



Western Technical College

10620100 Pumps and Gear Boxes

Course Outcome Summary

Course Information

Description	This course will introduce centrifugal pump systems and characteristics along with gear box designs. Troubleshooting of common pump systems and gear boxes will be explored. Additional pump systems will also be covered.
Career Cluster	Manufacturing
Instructional Level	Associate Degree Courses
Total Credits	2
Total Hours	54

Textbooks

950-PM1 Pump Lab Handbook. Copyright 2015. Publisher: Amatrol. Required.

Gear Drives (Pumps 2 books). Publisher: Amatrol. Required.

Learner Supplies

Scientific calculator - T1-30XIIIS or T1-36x Solar. **Vendor:** Campus Shop. Required.

Amatrol 206-LSUB4 Elearning License. **Vendor:** Campus Shop. Required.

Success Abilities

1. Cultivate Passion: Expand a Growth-Mindset
2. Cultivate Passion: Increase Self-Awareness
3. Live Responsibly: Develop Resilience
4. Live Responsibly: Embrace Sustainability
5. Refine Professionalism: Participate Collaboratively

Program Outcomes

1. Perform work safely.
2. Troubleshoot electrical and mechanical systems and devices.
3. Repair electrical and mechanical systems.
4. Communicate technical information.
5. Integrate electrical and mechanical systems and devices.

Course Competencies

1. Calculate the final gear ratio of a gearbox.

Assessment Strategies

- 1.1. Skill Demonstration

Criteria

You will know you are successful when

- 1.1. you calculate the final gear ratio of a multiple gear gearbox.
- 1.2. you calculate output torque or speed based on gear ratio.

Learning Objectives

- 1.a. Calculate the final gear ratio of a gearbox.
- 1.b. Determine the output torque or speed from a gearbox using the gear ratio.

2. Measure backlash in a gear drive system.

Assessment Strategies

- 2.1. Demonstration

Criteria

You will know you are successful when

- 2.1. you measure backlash of a gear drive system using appropriate measuring tools.
- 2.2. you set the backlash of a gear drive system to a set tolerance using proper measuring tools.

Learning Objectives

- 2.a. Measure the backlash of a gear drive system.
- 2.b. Set the backlash of a gear drive system to a specific tolerance.

3. Align two shafts using a laser alignment system.

Assessment Strategies

- 3.1. Performance

Criteria

You will know you are successful when

- 3.1. you setup and calibrate a laser shaft alignment system.
- 3.2. you align two shafts using a laser alignment system.

Learning Objectives

- 3.a. Set up a laser alignment system to align two shafts.
- 3.b. Align two shafts within allowable tolerances using a laser alignment tool.

4. Determine the displacement of a pump based on flow measurements.

Assessment Strategies

- 4.1. Performance

Criteria

You will know you are successful when

- 4.1. you calculate displacement of a gear pump based on measurements taken of assembly.
- 4.2. you measure pump flow based on gauge readings.

Learning Objectives

- 4.a. Calculate pump displacement based on pump measurements.
- 4.b. Determine pump displacement based on flow measurements.

5. Calculate pump head loss based on system construction.

Assessment Strategies

- 5.1. Written Objective Test

Criteria

You will know you are successful when

- 5.1. you calculate head loss based on system piping size and material.
- 5.2. you calculate head loss in PSI based on flow rate.

Learning Objectives

- 5.a. Calculate system head loss for a system based on pipe size and material.
- 5.b. Determine the amount of pressure drop across a piping system based on flow rate.

6. Calculate the volumetric efficiency of a pump at various pressure levels.

Assessment Strategies

- 6.1. Written Objective Test

Criteria

You will know you are successful when

- 6.1. you determine flow rate of a pump based on pressure and volumetric efficiency table.
- 6.2. you calculate volumetric efficiency based on pump inlet and outlet flow measurements.

Learning Objectives

- 6.a. Determine volumetric efficiency of a pump using supplied pump table.
- 6.b. Calculate volumetric efficiency based on pump flow rates.

7. Construct hydraulic hoses that meet industry standards for proper crimping.

Assessment Strategies

- 7.1. Performance

Criteria

You will know you are successful when

- 7.1. you cut a hose to the correct length and choose the correct fitting based on the application.
- 7.2. you crimp a fitting onto a hydraulic hose within industry specifications.

Learning Objectives

- 7.a. Construct a hose using the proper fitting for a selected application.
- 7.b. Install a crimp fitting on a hose to meet industry standards for crimp size.