

WESTERN IOWA TECH COMMUNITY COLLEGE
Course Syllabus

Term:
Course Number and Section: IND 462 ____
Course Title: Pumps
Semester Hours: 2.00
Meeting time/location:
Instructor:
Phone: 712.274.8733 Ext.
E-mail: @witcc.edu
Office Location:
Office Hours:

COURSE DESCRIPTION AND PREREQUISITES/COREQUISITES:

This course introduces students to the principles of pumps including connections and applications. Students will gain working knowledge of centrifugal and positive displacement pumps along with operating conditions governing pressure and flows in the system.

Prerequisite: None
Corequisite: None

REQUIRED TEXTBOOKS/MATERIALS

COURSE OBJECTIVES

The course will provide information which should enable the student to:

1. Describe the basic operation of centrifugal pumps
2. Describe the operation of positive displacement pumps
3. Identify the different types of positive displacement pumps
4. Recognize common pump issues including cavitation
5. Identify safety issues with pump operation
6. Describe the operation of a centrifugal pump with a mechanical seal
7. Identify different types of positive displacement pumps
8. Describe methods for measuring flow rates
9. Define total dynamic head and explain its importance
10. Describe how to size a pump for a given application
11. Identify the two types of gear pumps
12. Describe how to maintain a centrifugal, piston, gear, and diaphragm pump
13. Explain how to setup pump systems and troubleshoot common problems

CONTENT OUTLINE:

- I. Introduction to Pumps
 - A. Functions of pumps
 - B. Types of pumps
 - C. Pump components
 - D. Pump safety
 - E. Pump operation
- II. Centrifugal Pumps
 - A. Flow rates
 - B. Head concepts
 - C. Pump head-to-flow characteristics
 - D. Impeller properties
- III. Positive Displacement Pumps
 - A. Piston pumps
 - B. Gear pumps
 - C. Diaphragm pumps
- IV. Pump Troubleshooting and Maintenance

- A. Cavitation
- B. Pseudo-cavitation
- C. Mechanical seals
- D. Pump Maintenance

COMPETENCIES:

At the conclusion of the course the student will be able to:

1. Maintain a centrifugal, piston, gear, and diaphragm pump
2. Implement safety procedures associated with pump operation
3. Calculate the theoretical flow rate or displacement of a pump
4. Convert between mass and volumetric flow rates
5. Detect pump cavitation
6. Interpret a pump troubleshooting chart
7. Calculate the effect of impeller speed on flow rate
8. Define the best efficiency point and describe its importance
9. Determine pump size for a given application
10. Setup pump systems and troubleshoot common problems

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