ELC-112, DC-AC Electricity

Orientation and Introduction

Introduction

Concept Content:

In this section you will give an introduction of yourself to your class. This is an opportunity to state your relevant experiences and credentials to teach this subject along with your personal background. This can help connecting with students. You can make a video introduction and upload it to this page as well.

Also, this is where you will give a brief overview of the course and what it's contents will be. There is a section later on in this module where you will give more detail about the course.

Course Syllabus

Concept Goals:

Insert the student learning outcomes for the course here.

Concept Content:

This is where you will upload the syllabus. You can do this either by uploading the syllabus text here or you can upload a copy of the syllabus under the resources tab for this section. If you do upload it to the resources, please be sure to give instructions to your students to look for the syllabus there.

Course Resources

Concept Goals:

You can leave this section blank provided you uploaded the student learning outcomes to the previous section.

Concept Content:

This is where you would outline student support resources such as tutoring services, listing your office ours, contact info for support for your college's learning management system, etc. If there are documents you wish to upload, be sure to upload them to the resources tab and give instructions for the students to find the documents there.

Course Overview

Concept Goals:

By the end of this course, a student should:

1. Understand fundamental concepts of electricity, including circuit components, measurements, and different circuit types.
2. Describe inductance, capacitance, and the function of transformers in electrical systems.
3. Demonstrate how to safely wire and control DC motors.
4. Apply and demonstrate relevant knowledge of OSHA standards and company-specific safety protocols.
5. Analyze and interpret various types of circuit diagrams, build circuit DC and AC oscilloscope, and score 75 or above to pass.

Concept Content:

This course introduces the fundamental concepts of and computations related to DC/AC electricity. Emphasis is placed on DC/AC circuits, components, operation of test equipment; and other related topics. Upon completion, students should be able to construct, verify, and analyze simple DC/AC circuits.

Module	**Module Learning Objectives**
Basic Concepts of Electricity and Electrical Safety	• Outline the parts of an atom (SLO 1) • Understand how electrical current works (SLO 1) • Define electrical terms such as voltage, current, resistance, etc. (SLO 1) • Describe basic safety measures for electrical safety. (SLO 4)
Voltage Sources, Ohm's Law, Simple Circuits	• Outline and explain the different types of voltage sources (SLO 1) • Accurately define Ohm's Law (SLO 1) • Perform calculations using Ohm's Law (SLO 1)
Electrical Test and Measurement Equipment	• Understand how three phase electricity works (SLO 1) • Describe how to use an oscilloscope (SLO 1) • Demonstrate the ability to use a multimeter (SLO 1)

Alternating Current	• Explain the relationship between time and frequency (SLO 1) • Differentiate between apparent, true, and reactive power (SLO 1) • Understand resistor color codes and resistor types (SLO 1, SLO 3, SLO 5)
Electrical Components and Circuit Materials	• Explain the operation and use of various resistors (SLO 1) • Discuss capacitors including physical construction, type and working voltage (SLO 1) • Understand what factors to consider when replacing a fuse (SLO 4)
Transformers	• Describe how loads affect transformers. (SLO 2) • Analyze circuits transformer circuits to compute the voltage current and power on both Primary and Secondary side of the Transformer. (SLO 5) • Compare and contrast the different types of transformers. (SLO 2) • Describe the three types of transformer losses (SLO 1)
Motors, Generators, and Alternators	• Compare and contrast motors, generators, and alternators (SLO 1) • Undersand the operation of an AC motor (SLO 1) • Demonstrate understand of Ohm's law utilzing resistors (SLO 1, SLO 3)
Mid-Term Exam	• Demonstrate knowledge of course material.
Motor Controls	• Describe the basic functions of motor control circuits. (SLO 1) • Discuss types of switches used in a control circuit. (SLO 1) • Demonstrate understanding of Kirchhoff's Law. (SLO 1, SLO 4)
Industrial Wiring Diagrams and Schematics	• Understand the basics of reading electrical diagrams (SLO 5) • Describe the four basic numbering systems used for ladder diagrams (SLO 5) • Understand how the National Electrical Code sets standards for safeguarding people against hazards of electricity (SLO 1, SLO 4) • Demonstrate ability to properly use a potentiometer (SLO 1)
Electrical Troubleshooting	• Understand the importance of observation as a troubleshooting tool. (SLO 4) • Discuss various sources of energy for industrial systems and their related sensors (SLO 4) • Explain step-by-step troubleshooting methodology. (SLO 1, SLO 4)
Diodes, Rectifiers, and Power Supplies	• Explain how diodes work. (SLO 1) • Understand how AC is turned into DC power. (SLO 1) • Create various basic circuits following lab instructions. (SLO 3, SLO 4, SLO 5)
Transistors and Integrated Circuits	• Describe how intergrated circuits work. (SLO 1) • Describe how transistors work. (SLO 1) • Create various basic circuits following lab instructions. (SLO 3, SLO 4, SLO 5)

Three Phase AC Circuits	• Explain three-phase power and power generation. (SLO 2) • To study and demonstrate the two wattmeter method of measuring the power in 3-phase networks. (SLO 3, SLO 5) • To demonstrate the line and phase relations in 3-phase balanced networks. (SLO 5)
Final Exam	• Demonstrate knowledge of course material.

Instructor Note: This is a 15 week course. If you need a 16th week due to your semesters being 16 weeks, you may have to create a 16th week.

Course Schedule: **(Instructor Note: this course schedule is just a suggestion based on North Carolina System standards. You can adjust the schedule as suits your needs.)**

Week 1:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 2:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 3:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 4:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 5:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 6:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 7:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 8:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 9:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 10:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 11:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 12:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 13:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 14:

Monday Class 1 - Lecture Material - 1 Hour: Wednesday Class 2 - Lab Material - 1.5 Hours

Week 15:

Monday Class 1 - Final Exam

Notes/Helpful Tips

Next Steps…

Your Census assignments are REQUIRED in order to remain in the class and they MUST be completed prior to the Census Date **[insert census date here]**. **If you do not have a census date requirement, you can delete this section.**

Effective note taking is also important for not only this course, but for your career as well. Note taking is a great way to retain information. The process of taking notes can keep you alert and focused on the information being presented. It also keeps your mind engaged with what you are hearing, increasing the likelihood you will retain that information. Note taking can also allow you to better organize your thoughts on the information being discussed.

Here is a video that provides some tips for effective note taking.

Module 1 - Basic Concepts of Electricity and Electrical Safety

1.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Outline the parts of an atom (SLO 1)
- Understand how electrical current works (SLO 1)
- Define electrical terms such as voltage, current, resistance, etc. (SLO 1)
- Describe basic safety measures for electrical safety. (SLO 4)

Concept Content:

This week we will begin ELC 112. See module 1.2 for more detail.

This Week At A Glance:

Lectures:

Electrical Safety - 27 Slides

Reading:

Chapter 1 - 17 Slides

Chapter 2 - 11 Slides

Chapter 3 - 15 Slides

Chapter 3 Summary and Review - 2 Slides

Videos:

Electrical Safety for Qualified Workers - 3 Minutes

Assignments:

Module Review Quiz - 12 Questions

1.2 Module Content Resources

Concept Content:

This week we are covering the basic concepts of electricity and electrical safety. We will first cover electrical safety and why it is important. The we will discuss basics of electricity such as what voltage, current, and resistance are. We will also discuss the anatomy of atoms.

This Week's Material:

Lectures:

Electrical Safety - 27 Slides

Reading:

Chapter 1 - 17 Slides - This chapter covers electrical safety.

Chapter 2 - 11 Slides - This chapter covers basic electrical theory.

Source:

Herman, S. (2012). *Residential Construction Academy: Electrical Principles* (Second). Cengage. 2024, https://www.cengage.com

Videos:

Electrical Safety for Qualified Workers - 3 Minutes

1.3 Module Assessment/Assignment

Concept Content:

This Week's Assignment:

Module Review Quiz - 12 Questions - Click on the assignments tab and pull up quizzes to find the review.

1.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

1.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

1.6 Module Wrap-Up

Concept Goals:

By the end of this module, you should:

- Outline the parts of an atom (SLO 1)
- Understand how electrical current works (SLO 1)
- Define electrical terms such as voltage, current, resistance, etc. (SLO 1)
- Describe basic safety measures for electrical safety. (SLO 4)

Concept Content:

This week we discussed the basics of electricity, atoms, and electrical safety. Next week, we will cover resistance.

This Week At A Glance:

Lectures:

Electrical Safety - 27 Slides

Reading:

Chapter 1 - 17 Slides

Chapter 2 - 11 Slides

Chapter 3 - 15 Slides

Chapter 3 Summary and Review - 2 Slides

Videos:

Electrical Safety for Quaified Workers - 3 Minutes

Assignments:

Module Review Quiz - 12 Questions

Module 2 - Voltage Sources, Ohm's Law, Simple Circuits

2.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Outline and explain the different types of voltage sources (SLO 1)
- Accurately define Ohm's Law (SLO 1)
- Perform calculations using Ohm's Law (SLO 1)

Concept Content:

This week we will discuss ohms law. See module 3.2 for more detail.

This Week at a glance:

Reading:

Chapter 3 - Electrical Quantities and Ohms Law - 16 Slides

Lectures:

Ohms Law and Power - 36 Pages

Videos:

Ohms Law Explained - 10 Minutes

Assignments:

Module 3 Review - 8 Questions

Ohms Lab

2.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will cover electrical quantities and ohms law. Last week we discussed resistance and how we are going to talk about ohms which is how resistance is measured. This is an expansion on what we learned last week.

This Week's Material:

Reading:

Chapter 3 - Electrical Quantities and Ohms Law - 16 Slides

Lectures:

Ohms Law and Power - 36 Pages

Videos:

Ohms Law Explained - 10 Minutes - This video provides a visual explanation of our material on Ohms Law.

2.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module 3 Review Quiz - 8 Questions

Ohms Lab - 9 Pages. Download the document and we will go over the lab in class.

2.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

2.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

2.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Outline and explain the different types of voltage sources (SLO 1)
- Accurately define Ohm's Law (SLO 1)
- Perform calculations using Ohm's Law (SLO 1)

Concept Content:

This week we discussed ohms law. Next week we will talk about DC Series Circuits.

This week in review:

Reading:

Chapter 3 - Electrical Quantities and Ohms Law - 16 Slides

Lectures:

Ohms Law and Power - 36 Pages

Videos:

Ohms Law Explained - 10 Minutes

Assignments:

Module 3 Review - 8 Questions

Ohms Lab

Module 3 - Electrical Test and Measurement Equipment

3.1 Module Overview

Concept Goals:

By the end of the module, you should:

- Understand how three phase electricity works (SLO 1)
- Describe how to use an oscilloscope (SLO 1)
- Demonstrate the ability to use a multimeter (SLO 1)

Concept Content:

This week we will discuss electrical testing and measuring equipment. See module 3.2 for more detail.

This Week At A Glance:

Reading:

Chapter 21 Electrical Test and Measurement Equipment Part 1 - 13 Pages

Chapter 21 Electrical Test and Measurement Equipment Part 2 - 11 Pages

Source: industrial maintenance and mechatronics 1st edition

Lectures:

Chapter 21 Video Lecture

Videos:

How Three Phase Electricity Works - 8 Minutes

How to Use an Mutilimeter for Beginners - 8 Minutes

Oscilloscope Tutorial (Basics 101) - 7.5 Minutes

Assignment:

Module Review Quiz - 10 Questions

Digital Multimeter Simulator

3.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will discuss electrical tests and measurement. Topics will include step by step instructions on how to perform an electrical test, overvoltage categories, an introduction to digital multimeters, 3-phase electricity, among others.

This Week's Material:

Reading:

Chapter 21 Electrical Test and Measurement Equipment Part 1 - 13 Pages

Chapter 21 Electrical Test and Measurement Equipment Part 2 - 11 Pages

Source: industrial maintenance and mechatronics 1st edition

Lectures:

Chapter 21 Video Lecture

Videos:

How Three Phase Electricity Works - 8 Minutes

How to Use an Mutilimeter for Beginners - 8 Minutes

Oscilloscope Tutorial (Basics 101) - 7.5 Minutes

Sine Wave Fundamentals - This video takes a couple second to upload in the website.

3.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module Review Quiz - 10 Questions

Digital Multimeter Simulator - This is an online digitial multimeter simulator. It works simialr to a real-life simulator, including the ability to overload the multi-meter and blow a circuit. Go through the various functions and see if you can get accurate readings without blowing up the system.

3.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

3.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

3.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Understand how three phase electricity works (SLO 1)
- Describe how to use an oscilloscope (SLO 1)
- Demonstrate the ability to use a multimeter (SLO 1)

Concept Content:

This week we will discuss electrical testing and measuring equipment. See module 3.2 for more detail.

This Week In Review:

Reading:

Chapter 21 Electrical Test and Measurement Equipment Part 1 - 13 Pages

Chapter 21 Electrical Test and Measurement Equipment Part 2 - 11 Pages

Source: industrial maintenance and mechatronics 1st edition

Lectures:

Chapter 21 Video Lecture

Videos:

How Three Phase Electricity Works - 8 Minutes

How to Use an Mutilimeter for Beginners - 8 Minutes

Oscilloscope Tutorial (Basics 101) - 7.5 Minutes

Assignment:

Module Review Quiz - 10 Questions

Digital Multimeter Simulator

Module 4 - Alternating Current

4.1 Moudle Overview

Concept Goals:

By the end of this module, you should:

- Explain the relationship between time and frequency (SLO 1)
- Differentiate between apparent, true, and reactive power (SLO 1)
- Understand resistor color codes and resistor types (SLO 1, SLO 3, SLO 5)

Concept Content:

This week we will cover alternating currents. See module 4.2 for more details.

This Week At A Glance:

Reading:

Chapter 22 - Alternating Current - 13 Pages

Videos:

Power Factor Explained - 11 Minutes

What is Frequency - 5.5 Minutes

Understanding RMS Values in AC Circuits - 9 Minutes

Assignments:

Weekly Labs

Module Review Quiz - 10 Questions

4.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will cover alternating currents. Topics will include different types of wave currents, different types of power, and how various aspects of currents are measured.

This Week's Material:

Reading:

Chapter 22 - Alternating Current - 13 Pages

Source: industrial maintenance and mechatronics 1st edition

Lectures:

Chapter 22 Lecture

Videos:

Power Factor Explained - 11 Minutes

What is Frequency - 5.5 Minutes

Understanding RMS Values in AC Circuits - 9 Minutes

4.3 Moudle Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Weekly Labs:

Basics

Resistors

Solderless Circuits

Download the documents. Complete the three lab processes and fill out the questions on page three for each of them.

Module Review Quiz - 10 Questions

4.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

4.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

4.6 Module Wrap-Up

Concept Goals:

By the end of this module, you should:

- Explain the relationship between time and frequency (SLO 1)
- Differentiate between apparent, true, and reactive power (SLO 1)
- Understand resistor color codes and resistor types (SLO 1, SLO 3, SLO 5)

Concept Content:

This week we covered alternating currents. Next week we will talk about electrical components.

This Week In Review:

Reading:

Chapter 22 - Alternating Current - 13 Pages

Lectures:

Chapter 22 Lecture

Videos:

Power Factor Explained - 11 Minutes

What is Frequency - 5.5 Minutes

Understanding RMS Values in AC Circuits - 9 Minutes

Assignments:

Weekly Labs

Module Review Quiz - 10 Questions

Module 5 - Electrical Components and Circuit Materials

5.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Explain the operation and use of various resistors (SLO 1)
- Discuss capacitors including physical construction, type and working voltage (SLO 1)
- Understand what factors to consider when replacing a fuse (SLO 4)

Concept Content:

This week we are covering electrical components and circuit materials. Topics included are resistors, capacitors, circuit boards, relays, wires, and more.

This Week's Material:

Reading:

Chapter 23 - Electrical Components and Circuit Materials - 14 Pages

Videos:

Inductors Explained - The Basics - 10 Minutes

Capacitors Explained - The Basics - 8.5 Minutes

Potentiometer Explained - 5.5 Minutes

How to Fuses Work in Appliances - 1.5 Minutes

Assignments:

Module Review Quiz - 12 Questions

Resistor Lab

5.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we are covering electrical components and circuit materials. Topics included are resistors, capacitors, circuit boards, relays, wires, and more.

This Week's Material:

Reading:

Chapter 23 - Electrical Components and Circuit Materials - 14 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

Inductors Explained - The Basics - 10 Minutes

Capacitors Explained - The Basics - 8.5 Minutes

Potentiometer Explained - 5.5 Minutes

How to Fuses Work in Appliances - 1.5 Minutes

5.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module Review Quiz - 12 Questions

Resistor Lab

Download the document. We will work on the activity in class. There are also the questions on page three to answer.

5.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

5.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

5.6 Module Wrap-Up

Concept Goals:

By the end of this module, you should:

- Explain the operation and use of various resistors (SLO 1)
- Discuss capacitors including physical construction, type and working voltage (SLO 1)
- Understand what factors to consider when replacing a fuse (SLO 4)

Concept Content:

This week we are covering electrical components and circuit materials. Next week we will work on

This Week In Review:

Reading:

Chapter 23 - Electrical Components and Circuit Materials - 14 Pages

Videos:

Inductors Explained - The Basics - 10 Minutes

Capacitors Explained - The Basics - 8.5 Minutes

Potentiometer Explained - 5.5 Minutes

How to Fuses Work in Appliances - 1.5 Minutes

Assignments:

Module Review Quiz - 12 Questions

Resistor Lab

Module 6 - Transformers

6.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Describe how loads affect transformers. (SLO 2)
- Analyze circuits transformer circuits to compute the voltage, current and power on both Primary and Secondary side of the Transformer. (SLO 5)
- Compare and contrast the different types of transformers. (SLO 2)
- Describe the three types of transformer losses (SLO 1)

Concept Content:

This week we will discuss transformers. See module 6.2 for more details.

This Week At A Glance:

Reading:

Chapter 25 Transformers -19 Pages

Source: industrial maintenance and mechatronics 1st edition

Lectures:

Three Phase Transformers - 33 Slides

Videos:

How Does A Transformer Work - 6.5 Minutes

Assignments:

Module Review Quiz - 12 Questions

Transformers Lab

6.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will discuss transformers. This will include the differences between single and three phase transformers, how transformers are rated, and how loads affect transformers.

This Week's Material:

Reading:

Chapter 25 Transformers -19 Pages

Source: industrial maintenance and mechatronics 1st edition

Lectures:

Three Phase Transformers - 33 Slides

Videos:

How Does A Transformer Work - 6.5 Minutes

6.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module Review Quiz - 12

Transformers Lab

Download the transformers lab document. We will work on it in class.

6.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

6.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

6.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Describe how loads affect transformers. (SLO 2)
- Analyze circuits transformer circuits to compute the voltage, current and power on both Primary and Secondary side of the Transformer. (SLO 5)
- Compare and contrast the different types of transformers. (SLO 2)
- Describe the three types of transformer losses (SLO 1)

Concept Content:

This week we discussed transformers.

This Week In Review:

Reading:

Chapter 25 Transformers -19 Pages

Source: industrial maintenance and mechatronics 1st edition

Lectures:

Three Phase Transformers - 33 Slides

Videos:

How Does A Transformer Work - 6.5 Minutes

Assignments:

Module Review Quiz - 12 Questions

Transformers Lab

Module 7 - Motors, Generators, and Alternators

7.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Compare and contrast motors, generators, and alternators (SLO 1)
- Undersand the operation of an AC motor (SLO 1)
- Demonstrate understand of Ohm's law utilzing resistors (SLO 1, SLO 3)

Concept Content:

This week we will look over motors, generators, and alternators. See module 7.1 for more detail.

This Week At A Glance:

Reading:

Chapter 26 - Motors, Generators, and Alternators - 10 Pages

Videos:

How Electric Motors Work - 3 Phase AC Induction Motors - 15.5 Minutes

How Does An Electric Motor Work - DC Motors Explained - 15.5 Minutes

How Alternators Work - Automotive Electricty Generator - 18 Minutes

AC Electrical Generator Basis - 6 Minutes

Assignments:

Module Review Quiz

Weekly Labs

7.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will look over motors, generators, and alternators. Topics include the different types of motors, generators, alternators and how they operate.

This Week's Material:

Reading:

Chapter 26 - Motors, Generators, and Alternators - 12 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

How Electric Motors Work - 3 Phase AC Induction Motors - 15.5 Minutes

How Does An Electric Motor Work - DC Motors Explained - 15.5 Minutes

How Alternators Work - Automotive Electricty Generator - 18 Minutes

AC Electrical Generator Basis - 6 Minutes

7.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module Review Quiz - 10 Questions

Weekly Labs:

Resistors in Parrallel Lab

Resistors in Series Lab

Ohm's Law Lab

Download the lab documents. We will work on the packets in class.

7.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

7.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

7.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Compare and contrast motors, generators, and alternators (SLO 1)
- Undersand the operation of an AC motor (SLO 1)
- Demonstrate understand of Ohm's law utilzing resistors (SLO 1, SLO 3)

Concept Content:

This week we looked over motors, generators, and alternators. Next week is our mid-term exam.

This Week In Review:

Reading:

Chapter 26 - Motors, Generators, and Alternators - 12 Pages

Videos:

How Electric Motors Work - 3 Phase AC Induction Motors - 15.5 Minutes

How Does An Electric Motor Work - DC Motors Explained - 15.5 Minutes

How Alternators Work - Automotive Electricty Generator - 18 Minutes

AC Electrical Generator Basis - 6 Minutes

This Week's Assignments:

Module Review Quiz -10 Questions

Weekly Labs

Module 8 - Mid-Term Exam

8.1 Mid-Term Exam

Concept Goals:

By the end of this week, you should:

- Demonstrate knowledge of course material.

Concept Content:

This week we will complete the mid-term exam. To access it, click on the assignments tab and look under test.

Mid-Term Exam - 34 Questions

8.2 Module Wrap-Up

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

Thank you for completing the mid-term exam. Next week we will pick back up with DC Inductance and DC Capacitance.

Module 9 - DC Inductance and DC Capacitance

9.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Describe the basic functions of motor control circuits. (SLO 1)
- Discuss types of switches used in a control circuit. (SLO 1)
- Demonstrate understand of Kirchhoff's Law. (SLO 1, SLO 4)

Concept Content:

This week we are covering motor controls. See module 9.2 for more details.

This Week At A Glance:

Reading:

Chapter 27 - Motor Controls - 19 Pages

Videos:

Motor Control 101 - 16 Minutes

What is an Overload Relay - 8.5 Minutes

Assignments:

Module Review Quiz - 10 Questions

Weekly Labs

9.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we are covering motor controls. Topics include different types of switches, input devices, fuses, and relays.

This week's material:

Reading:

Chapter 27 - Motor Controls - 19 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

Motor Control 101 - 16 Minutes

What is an Overload Relay - 8.5 Minutes

9.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module Review Quiz - 10 Questions

Weekly Labs

Kirchhoff's Law Lab 1

Kirchhoff's Law Lab 2

Watt's Law

Voltage

Download the lab packets, we will work on them in class.

9.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

9.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

9.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Describe the basic functions of motor control circuits. (SLO 1)
- Discuss types of switches used in a control circuit. (SLO 1)
- Demonstrate understand of Kirchhoff's Law. (SLO 1, SLO 4)

Concept Content:

This week we are covering motor controls. See module 9.2 for more details.

This Week In Review:

Reading:

Chapter 27 - Motor Controls - 19 Pages

Videos:

Motor Control 101 - 16 Minutes

What is an Overload Relay - 8.5 Minutes

Assignments:

Module Review Quiz - 10 Questions

Weekly Labs

Module 10 Industrial Wiring Diagrams and Schematics

10.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Understand the basics of reading electrical diagrams (SLO 5)
- Describe the four basic numbering systems used for ladder diagrams (SLO 5)
- Understand how the National Electrical Code sets standards for safeguarding people against hazards of electricity (SLO 1, SLO 4)
- Demonstrate ability to properly use a potentiometer (SLO 1)

Concept Content:

This week we will look at industrial wiring diagrams and practices. See module 10.2 for more details.

This Week At A Glance:

Reading:

Chapter 28 - Industrial Wiring Diagrams and Practices - 14 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

How to Read Electrical Diagrams - Wiring Diagrams Explained - 11 Minutes

Crack the Code - Mastering the NEC Code - 5 Minutes

Assignments:

Module Review Quiz - 7 Questions

Weekly Labs

10.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will look at industrial wiring diagrams and practices. Topics include a look into electrical diagrams, the national electrical code, wiring standards, among others.

This week's material:

Reading:

Chapter 28 - Industrial Wiring Diagrams and Practices - 14 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

How to Read Electrical Diagrams - Wiring Diagrams Explained - 11 Minutes

Crack the Code - Mastering the NEC Code - 5 Minutes

10.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Weeks Assignments:

Module Review Quiz - 7 Questions

Weekly Labs

Capacitor Values Lab

Potentiometers Lab

Photocells Lab

Download the lab documents and we will work on them in class.

10.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

10.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

10.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Distinguish between AC and DC Voltage and Current (SLO 1)
- List the types of AC wave forms (SLO 1)
- Understand how resistance in AC circuits work (SLO 1)

Concept Content:

This week we looked at industrial wiring diagrams and practices. Next week we will discuss troubleshooting.

This Week In Review:

Reading:

Chapter 28 - Industrial Wiring Diagrams and Practices - 14 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

How to Read Electrical Diagrams - Wiring Diagrams Explained - 11 Minutes

Crack the Code - Mastering the NEC Code - 5 Minutes

Assignments:

Module Review Quiz - 7 Questions

Weekly Labs

Module 11 - Troubleshooting, AC Relays and Power Distribution Systems

11.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Understand the importance of observation as a troubleshooting tool. (SLO 4)

- Discuss various sources of energy for industrial systems and their related sensors (SLO 4)
- Explain step-by-step troubleshooting methodology. (SLO 1, SLO 4)

Concept Content:

This week we will look over maintenance and troubleshooting. This will include defining preventative maintenance and describing the types of maintenance work.

Reading:

Chapter 30 - Electrical Troubleshooting - 13 Pages

Videos:

Basic Electrical Troubleshooting - 37 Minutes

Bonus Video:

Electrical Troubleshooting - 46 Minutes

Assignments:

Weekly Labs

11.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will look over electrical troubleshooting. We will go over sources of energy, troubleshooting methodologies, and how to properly document incidents.

Reading:

Chapter 30 - Electrical Troubleshooting - 13 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

Basic Electrical Troubleshooting - 37 Minutes

Bonus Video:

Electrical Troubleshooting - 46 Minutes - This video walkthrough covers real-world experience with troubleshooting electrical equipment. You can see the instructor working in real-time as they discuss their process of finding the issue with the electrical equipment they are working with.

11.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignment:

Weekly Labs

Intro to Capacitors Lab

Intro to Speakers Lab

Intro to Diodes

Intro to SCRs

Intro to NPN Transistors

Intro to PNP Transistors

Intro to 555 Timer IC

Download the lab packets, we will work on them in class.

11.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

11.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

11.6 Module Wrap-Up

Concept Goals:

By the end of this module, you should:

- Understand the importance of observation as a troubleshooting tool. (SLO 4)
- Discuss various sources of energy for industrial systems and their related sensors (SLO 4)
- Explain step-by-step troubleshooting methodology. (SLO 1, SLO 4)

Concept Content:

This week we looked over maintenance and troubleshooting.

Reading:

Chapter 30 - Electrical Troubleshooting - 13 Pages

Videos:

Basic Electrical Troubleshooting - 37 Minutes

Bonus Video:

Electrical Troubleshooting - 46 Minutes

Assignments:

Weekly Labs

Module 12 - Diodes, Refictors, and Power Supplies

12.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Explain how diodes work. (SLO 1)
- Understand how AC is turned into DC power. (SLO 1)
- Create various basic circuits following lab instructions. (SLO 3, SLO 4, SLO 5)

Concept Content:

This week we are looking over diodes, rectifiers, and power supplies. See module 12.2 for more details.

This Week At A Glance:

Reading:

Chapter 31 - Diodes, Rectifiers, and Power Supplies - 5 Pages

Videos:

Diodes Explained - 11.5 Minutes

How AC is turned to DC - Rectifiers - 5.5 Minutes

Power Supplies Explained - 10.5 Minutes

This Week's Assignments:

Weekly Labs

12.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will discuss diodes, rectifiers, and power supplies.

This Week's Material:

Reading:

Chapter 31 - Diodes, Rectifiers, and Power Supplies - 5 Pages

Source: industrial maintenance and mechatronics 1st edition

Videos:

Diodes Explained - 11.5 Minutes

How AC is turned to DC - Rectifiers - 5.5 Minutes

Power Supplies Explained - 10.5 Minutes

12.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Module's Assignments:

Transistor Oscillator Lab

Dual Burglar Alarm Lab

Automatic Night Light Lab

DC to DC Power Supply Lab

Electronic Metronome Lab

Electric Motorcycle Lab

Download the lab documents and we will go over the labs in class.

12.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

12.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

12.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Explain how diodes work. (SLO 1)
- Understand how AC is turned into DC power. (SLO 1)
- Create various basic circuits following lab instructions. (SLO 3, SLO 4, SLO 5)

Concept Content:

This week we looked over diodes, rectifiers, and power supplies. Next week we look at transistors and intergrated circuits.

This Week In Review:

Reading:

Chapter 31 - Diodes, Rectifiers, and Power Supplies - 5 Pages

Videos:

Diodes Explained - 11.5 Minutes

How AC is turned to DC - Rectifiers - 5.5 Minutes

Power Supplies Explained - 10.5 Minutes

This Week's Assignments:

Weekly Labs

Module 13 - Transistors and Intergrated Circuits

13.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Describe how intergrated circuits work. (SLO 1)
- Describe how transistors work. (SLO 1)
- Create various basic circuits following lab instructions. (SLO 3, SLO 4, SLO 5)

Concept Content:

This week we will talk about transistors and integrated circuits. See module 13.2 for more detail.

This Week At A Glance:

Reading:

Chapter 31 - Transistors and Intergrated Circuits - 12 Pages

Videos:

How Integrated Circuits Work - 9.5 Minutes

How a Bipolar Junction Transistor Works - 4.5 Minutes

How Field Effect Transistors Work - 8.5 Minutes

Assignments:
Module Labs

13.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will talk about transistors and integrated circuits. We will discuss specific syptes of transistors and what happens when circuit boards fail.

This Week's Material:

Reading:

Chapter 31 - Transistors and Intergrated Circuits - 12 Pages
Source: industrial maintenance and mechatronics 1st edition

Videos:

How Integrated Circuits Work - 9.5 Minutes

How a Bipolar Junction Transistor Works - 4.5 Minutes

How Field Effect Transistors Work - 8.5 Minutes

13.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Railroad Crossing Lights Lab

Variable Speed Lights Lab

Continuity Tester Lab

Audio Generator Lab

Police Siren Lab

Screaming Box Lab

Download the lab documents, we will work on them in class.

13.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they

have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

13.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

13.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Describe how intergrated circuits work. (SLO 1)
- Describe how transistors work. (SLO 1)
- Create various basic circuits following lab instructions. (SLO 3, SLO 4, SLO 5)

Concept Content:

This week we talked about transistors and integrated circuits. Next week we will look at three phase circuits.

This Week In Review:

Reading:

Chapter 31 - Transistors and Intergrated Circuits - 12 Pages

Videos:

How Integrated Circuits Work - 9.5 Minutes

How a Bipolar Junction Transistor Works - 4.5 Minutes

How Field Effect Transistors Work - 8.5 Minutes

Assignments:
Module Labs

Module 14 - Three Phase AC Circuits

14.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Explain three-phase power and power generation. (SLO 2)
- To study and demonstrate the two wattmeter method of measuring the power in 3-phase networks. (SLO 3, SLO 5)
- To demonstrate the line and phase relations in 3-phase balanced networks. (SLO 5)

Concept Content:

This week we will discuss three phase circuits. See module 12.2 for more detail.

This Week At A Glance:

Reading:

Unit 26 - Three Phase Circuits

Unit 26 - Three Phase Circuits Pt. 2

Lectures:

Three Phase Alternators - 23 Slides

Three Phase Power - 26 Slides

Videos:

How Three Phase Electricity Works - 8 Minutes

Assignments:

Three Phase Power Measurement Lab

14.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will look into three phase circuits and systems. Topics we will cover include: basics of three-phase power generation, how to calculate voltage/current/power in three-phase loads, and how important three phase power generation is.

This Week's Material:

Reading:

Unit 26 - Three Phase Circuits

Unit 26 - Three Phase Circuits Pt. 2

Source:

Herman, S. (2020). *Delmar's Standard Book of Electricity* (7th ed.). Cengage.

Lectures:

Three Phase Alternators - 23 Slides

Three Phase Power - 26 Slides

Videos:

How Three Phase Electricity Works - 8 Minutes

14.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

Assignments:

Three Phase Power Measurement Lab

Click on the above link to see this week's lab. We will follow the instructions using the equipment in class.

14.4 Module Reflection

Concept Content:

This is a completely optional section. The purpose of this section is to ask your students to reflect on the material they have learned in this course. Or, if there is a specific area of the content you wanted to make sure students understood, you could guide them to discuss that in their response to your reflection question(s). You could also use this section to discuss case studies related to the content this section went over. However, if you feel that this would not be an appropriate assignment/task for your specific subject, please feel free to delete this section from your class.

14.5 Module Discussion Board

Concept Content:

This is a completely optional section. The purpose of this section is to invite your students to discuss the week's content and what they learned from it with each other. If you feel this would not be appropriate for your class or at least this week's content, feel free to delete it. If you are interested in doing a discussion board, a good idea would be to come up with a question related to the week's content for the students to answer. From there, require them to answer the quesion and respond to a least one other student's answer to foster discussion.

14.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Explain three-phase power and power generation. (SLO 2)
- To study and demonstrate the two wattmeter method of measuring the power in 3-phase networks. (SLO 3, SLO 5)
- To demonstrate the line and phase relations in 3-phase balanced networks. (SLO 5)

Concept Content:

This week we discussed three phase circuits. Next week we will look at transformers.

This Week In Review:

Reading:

Unit 26 - Three Phase Circuits

Unit 26 - Three Phase Circuits Pt. 2

Lectures:

Three Phase Alternators - 23 Slides

Three Phase Power - 26 Slides

Videos:

How Three Phase Electricity Works - 8 Minutes

Assignments:

Three Phase Power Measurement Lab

Module 15 - Final Exam

15.1 Final Exam

Concept Goals:

By the end of this week, you should:

- Demonstrate knowledge of course material.

Concept Content:

This week we will complete the final exam. To access it, click on the assignments tab and look under test.

Final Exam - 37 Questions

15.2 Course Wrap-Up

Concept Content:

You have now completed ELC-112. Thank you for your work this semester. Best of luck moving forward.

Faculty Resources (For Instructor Only, Do Not Publish Live)

Odigia Guide

Concept Content:

Click on the resources tab to find the guide sheet for instructors.