

SPWG 170A: POWER SYSTEMS 1

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2021
Credits:	5
Lecture Hours :	72
Lab Hours:	60
Hours Arranged:	0
Prerequisite:	MTRK 159 or by department consent based off of experience and/or industry certification.
Strongly Recommended:	ENGL 101 and MATH 144.
Transferable to CSU:	Yes
Transferable to UC:	No
Grading Method:	Standard Letter

Catalog Course Description

Intended for diesel technology students seeking a career in the power generation sector, this course is designed to introduce students to the field of electric power generation. Students will be provided with the knowledge and skills necessary to understand the theory and principles of diesel power generation. Included will be theories on DC and AC voltage systems in both the low voltage and high voltage applications with an emphasis on generator construction and operation. This course is designed to prepare students for the EGSA or CEP certifications. 72 lecture hours, 60 lab hours.

Course Objectives

- Demonstrate personal and equipment safety.
- Demonstrate electrical equipment and electrical circuit safety.
- Understand and demonstrate circuit construction and operation.
- Understand and demonstrate direct current circuit operation and testing.
- Understand and demonstrate alternating current circuit operation and testing.
- Understand and demonstrate power and power generators.
- Demonstrate knowledge of electrical schematics and batteries.
- Understand and demonstrate power generator control panels.

Major Course Content

1. Personal and equipment safety
 - a. Use of personal protective equipment
 - b. General industrial and large equipment safety
2. Electrical equipment and circuit safety
 - a. High voltage electrical equipment safety
 - b. Electrical circuit inspection and testing safety
3. Circuit construction and operation
 - a. Calculate voltage, amperage and resistance using ohm's law
 - b. Calculate voltage, amperage and resistance using Kirchhoff's law
 - c. Series, parallel and series-parallel circuits use in power generation
4. Direct current circuit operation and testing

- a. Direct current generating theory
 - b. Direct current circuit operational theory
 - c. Direct current circuit testing and testing equipment
5. Alternating current circuit operation and testing
 - a. Alternating current generating theory
 - b. Alternating current circuit operational theory
 - c. Alternating current circuit testing and testing equipment
 6. Power and power generators
 - a. Introduction to high power generation
 - b. Generators, systems, applications, components, and their functions.
 - c. Excitation systems, components, and their functions.
 7. Calculations for EPG
 - a. Calculating physical quantities and power values
 - b. Understanding reading switchgear to package mounted panel meters, and sensor outputs.
 8. EPG electronic communications
 - a. Improved understanding of electronic communications and it various components.
 - b. Communications networks and protocols.
 - c. On site power needs for operational environment and systems requirements.

Lab Content

Labs will be in the form of hands on worksheets, tasks, and team; instructor led lessons.

(During lab participants will be asked to bring their safety glasses with side shields, leather boots/shoes (electrical hazard rated recommended, and work uniform.)

1. General and electrical safety guidelines
 - a. Personal equipment safety use in the shop
 - b. Electrical wiring and layout in the shop environment
 - c. Familiarizing with electrical warnings on shop electrical panels and equipment
2. Basic electricity concepts
 - a. Basic testing of AC and DC circuits
 - b. Applications of inductance and capacitance in AC and DC circuits
 - c. Electrical schematic fundamentals for AC and DC circuits
3. Power Generation Diagnostics
 - a. DMM use for diagnostics on AC and DC applications
 - b. Phase rotation meter use for diagnostics on generators
 - c. Megaohmmeter use for diagnostics on power generator circuits
4. Basic power generation topics
 - a. Inspection of single phase AC output
 - b. Inspection of three phase AC output
 - c. Test voltage regulators
 - d. Identify power factor effects applied to power generation
5. Identify system components
 - a. Identify generator components
 - b. Identify generator connections
 - c. Identify support system components

Suggested Reading Other Than Required Textbook

030B Intro EPG pt 1 Deadbus wiring schematic

Examples of Required Writing Assignments

One paper writing assignment: Explain the fundamental concepts, properties, and interrelationships of DC theory as they relate to EP.

Examples of Outside Assignments

Sample test

Instruction Type(s)

Lecture, Lab, Online Education Lecture