HYD-110, Hydraulics and Pneumatics

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, you should:

1.) Interpret hydraulic and pneumatic system schematics.

2.) Demonstrate knowledge of fluid power systems and components.

A. Measure oil flow and pressure in fluid power system.

B. Operate manual and directional control valves.

C. Explain the function of hydraulic actuators.

3.) Locate and apply relevant safety standards within the workplace.

Concept Content:

This course introduces the basic components and functions of hydraulic and pneumatic systems. Topics include standard symbols, pumps, control valves, control assemblies, actuators, FRL, maintenance procedures, and switching and control devices. Upon completion, students should be able to understand the operation of a fluid power system, including design, application, and troubleshooting.

Module	**Module Learning Objectives**
Week 1 - Introduction to Pneumatics	• Identify basic schematic symbols for pneumatic components (SLO 2) • Define what pneumatic means (SLO 2) • List disadvantages and advantages of pneumatics over hydraulics (SLO 1)
Week 2 - Basic Pneumatic Circuits	• Correctly label pneumatic symbols (SLO 1) • Describe how air motors work and their components (SLO 2) • Describe how different types of cylinder's work (SLO 2)
Week 3 - Pneumatic Pressure and Flow	• Describe the parts of a pneumatic cylinder and how they work (SLO 1) • Understand the various formulas used for calculating pressure, force output, etc. (SLO 1) • Describe in detail the safety precautions taken in a manufacturing facility (SLO 3) • Demonstrate how to operate a basic two-hand-control safety circuit (SLO 2)

Week 4 - Conditioning and Distribution of Compressed Air in Pneumatic Systems	• Understand and define the concepts of pressure and cylinder force (SLO 2) • Understand how pneumatic leverage works (SLO 2) • Understand how pressure and volume work in pneumatic systems (SLO 2) • Describe how air flow and resistance works (SLO 2)
Week 5 - Pneumatic Valve Functions	• Describe the parts of a needle valve and how it works. (SLO 2) • Adjust flow rates to control actuator speed. (SLO 2) • Demonstrate the ability to read and design basic pneumatic circuit diagrams. (SLO 1) • Practice building a basic pneumatic speed control circuit using appropriate equipment. (SLO 2, SLO 3)
Week 6 - Controlling Pneumatic Systems	• Describe the parts of a valve and understand their functions (SLO 2) • Understand how to troubleshoot actuators (SLO 2) • Design pneumatic circuits per assignment instructions (SLO 1, SLO 3)
Week 7 - Mid-Term Exam	• Demonstrate Understanding of Course Materials
Week 8 - Introduction to Hydraulics	• Identify schematic symbols (SLO 1) • Label and understand the components of a hydraulic system (SLO 2)
Week 9 - Basic Hydraulic Circuits	• Understand and describe how flow meters work (SLO 2) • Understand the applications for the most common types of motors (SLO 2) • Understand basic rules of drawing hydraulic schematics (SLO 1)
Week 10 - Principles of Hydraulic Pressure and Flow	• Describe how to calculate the force output of an extending cylinder (SOL 2) • Understand how to size hydraulic cylinders (SLO 2) • Understand how Pascal's Law and how it relates to Hydraulics (SLO 2)
Week 11 - Gear Pumps and Hydraulic Math	• Understand how gear pumps work (SLO 2) • Understand the math basics that are used in hydraulic systems (SLO 2)
Week 12 - Hydraulic Speed Control	• Understand the difference between series and parallel circuits (SLO 2) • Understand how to troubleshoot system pressure issues (SLO 2) • Design a circuit per specifications (SLO 1, SLO 3)
Week 13 - Pressure Control Circuits	• Describe the parts of and functions of various types of valves. (SLO 2) • Identify schematic symbols for specific valves. (SLO 1)
Week 14 - Misc. Hydraulics Topics	• Be able to identify parts of a cylinder in a sketch. (SLO 2) • Create a hydraulic schematic. (SLO 1) • Create a bill of materials. (SLO 2)
Week 15 - Final Exam	• Demonstrate Understanding of Course Materials

Instructor Note: This course comes with a bonus week of content in case the one is needed.

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

Week 16:

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 - Introduction to Pneumatics

1.1 Module Overview

Concept Goals:

By the end of this week you should:

- Identify basic schematic symbols for pneumatic components (SLO 2)
- Define what pneumatic means (SLO 2)
- List disadvantages and advantages of pneumatics over hydraulics (SLO 1)

Concept Content:

This week we are starting our study of hydraulics and pneumatics. See module 1.2 for more details regarding this week.

This Week At A Glance:

Learning Activity Packet/Lecture - 104 Pages

Videos:

Measure Pressure With Barometers and Manometers - 8.5 Minutes

Pneumatic Schematics (Part 1 of 2) - 15 Minutes

Pneumatic System Basics - 2 Minutes

Assignments:

Module Review Quiz - 10 Questions

Intro to Pneumatics Assignments 1 & 2

1.2 Module Content Resources

Concept Content:

This week is the start of our introduction to hydraulics. Topics this week include an introduction to pneumatics, pneumatic power, circuit connections, and basic cylinder circuits.

This Week's Material:

Learning Activity Packet/Lecture - 104 Pages

Source: Amatrol HB834

Videos:

Measure Pressure With Barometers and Manometers - 8.5 Minutes - This video provides a good overview of how to measure air pressure with two of the most common tools used to do that.

Pneumatic Schematics (Part 1 of 2) - 15 Minutes - This provides a great visual explanation of content we go over in the learning activity packet.

Pneumatic System Basics - 2 Minutes - This provides a quick snapshot of a pneumatic system.

1.3 Module Assessment/Assignment

Concept Content:

This Week's Assignments:

Module Review Quiz - 10 Questions

Intro to Pneumatics Assignments 1 & 2 - Download the files and we will go over the assignments in class. The second assignment will require you to work on it at home before turning it in.

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:

Module Learning Objectives:

- Identify basic schematic symbols for pneumatic components (SLO 2)
- Define what pneumatic means (SLO 2)
- List disadvantages and advantages of pneumatics over hydraulics (SLO 1)

Concept Content:

This week we started our study on pneumatics. Next week we are continuing our introduction to pneumatics.

This Week In Review:

Learning Activity Packet/Lecture - 104 Pages

Videos:

Measure Pressure With Barometers and Manometers - 8.5 Minutes

Pneumatic Schematics (Part 1 of 2) - 15 Minutes

Pneumatic System Basics - 2 Minutes

Assignments:

Module Review Quiz - 10 Questions

Intro to Pneumatics Assignments 1 & 2

Module 2 - Basic Pneumatic Circuits

2.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Correctly label pneumatic symbols (SLO 1)
- Describe how air motors work and their components (SLO 2)
- Describe how different types of cylinder's work (SLO 2)

Concept Content:

This week we continue our look into pneumatics. See module 2.2 for more detail.

This Week At A Glance:

Lecture:

Basic Pneumatic Circuits - 40 Pages

Textbook:

Bimba Pneumatics Handbook - Sections II and IV - Pages 15-29 and 33-37

Videos:

Basics of Pneumatics and Pneumatic Systems Part 1 - 6 Minutes

Introduction to Pneumatic Logic - 8.5 Minutes

How to Read Pneumatic Valve Symbols - 13.5 Minutes

Assignments:

Module Quiz - 10 Questions

Week 2 Assignments

2.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we continue our look into pneumatics. This will include an overview of cylinders and basic circuits. We will also introduce pneumatic logic and expand upon reading pneumatic symbols that we started last week.

This Week's Material:

Lecture:

Basic Pneumatic Circuits - 40 Pages

Textbook:

Bimba Pneumatics Handbook - Sections II and IV - Pages 15-29 and 33-37

Videos:

Basics of Pneumatics and Pneumatic Systems Part 1 - 6 Minutes

Introduction to Pneumatic Logic - 8.5 Minutes

How to Read Pneumatic Valve Symbols - 13.5 Minutes - This video goes more in-depth about schematic symbols and provides clear visuals regarding valve symbols.

2.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module Quiz - 10 Questions

Week 2 Assignments

Download the assignments. We have two this week regarding pneumatics. We will work on them 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:

By the end of this week, you should:

- Correctly label pneumatic symbols (SLO 1)
- Describe how air motors work and their components (SLO 2)
- Describe how different types of cylinder's work (SLO 2)

Concept Content:

This week we continued our look into pneumatics. Next week we will continue looking into pneumatics.

This Week In Review:

Lecture:

Basic Pneumatic Circuits - 40 Pages

Textbook:

Bimba Pneumatics Handbook - Sections II and IV - Pages 15-29 and 33-37

Videos:

Basics of Pneumatics and Pneumatic Systems Part 1 - 6 Minutes

Introduction to Pneumatic Logic - 8.5 Minutes

How to Read Pneumatic Valve Symbols - 13.5 Minutes

Assignments:

Module Quiz - 10 Questions

Week 2 Assignments

Module 3 - Pneumatic Pressure and Flow

3.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Describe the parts of a pneumatic cylinder and how they work (SLO 1)
- Understand the various formulas used for calculating pressure, force output, etc. (SLO 1)
- Describe in detail the safety precautions taken in a manufacturing facility (SLO 3)
- Demonstrate how to operate a basic two-hand-control safety circuit (SLO 2)

Concept Content:

This week we continue our discussion on pneumatics. See module 3.2 for more details.

This Week At A Glance:

Principles of Pneumatic Pressure and Flow - 53 Pages

Videos:

How an Industrial Pneumatic System Works - 8 Minutes

Directional Control Valve Basics Pt 1 - 6 Minutes

Pressure and Volume - 5 Minutes

Assignment:

Module Review Quiz - 8 Questions

Module Assignments

3.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we continue our discussion on pneumatics. Topics for this week include pressure vs cylinder force, pneumatic leverage, pressure and volume, and air flow and resistance. We will also go into detail about control valves and how they work.

This Week's Material:

Principles of Pneumatic Pressure and Flow - 53 Pages

Videos:

How an Industrial Pneumatic System Works - 8 Minutes

Directional Control Valve Basics Pt 1 - 6 Minutes

Pressure and Volume - 5 Minutes - This video provides a good explanation of pressure and volume.

3.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module Review Quiz - 8 Questions

Module Assignments Worksheets - Download the assignments document. We will work on the assignments in class.

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:

By the end of this week, you should:

- Describe the parts of a pneumatic cylinder and how they work (SLO 1)
- Understand the various formulas used for calculating pressure, force output, etc. (SLO 1)
- Describe in detail the safety precautions taken in a manufacturing facility (SLO 3)
- Demonstrate how to operate a basic two-hand-control safety circuit (SLO 2)

Concept Content:

This week we continue our discussion on pneumatics. See module 3.2 for more details.

This Week In Review:

Principles of Pneumatic Pressure and Flow - 53 Pages

Videos:

How an Industrial Pneumatic System Works - 8 Minutes

Directional Control Valve Basics Pt 1 - 6 Minutes

Pressure and Volume - 5 Minutes

Assignment:

Module Review Quiz - 8 Questions

Module Assignments

Module 4 - Conditioning and Distribution of Compressed Air in Pneumatic Systems

4.1 Moudle Overview

Concept Goals:

By the end of this week, you should:

- Understand and define the concepts of pressure and cylinder force (SLO 2)
- Understand how pneumatic leverage works (SLO 2)
- Understand how pressure and volume work in pneumatic systems (SLO 2)
- Describe how air flow and resistance works (SLO 2)

Concept Content:

This week we are continuing our look into pneumatic system. See module 4.2 for more details.

This Week's Material:

Textbook:

Chapter 16 - Conditioning and Distribution of Compressed Air: Part 1, Part 2

Chapter 17 - Work Performers of Pneumatic Systems: Part 1, Part 2

Lecture:

Week 4 Lecture Outline - 6 Pages

Videos:

Understanding Directional Control Valve Schematics - 16 Minutes

Pneumatic Flow Rate Calculations - 7.5 Minutes

Assignments:

Week 4 Review Quiz - 7 Questions

Week 4 Lab Activities

4.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will continue our look over pneumatic systems. We will looking into concepts such as pressure, cylinder force, volume, air flow, and resistance and how they all work in a pneumatic system.

This Week's Material:

Textbook:

Chapter 16 - Conditioning and Distribution of Compressed Air: Part 1, Part 2

Chapter 17 - Work Performers of Pneumatic Systems: Part 1, Part 2

Source:

Daines, J. R., & Daines, M. J. (2018). *Fluid Power: Hydraulics and Pneumatics* (3rd ed.). The Goodheart-Willcox Company, Inc.

Lecture:

Week 4 Lecture Outline - 6 Pages

Videos:

Understanding Directional Control Valve Schematics - 16 Minutes

Pneumatic Flow Rate Calculations - 7.5 Minutes

4.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Week 4 Review Quiz - 7 Questions

Week 4 Lab Activities - Download the files, we will work on the activities in class.

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:

Module Learning Objectives:

- Understand and define the concepts of pressure and cylinder force (SLO 2)
- Understand how pneumatic leverage works (SLO 2)
- Understand how pressure and volume work in pneumatic systems (SLO 2)
- Describe how air flow and resistance works (SLO 2)

Concept Content:

This week we continued our look into pneumatic system. Next week we are looking into speed control circuits.

This Week At A Glance:

Textbook:

Chapter 16 - Conditioning and Distribution of Compressed Air: Part 1, Part 2

Chapter 17 - Work Performers of Pneumatic Systems: Part 1, Part 2

Lecture:

Week 4 Lecture Outline - 6 Pages

Videos:

Understanding Directional Control Valve Schematics - 16 Minutes

Pneumatic Flow Rate Calculations - 7.5 Minutes

Assignments:

Week 4 Review Quiz - 7 Questions

Week 4 Lab Activities

Module 5 - Pneumatic Valve Functions

5.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Describe the parts of a needle valve and how it works. (SLO 2)
- Adjust flow rates to control actuator speed. (SLO 2)
- Demonstrate the ability to read and design basic pneumatic circuit diagrams. (SLO 1)
- Practice building a basic pneumatic speed control circuit using appropriate equipment. (SLO 2, SLO 3)

Concept Content:

This week we continue our study of pneumatic systems. See module 5.2 for more detail.

This Week At A Glance:

Lecture:

Week 4 Lecture - 42 Pages

Videos:

Meter In Meter Out - 16.5 Minutes

Valve Solenoid - 4.5 Minutes

Directional Control Valve Pt 2 - 4 Minutes

Assignments:

Module 5 Review Quiz - 8 Questions

Module 5 Lab

5.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we continue exploring pneumatic systems. This week we will explore speed control circuits.

This Week's Material:

Lecture:

Week 4 Lecture - 42 Pages

Videos:

Meter In Meter Out - 16.5 Minutes

Valve Solenoid - 4.5 Minutes

Directional Control Valve Pt 2 - 4 Minutes

5.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module 5 Review Quiz - 8 Questions

Module 5 Lab

Download the document with the assignments on it. We will work on them in class.

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:

Module Learning Objectives:

- Describe the parts of a needle valve and how it works. (SLO 2)
- Adjust flow rates to control actuator speed. (SLO 2)
- Demonstrate the ability to read and design basic pneumatic circuit diagrams. (SLO 1)
- Practice building a basic pneumatic speed control circuit using appropriate equipment. (SLO 2, SLO 3)

Concept Content:

This week we continued our study of pneumatic systems. Next week we will wrap up our study of pneumatic systems.

This Week At A Glance:

Lecture:

Week 4 Lecture - 42 Pages

Videos:

Meter In Meter Out - 16.5 Minutes

Valve Solenoid - 4.5 Minutes

Directional Control Valve Pt 2 - 4 Minutes

Assignments:

Module 5 Review Quiz - 8 Questions

Module 5 Lab

Module 6 - Controlling Pneumatic Systems

6.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Describe the parts of a valve and understand their functions (SLO 2)
- Understand how to troubleshoot actuators (SLO 2)
- Design pneumatic circuits per assignment instructions (SLO 1, SLO 3)

Concept Content:

This week we will conclude our section on pneumatics. See module 6.2 for more detail.

This Week At A Glance:

Textbook:

Controlling a Pneumatic System Part 1 - 15 Pages

Controlling a Pneumatic System Part 2 - 7 Pages

Lecture:

Week 6 Lecture Outline - 4 Pages

Videos:

Electro-Pneumatics (Solenoid Valve and Cylinder Troubleshooting) - 17.5 Minutes

Possible Causes for Air Cylinder Speed Loss - 4.5 Minutes

Pneumatic Actuators Troubleshooting - 3 Minutes

Effects of Water in an Air Cylinder - 6 Minutes

Assignments:

Module 6 Quiz - 5 Questions

Module 6 Lab

6.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we continue our look into pneumatic systems. Topics this week include troubleshooting and control systems for pneumatic systems.

This Week's Material:

Textbook:

Controlling a Pneumatic System Part 1 - 15 Pages

Controlling a Pneumatic System Part 2 - 7 Pages

Lecture:

Week 6 Lecture Outline - 4 Pages

Videos:

Electro-Pneumatics (Solenoid Valve and Cylinder Troubleshooting) - 17.5 Minutes

Possible Causes for Air Cylinder Speed Loss - 4.5 Minutes

Pneumatic Actuators Troubleshooting - 3 Minutes

Effects of Water in an Air Cylinder - 6 Minutes

6.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module 6 Quiz - 5 Questions

Module 6 Lab

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 the parts of a valve and understand their functions (SLO 2)
- Understand how to troubleshoot actuators (SLO 2)
- Design pneumatic circuits per assignment instructions (SLO 1, SLO 3)

Concept Content:

This week we concluded our section on pneumatics. Next week we will have our mid-term exam which will cover pneumatic systems.

This Week In Review:

Textbook:

Controlling a Pneumatic System Part 1 - 15 Pages

Controlling a Pneumatic System Part 2 - 7 Pages

Lecture:

Week 6 Lecture Outline - 4 Pages

Videos:

Electro-Pneumatics (Solenoid Valve and Cylinder Troubleshooting) - 17.5 Minutes

Possible Causes for Air Cylinder Speed Loss - 4.5 Minutes

Pneumatic Actuators Troubleshooting - 3 Minutes

Effects of Water in an Air Cylinder - 6 Minutes

Assignments:

Module 6 Quiz - 5 Questions

Module 6 Lab

Module 7 - Mid-Term Exam

7.1 Mid-Term Exam

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we will take our mid-term exam. It will cover the material concerning pneumatics. To access the test, go to the assignments tab and click on test.

Mid-Term Exam - 28 Questions

7.2 Module Wrap-Up

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

Thank you for your work in the course so far this semester. We will start our look into hydraulics

next week.

Module 8 - Introduction to Hydraulics

8.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Identify schematic symbols (SLO 1)
- Label and understand the components of a hydraulic system (SLO 2)

Concept Content:

This week we will start our section on hydraulics. See module 8.2 for more details

This Week At A Glance:

Lecture:

Introduction to Hydraulics - 82 Pages

Videos:

Hydraulic Schematics - 40 Minutes

Introduction to Fluid Power - 43.5 Minutes

Assignments:

Week 8 Review Quiz - 7 Questions

Video Summary Assignments

8.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we are starting our look into hydraulic systems. Topics will include an introduction to fluid power, and an overview of hydraulic schematics.

This Week's Material:

Lecture:

Introduction to Hydraulics - 82 Pages

Videos:

Hydraulic Schematics - 40 Minutes

Introduction to Fluid Power - 43.5 Minutes

8.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Week 8 Review Quiz - 7 Questions

Video Summary Assignments - For this assignment, you will watch the two videos provided in module 8.2. Please provide a page-length summary of what you learned in each video. The upload link for the files will be located under quiz in the assignments tab. It is the eighth question.

8.4 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.

8.5 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.

8.6 Module Wrap-Up

Concept Goals:

Module Learning Objectives:

- Identify schematic symbols (SLO 1)
- Label and understand the components of a hydraulic system (SLO 2)

Concept Content:

This week we started our section on hydraulics. We will continue our students on hydraulics next week.

This Week In Review:

Lecture:

Introduction to Hydraulics - 82 Pages

Videos:

Hydraulic Schematics - 40 Minutes

Introduction to Fluid Power - 43.5 Minutes

Assignments:

Week 8 Review Quiz - 7 Questions

Video Summary Assignments

Module 9 - Basic Hydraulic Circuits

9.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Understand and describe how flow meters work (SLO 2)
- Understand the applications for the most common types of motors (SLO 2)
- Understand basic rules of drawing hydraulic schematics (SLO 1)

Concept Content:

We are continuing our look into hydraulics this week. See module 9.2 for more details.

This Week At A Glance:

Lecture:

Hydraulics Lecture - 45 Pages

Videos:

Hydraulic Pumps Types, and How the Work - 13 Minutes

Calculating Hydraulic Pump Flow and Efficiency - 6.5 Minutes

How Hydraulic Valves Work - 11 Minutes

Assignments:

Module Review Quiz - 8 Questions

Video Review Assignment

9.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we continue our study of hydraulics. Topics include defining flow rate, measuring flow rate, operating flow meters, and displacement pumps among others.

This Week's Material:

Lecture:

Hydraulics Lecture - 45 Pages

Videos:

Hydraulic Pumps Types, and How the Work - 13 Minutes

Calculating Hydraulic Pump Flow and Efficiency - 6.5 Minutes

How Hydraulic Valves Work - 11 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 - 8 Questions

Video Review Assignment - For each of the videos this week, write at least a one paragraph summary of the topics covered. Upload your document to the file upload question on this week's quiz.

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:

- Understand and describe how flow meters work (SLO 2)
- Understand the applications for the most common types of motors (SLO 2)
- Understand basic rules of drawing hydraulic schematics (SLO 1)

Concept Content:

We continued our look into hydraulics this week. Next week we continue our study of hydraulics.

This Week In Review:

Lecture:

Hydraulics Lecture - 45 Pages

Videos:

Hydraulic Pumps Types, and How the Work - 13 Minutes

Calculating Hydraulic Pump Flow and Efficiency - 6.5 Minutes

How Hydraulic Valves Work - 11 Minutes

Assignments:

Module Review Quiz - 8 Questions

Video Review Assignment

Module 10 - Principles of Hydraulic Pressure and Flow

10.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Describe how to calculate the force output of an extending cylinder (SOL 2)
- Understand how to size hydraulic cylinders (SLO 2)
- Understand how Pascal's Law and how it relates to Hydraulics (SLO 2)

Concept Content:

This week we continue our review of hydraulics. See module 10.2 for more detail.

This Week At A Glance:

Lectures:

Week 10 Lecture - 46 Pages

Videos:

Hydraulic Cylinder Force Calculation - 5.5 Minutes

Sizing Hydraulic Cylinders and Selecting Pumps Based on Force Requirements - 9.5 Minutes

Assignments:

Module 10 Review Quiz - 5 Questions

Force Output of an Extending Cylinder Caclulation Assignment

10.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we continue our review of hydraulics. Particularly we are looking into hydraulic pressure and flow.

This Week's Material:

Lectures:

Week 10 Lecture - 46 Pages

Videos:

Hydraulic Cylinder Force Calculation - 5.5 Minutes

Sizing Hydraulic Cylinders and Selecting Pumps Based on Force Requirements - 9.5 Minutes

10.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module 10 Review Quiz - 5 Questions

Force Output of an Extending Cylinder Calculation Assignment - Download the worksheet. We will work on it in class. **(Instructor Note: the answer key for this assignment is located in the instructor resources section)**

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:

- Describe how to calculate the force output of an extending cylinder (SOL 2)
- Understand how to size hydraulic cylinders (SLO 2)
- Understand how Pascal's Law and how it relates to Hydraulics (SLO 2)

Concept Content:

This week we continued our review of hydraulics. We will continue studying hydraulics next week.

This Week In Review:

Lectures:

Week 10 Lecture - 46 Pages

Videos:

Hydraulic Cylinder Force Calculation - 5.5 Minutes

Sizing Hydraulic Cylinders and Selecting Pumps Based on Force Requirements - 9.5 Minutes

Assignments:

Module 10 Review Quiz - 5 Questions

Force Output of an Extending Cylinder Calculation Assignment

Module 11 - Gear Pumps and Hydraulic Math

11.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Understand how gear pumps work (SLO 2)
- Understand the math basics that are used in hydraulic systems (SLO 2)

Concept Content:

This Week we continue looking into hydraulics. See module 11.2 for more details.

This Week At A Glance:

Lectures:

Hydraulics Math Lecture

Hydraulic Gear Pumps Lecture

Videos:

Hydraulics Math - 1.5 Hours

Hydraulic Gear Pumps Explained - 14 Minutes

Assignment:

Module Review Quiz - 9 Questions

11.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week we continue looking into hydraulics. We will first expand upon the math we learned last week and will conclude this week looking over how gear pumps work.

This Week's Material:

Lectures:

Hydraulics Math Lecture

Hydraulic Gear Pumps Lecture

Videos:

Hydraulics Math - 1.5 Hours

Hydraulic Gear Pumps Explained - 14 Minutes

These videos expand upon the concepts covered in the lectures.

11.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignment:

Module Review Quiz - 9 Questions

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.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:

Module Learning Objectives:

- Understand how gear pumps work (SLO 2)
- Understand the math basics that are used in hydraulic systems (SLO 2)

Concept Content:

This week we continued looking into hydraulics. Next week we continue our study of hydraulics.

This Week In Review:

Lectures:

Hydraulics Math Lecture

Hydraulic Gear Pumps Lecture

Videos:

Hydraulics Math - 1.5 Hours

Hydraulic Gear Pumps Explained - 14 Minutes

Assignment:

Module Review Quiz - 9 Questions

Module 12 - Hydraulic Speed Control

12.1 Module Overview

Concept Goals:

By the end of this module, you should:

- Understand the difference between series and parallel circuits (SLO 2)
- Understand how to troubleshoot system pressure issues (SLO 2)
- Design a circuit per specifications (SLO 1, SLO 3)

Concept Content:

This week we continue our look into hydraulic systems. See module 12.2 for more detail.

This Week At A Glance:

Lecture:

Week 12 Lecture - 64 Pages

Videos:

Pressure Drops in Series Circuits - 5 Minutes

Pressure in Parallel Circuits - 8.5 Minutes

How to Use System Pressure to Troubleshoot - 7.5 Minutes

Hydraulic System Inspection & Troubleshooting Session 1 - 22.5 Minutes

Hydraulic System Inspection & Troubleshooting Session 2 - 24 Minutes

Pressure Drops in Series Circuits - 5 Minutes

Assignment:

Hands on Proficiency Test

12.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we continue our look into hydraulic systems. Topics will include describing the operations of relief valves, direct acting relief valve, check valve, and flow control valves. We will also talk about series and parallel circuits and how they function in a hydraulics system.

This Week's Material:

Lecture:

Week 12 Lecture - 64 Pages

Videos:

Pressure Drops in Series Circuits - 5 Minutes

Pressure in Parallel Circuits - 8.5 Minutes

How to Use System Pressure to Troubleshoot - 7.5 Minutes

Hydraulic System Inspection & Troubleshooting Session 1 - 22.5 Minutes

Hydraulic System Inspection & Troubleshooting Session 2 - 24 Minutes

Pressure Drops in Series Circuits - 5 Minutes

12.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

Assignment:

Hands on Proficiency Test

Download the document. We will work on this activity 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:

- Understand the difference between series and parallel circuits (SLO 2)
- Understand how to troubleshoot system pressure issues (SLO 2)
- Design a circuit per specifications (SLO 1, SLO 3)

Concept Content:

This week we continued our look into hydraulic systems. Next week we will begin our final two weeks on hydraulics.

This Week In Review:

Lecture:

Week 12 Lecture - 64 Pages

Videos:

Pressure Drops in Series Circuits - 5 Minutes

Pressure in Parallel Circuits - 8.5 Minutes

How to Use System Pressure to Troubleshoot - 7.5 Minutes

Hydraulic System Inspection & Troubleshooting Session 1 - 22.5 Minutes

Hydraulic System Inspection & Troubleshooting Session 2 - 24 Minutes

Pressure Drops in Series Circuits - 5 Minutes

Assignment:

Hands on Proficiency Test

Module 13 - Pressure Control Circuits

13.1 Module Overview

Concept Goals:

By the end of this week, you should:

- Describe the parts of and functions of various types of valves. (SLO 2)
- Identify schematic symbols for specific valves. (SLO 1)

Concept Content:

This week we begin the last two weeks of our section on hydraulics. See module 13.2 for more detail.

This Week In Review:

Lecture:

Week 13 Lecture - 44 Pages

Videos:

2 and 3 Wire Control Circuits for Fluid Power Systems - 11.5 Minutes

Festo Pneumatic Cobot Articulating Arm - 3 Minutes

Pneumatic Roo -3 Minutes

Pneumatic EOAT End Of Arm Tool - 2 Minutes

Lighting Hybrids - 3.5 Minutes

Hydraulic Hybrid Vehicle - 1.5 Minutes

Assignments:

Video Review Summaries

Module 13 Review Quiz - 10 Questions

13.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week we begin the last two weeks of our section on hydraulics. Topics we will touch upon will include describing the function of various types of valves such as pressure sequence and bypass check valves. We will also look over the schematic symbols for these valves and circuits with the goal of you being able to identify those symbols.

This Week At A Glance:

Lecture:

Week 13 Lecture - 44 Pages

Videos:

2 and 3 Wire Control Circuits for Fluid Power Systems - 11.5 Minutes

Festo Pneumatic Cobot Articulating Arm - 3 Minutes

Pneumatic Roo -3 Minutes

Pneumatic EOAT End Of Arm Tool - 2 Minutes

Lighting Hybrids - 3.5 Minutes

Hydraulic Hybrid Vehicle - 1.5 Minutes

13.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignments:

Module 13 Review Quiz - 10 Questions

Video Review Summaries - watch the videos from module 13.2 and provide a 50 word summary for each video. Upload your word document with your summaries to the quiz section to question 11.

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.

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:

By the end of this week, you should:

- Describe the parts of and functions of various types of valves. (SLO 2)
- Identify schematic symbols for specific valves. (SLO 1)

Concept Content:

This week we began the last two weeks of our section on hydraulics. Next week is our last week on the subject of hydraulics.

This Week At A Glance:

Lecture:

Week 13 Lecture - 44 Pages

Videos:

2 and 3 Wire Control Circuits for Fluid Power Systems - 11.5 Minutes

Festo Pneumatic Cobot Articulating Arm - 3 Minutes

Pneumatic Roo -3 Minutes

Pneumatic EOAT End Of Arm Tool - 2 Minutes

Lighting Hybrids - 3.5 Minutes

Hydraulic Hybrid Vehicle - 1.5 Minutes

Assignments:

Video Review Summaries

Module 13 Review Quiz - Questions

Module 14 - Misc. Hydraulics Topics

14.1 Module Overview

Concept Goals:

By the end of this week you should,

- Be able to identify parts of a cylinder in a sketch. (SLO 2)
- Create a hydraulic schematic. (SLO 1)
- Create a bill of materials. (SLO 2)

Concept Content:

This week is our final week for hydraulics. See module 14.2 for more detail.

This Week In Advance:

Lectures:

Week 14 Lecture - 56 Slides

Handouts:

Series 2A, 2H, 3L, VH Cylinders Parts Identification Worksheet - Instructor Note: you can use this worksheet in class to discuss the parts of the cylinder and how they interact with each other.

Assignment:

Final Research Project

14.2 Module Content Resources

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This week is our last week on hydraulics. This week will be spend covering smaller topics that we did not get to touch upon earlier this semester. These will include cylinder mounting styles, pneumatic cylinders, types of high-pressure hydraulic hoses, etc. As you can see, we will also be stepping back into pneumatics a bit as well this week.

This Week's Material:

Lectures:

Week 14 Lecture - 56 Slides

Handouts:

Series 2A, 2H, 3L, VH Cylinders Parts Identification Worksheet - Instructor Note: you can use this worksheet in class to discuss the parts of the cylinder and how they interact with each other.

14.3 Module Assessment/Assignment

Concept Goals:

Outline the learning goals for this module here.

Concept Content:

This Week's Assignment:

Final Research Project - This week we have a final project for hydraulics. Download the document. We will work on it in class. You will have until next week to finish the project before our final exam.

Instructor Note: you will have to edit the document to add in the due date for your 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:

By the end of this week you should,

- Be able to identify parts of a cylinder in a sketch. (SLO 2)
- Create a hydraulic schematic. (SLO 1)
- Create a bill of materials. (SLO 2)

Concept Content:

This week was our final week for hydraulics. Next week is our final exam.

This Week In Review:

Lectures:

Week 14 Lecture - 56 Slides

Handouts:

Series 2A, 2H, 3L, VH Cylinders Parts Identification Worksheet - Instructor Note: you can use this worksheet in class to discuss the parts of the cylinder and how they interact with each other.

Assignment:

Final Research Project

Module 15 - Final Exam

15.1 Final Exam

Concept Goals:

By the end of this week, you should:

Demonstrate understanding of course material.

Concept Content:

This week we will take our final-term exam. It will cover all of our materials thus semester. To access the test, go to the assignments tab and click on test.

Final-Term Exam - 48 Questions

15.2 Course Wrap-Up

Concept Content:

Thank you for your work this semester. Best of luck going forward in your program.

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.