

## Clackamas Community College

### Online Course/Outline Submission System

---

Show changes since last approval in red

[Print](#)[Edit](#)[Delete](#)[Back](#)[Reject](#)[Publish](#)

#### Section #1 General Course Information

**Department:** Apprenticeship

**Submitter**

First Name: Shelly

Last Name: Tracy

Phone: 0945

Email: shellyt

---

**Course Prefix and Number:** APR - 121UE

---

**# Credits:** 4

**Contact hours**

Lecture (# of hours): 44

Lec/lab (# of hours):

Lab (# of hours):

Total course hours: 44

For each credit, the student will be expected to spend, on average, 3 hours per week in combination of in-class and out-of-class activity.

---

**Course Title:** Line Estimator Theory I: Operations

**Course Description:**

Principles and concepts of electrical laws, codes, work safety habits, electrical calculations and electrical apparatus for power line work. Focus is on installation process for transformers, test equipment and field equipment.

---

**Type of Course:** Career Technical Apprenticeship

Can this course be repeated for credit in a degree?

**No**

Does this course map to any general education outcome(s)?

**No**

Is this course part of an AAS or related certificate of completion?

**Yes**

**Name of degree(s) and/or certificate(s):** Electrician Apprenticeship Technology AAS

Are there prerequisites to this course?

**No**

Are there corequisites to this course?

**No**

Are there any requirements or recommendations for students taken this course?

**Yes**

**Recommendations:** None

**Requirements:** Accepted into the Line Estimator apprenticeship program

Are there similar courses existing in other programs or disciplines at CCC?

**No**

Will this class use library resources?

**Yes**

Have you talked with a librarian regarding that impact?

**No**

Is there any other potential impact on another department?

**No**

Does this course belong on the Related Instruction list?

**No**

GRADING METHOD:

A-F Only

**Audit:** No

When do you plan to offer this course?

✓ Not every term

Is this course equivalent to another?

If yes, they must have the same description and outcomes.

**No**

Will this course appear in the college catalog?

**No**

Will this course appear in the schedule?

**No**

**Student Learning Outcomes:**

Upon successful completion of this course, students should be able to:

1. list and explain laws and codes that govern electric utility operations and dictate performance standards,
2. discuss work safety habits and the major provisions of the OSHA Hazard Communication Standard,
3. identify electrical apparatus for outside power line work,
4. describe mounting methods used for different size distribution transformers,
5. summarize the advantages of using a CSP transformer over a conventional transformer and explain the relationship of mutual inductance to the operation of transformers,
6. compare and contrast the different types of distribution circuits,
7. solve DC theory equations and other mathematical and electrical problems using Ohm's Law formulas and square root calculations,
8. outline factors considered by the courts in sexual harassment cases,
9. explain the basics of and safety precautions for wye-delta, delta-wye, and open delta configurations and describe the uses of each;
10. interpret transformer nameplate data and differentiate between those that are additive and those that are subtractive in polarity,
11. list and describe the principle parts of a generator,
12. explain the basic principles of voltage drop, including line loss or drop.

---

***This course does not include assessable General Education outcomes.***

---

**Major Topic Outline:**

1. Electrical Principles
  - a. Laws that govern electric utility operations
  - b. Codes that dictate performance standards
  - c. Work safety habits
  - d. Electrical apparatus for outside power line work
2. Line Estimator Theory I: Operations Topics
  - a. Mounting methods used for different size distribution transformers
  - b. Advantages of using a CSP transformer over a conventional transformer
  - c. Relationship of mutual inductance to the operation of transformers
  - d. Types of distribution circuits
  - e. Calculate square roots in class and the job, which will enable solving of many mathematical/electrical problems
  - f. Basic Ohm's Law formulas as they apply to DC theory
  - g. Factors which are considered by the courts in sexual harassment cases
  - h. Connections for three-phase transformer banks, at various voltages, connected in the following configurations: wye-delta, delta-wye, open delta

- i. Safety procedures for connecting wye and delta configurations
- j. Uses of different wye and delta three-phase systems
- k. Transformers that are additive and those that are subtractive in polarity
- l. Transformer nameplate data
- m. Principle parts of a generator
- n. Basic principles of voltage drop (line loss or line drop)
- o. Major provisions of the OSHA Hazard Communication Standard

Does the content of this class relate to job skills in any of the following areas:

- |                                      |           |
|--------------------------------------|-----------|
| 1. Increased energy efficiency       | <b>No</b> |
| 2. Produce renewable energy          | <b>No</b> |
| 3. Prevent environmental degradation | <b>No</b> |
| 4. Clean up natural environment      | <b>No</b> |
| 5. Supports green services           | <b>No</b> |

Percent of course: 0%

First term to be offered:

**Next available term after approval**

:

---