OUTLINE

Industrial Technology 158
Verdugo Power Academy II

I. Catalog Statement

The Verdugo Power Academy II is the second course in a two course series that prepares candidates for an Electrical Line Mechanic (ELM) position. Development of basic skills needed to be successful candidates is emphasized. These skills include: overall safety considerations, power pole climbing skills, knowledge of the basic tools and materials involved with the electrical theory that is specific to this trade. A 175 hour power pole-climbing certificate of completion is granted to students who successfully complete this course.

Total Lecture Units: 4.0
Total Laboratory Units: 6.0
Total Course Units: 10.0

Total Lecture Hours: 64.0
Total Laboratory Hours: 296.0
Total Faculty Contact Hours: 360.0

Prerequisite: Industrial Technology 157.

Note: Students during the course of instruction will be required to lift up to 60 lbs with repetition and will be required to climb and perform installation and maintenance operations at the top of 30 foot power poles. Physical or psychological limitations should be taken into account when enrolling in the class.

Note: A maximum of 17.5 units will be granted for any combination of ITECH 155, ITECH 157 and ITECH 158.

II. Course Entry Expectations

Skills Level Ranges: Reading 5; Writing 5; Listening/Speaking 5; Math 3.

Prior to enrolling in the course, the student should be able to:
1. describe electrical theory;
2. identify hot line tools and their use;
3. explain personal protective grounding practices;
4. explain single and three-phase construction;
5. explain grounding principles;

6. explain conductor handling and control;
7. explain transformer operation;
8. explain the purpose of substations;
9. explain underground equipment operations;
10. describe the characteristics of conductors, insulators, and semi-conductors;
11. apply electrical formulas to circuit problem solving;
12. explain the rules for installation and maintenance of electric supply stations and equipment;
13. describe hazards of electrical system components;
14. describe terms and definitions of the trade;
15. perform common aerial lift operations.

III. Course Exit Standards

Upon successful completion of the required coursework, the student will be able to:

1. demonstrate fall arrest equipment for pole climbers;
2. demonstrate pole climbing procedures;
3. demonstrate crossarm installation and removal;
4. demonstrate belting and unbelting procedures;
5. apply splicing sleeves and mechanical jumpers; preformed and hand tied.

IV. Course Content — Total Faculty Contact Hours = 360

A. Power Line Reconductoring — Lecture 6 hours / Lab 18 hours
   1. Overhead replacement practices
   2. Line induction considerations
   3. Equipment and tooling

B. Single-Phase Transformers, Regulators, and Capacitors — Lecture 6 hours / Lab 18 hours
   1. Single-phase connections
   2. Single-phase taps
   3. Capacitive reactance
   4. Regulator ballasts

C. Substation Equipment Operations — Lecture 8 hours / Lab 8 hours
   1. Air-insulated and gas-insulated
   2. Switchgear
   3. High and low voltage bussing

D. Three-Phase Transformers — Lecture 6 hours / Lab 18 hours
   1. Wye and Delta systems
   2. Phase designations
   3. Phase rotation

E. Troubleshooting Customer Line Service Complaints — Lecture 6 hours / Lab 18 hours
   1. Response Time

2. Fault isolation

F. Overhead and Underground System Maintenance — Lecture 8 hours
   1. Preventive maintenance practices — Lab 16 hours
   2. Failure maintenance practices

G. Overhead Equipment Installation — Lecture 6 hours
   1. Transformer removal and installation — Lab 18 hours
   2. Capacitor removal and installation
   3. High voltage switches and fuses

H. Overhead Line Construction — Lecture 7 hours
   1. Crossarm installation — Lab 18 hours
   2. Insulator installation
   3. Hardware and tools

I. Wood Pole Climbing Techniques — Lecture 11 hours
   1. Use and care of pole climbing equipment — Lab 164 hours
   2. Pole climbing practices
   3. Pole-top rescue

V. Methods of Instruction

The following methods of instruction may be used in the course:
1. lecture;
2. demonstration;
3. multimedia presentations;
4. simulated field work.

VI. Out of Class Assignments

The following out of class assignments may be used in the course:
1. individual projects (e.g. written assignments, reading reports);
2. group projects (e.g. homework problems, problems solving demonstrations, discussion on textbook topics).

VII. Methods of Evaluation

The following methods of evaluation may be used in the course:
1. midterm examination;
2. final examination;

3. manipulation skills evaluation (e.g. Pole climbing, overhead line construction and equipment installation).

VIII. Textbook

Kurtz and Shoemaker, *The Lineman and Cableman's Handbook*, [Current Edition]. Hightstown, N.J.: McGraw Hill, 2009.
10th Grade Textbook Reading Level. ISBN: 978-0-071-46789-6

IX. Student Learning Outcomes

1. Student will know how to install and uninstall various electrical equipment.
2. Student will demonstrate electrical safety and climbing safety.