

**Clackamas Community College**  
Online Course/Outline Submission System

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**Section #1 General Course Information**

**Department:**Apprenticeship

**Submitter**

First Name: Shelly

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**Course Prefix and Number:**APR - 233UL

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**# Credits:**5

**Contact hours**

Lecture (# of hours): 55

Lec/lab (# of hours):

Lab (# of hours):

Total course hours: 55

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.

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**Course Title:**Outside Electrical Advanced Theory III

**Course Description:**

Instruct third year, third term apprentices on outside electrical apprenticeship training as it applies to primary fusing and fuse principles, reclosers and sectionalizers, substation equipment, line fault current and voltage regulation, capacitors, power factor/harmonics, fiber optics including: fiber type, cable type, codes and standards, aerial construction, and underground construction, alternative energy sources and journeymen responsibilities.

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**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):**Electrical Apprenticeship Technologies AAS

Are there prerequisites to this course?

**Yes**

**Pre-reqs:**APR-232UL

**Have you consulted with the appropriate chair if the pre-req is in another program?**

**No**

Are there corequisites to this course?

**No**

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

**Yes**

**Recommendations:**None

**Requirements:**Second-year outside electrical theory

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

**No**

Will this class use library resources?

**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 or Pass/No Pass

**Audit:**No

When do you plan to offer this course?

**✓ Spring**

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. describe what primary fusing is and explain fuse principles,
2. explain the function of sectionalizers and reclosers (mechanical and electronic),
3. name the key equipment components in a substation and state their function including: oil circuit breakers, batteries, air switches and substation control equipment;
4. demonstrate how to test for line faults,
5. demonstrate capacitor switching,
6. explain power factors and power harmonics,
7. name fiber and cable optics types,
8. cite codes and standards for fiber optic construction application both aerial and underground,
9. present pros and cons to alternate energy sources including wind and photovoltaic,
10. state their responsibility as a journeyman to the community, the company and commit to follow the National Electric Safety Code (NESC) for safe work practices.

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

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**Major Topic Outline:**

1. Primary fusing/fuse principles.
2. Reclosers and sectionalizers.
3. Substation equipment.
4. Fault current, voltage regulation and testing for line faults.
5. Capacitors.
6. Power factor/harmonics.
7. Fiber optics.
8. Alternate energy: wind and photovoltaic.
9. Journeyman responsibilities.

**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**

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