



BAKER COLLEGE
STUDENT LEARNING OUTCOMES

MATT 1510 Mechanical Drives 1 & 2
3 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Explain the safe use practices of mechanical drives used in manufacturing. (MD 1 module 1)
 - a. Discuss the 6 dress safety rules.
 - b. Review the 8 Mechanical Transmission Safety rules.
 - c. Describe the operation of the Lockout/Tagout system.
2. Examine Mechanical Drive systems. (MD 1 module 1)
 - a. Discuss the advantages and disadvantages of coupled transmission systems.
 - b. Review the 3 types of shaft to adjacent shaft power transmission.
 - c. Identify the 3 types of Foundations and the importance of a Bedplate.
 - d. Examine the 3 types of motor mounts.
 - e. Identify proper motor mounting, leveling and soft foot conditions.
 - f. Demonstrate the ability to measure motor speed using a Tachometer
3. Explore the function and operation of Keys and Key Fasteners. (MD1 module 2)
 - a. Describe the 6 types of key fasteners and set screws used to hold keys in place.
 - b. Identify Key and Keyseat Specifications and tolerance classifications.
 - c. Demonstrate competency in assembling a shaft and hub with a key fastener.
 - d. Describe 2 methods of loading a mechanical drive system.
 - e. Describe how to calculate rotary mechanical power and mechanical efficiency.
 - f. Discuss the ways to measure shaft torque and electric motor current.
4. Analyze and understand power transmission systems. (MD1 Module 3)
 - a. Describe the material used and the function of a shaft.
 - b. Describe the function of a bearing and define the 3 types of bearing loads.
 - c. Discuss the 2 methods of shaft bearing mounts and the 2 categories of bearings.
 - d. Describe the function and application of mechanical couplings.
 - e. Identify the purpose and function of shaft alignment
5. Demonstrate competency of belt drive concepts. (MD1 module 4)
 - a. Describe the function of the 3 basic components of a belt drive
 - b. Describe pitch, pitch circle, pitch diameter and pitch length of a belt drive
 - c. Explain and be able to calculate pulley ratio and its effect on torque
 - d. Identify the 5 types of belt drives and their applications
 - e. Describe how to install, align and measure tension on a belt drive system

6. Explore the concepts of chain drives. (MD1 module 5)
 - a. Describe the function of the 3 basic components of a chain drive.
 - b. Explain sprocket ratio and how to calculate shaft speed and torque.
 - c. Describe the 4 types of chain and understand their applications.
 - d. Describe how to install, align and remove various chain drive systems.

 7. Identify the concepts of Spur Gear Drives. (MD1 module 6)
 - a. Describe the function of the 3 basic components of a gear drive system.
 - b. Define gear pitch, pitch circle, and pitch diameter.
 - c. Describe how to calculate gear ratio, shaft speed and torque.
 - d. Describe the 4 types of gear drives.
 - e. Describe the 4 types of parallel shaft gears.
 - f. Explain the features and dimensions of a gear and gear drive systems.
 - g. Describe the acceptable parameters of backlash in a gear drive system.
 - h. Demonstrate competency when installing and aligning a gear drive system.

 8. Demonstrate an understanding of multiple Shaft drive systems. (MD1 module 7)
 - a. Explain how to calculate the speed and torque output in a multi-shaft gear drive.
 - b. Explain the function and how to calculate torque and speed of compound gear systems.
 - c. Describe how to determine the direction of rotation in a multi gear drive system.
 - d. Demonstrate competency when installing and aligning a multi-shaft drive system.

 9. Demonstrate an understanding on the use of various couplings used on mechanical drive systems. (MD2 module6)
 - a. Describe the 5 types of flexible metal couplings
 - b. Describe the operation of a chain, grid and gear couplings
 - c. Explain how to select the proper coupling for an application
 - d. Describe the function of a solid coupling. (MD1module7)
 - e. Describe the function and application of mechanical couplings. (MD1module 3segment3)
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Big Ideas and Essential Questions

Big Ideas

- Industrial Safety Foundations of Mechanical Drives
- Basic Principles of Mechanical Drives
- Understanding the Mathematics behind Mechanical Drives
- Proficiency in the setup and alignment of Mechanical Drives
- Fundamental understanding of the desired output of Mechanical Drives

Essential Questions

1. Why is safety the first priority?
2. Why is it important to consider speed and torque efficiencies and accuracies?
3. How do I determine what Mechanical Drive should be utilize in different applications?
4. What impact does an incorrect usage have on performance of the product?
5. How are the different Mechanical Drives used?
6. How does documentation impact industrial communication between shifts?
7. What are the potential uses in the future?

These SLOs are not approved for experiential credit.

Effective: Fall 2017