

MECH-263 MECHANICAL DRIVES II 4 CREDITS

SYLLABUS

CATALOG DESCRIPTION

This course teaches the bearings and gears used in heavy duty mechanical transmission systems. This course will emphasize linear axis drives, clutches, and brakes. In addition, this course teaches how to set up, operate and apply laser shaft alignment to a variety of industrial applications.

Prerequisites: MECH 262, MECH 263, MECH 264, MECH 265, MECH 266

Semester Offered: SPRING, ON DEMAND

COMMON STUDENT LEARNING OUTCOMES

Upon successful completion of San Juan College programs and degrees, the student will demonstrate competency in...

BROAD AND SPECIALIZED LEARNING

Students will actively and independently acquire, apply, and adapt skills and knowledge with an awareness of global contexts.

CRITICAL THINKING

Students will think analytically and creatively to explore ideas, make connections, draw conclusions and solve problems.

CULTURAL AND CIVIC ENGAGEMENT

Students will act purposefully, reflectively, and ethically in diverse and complex environments.

EFFECTIVE COMMUNICATION

Students will exchange ideas and information with clarity in multiple contexts.

INFORMATION LITERACY

Students will be able to recognize when information is needed and have the ability to locate, evaluate, and use it effectively.

INTEGRATING TECHNOLOGIES

Students will demonstrate fluency in the application and use of technologies in multiple contexts.

Student work from this class may be randomly selected and used anonymously for assessment of course, program, and/or institutional learning outcomes. For more information, please refer to the Dean of the appropriate School.

COURSE LEARNING OUTCOMES

Upon successful completion of the course, the student will be able to...

1. Install and adjust a solid bearing using a hammer and mandrel. Select a lubrication system for a plain bearing system. Install and adjust a type 1 bearing using an arbor press. Lubricate a plain bearing using the oil cup

method. Identify the size and type of plain bearing materials and give a specification and application. Determine the shaft clearance for a given plain bearing application. Troubleshoot a plain bearing installation.

- 2. Handle and clean an antifriction bearing. Ball bearing component identification. Describe how ball bearings are specified. Identify a ball bearing given a sample. Install and remove a ball bearing on a shaft using an arbor press. Install a ball bearing on a shaft using a bearing heater. Install and align a deep groove ball bearing system. Remove a ball bearing using a bearing puller.
- 3. Tapered roller bearing component identification. Identify type and size of a tapered roller bearing given a sample. Install a tapered roller bearing on a shaft and housing using a sleeve and hammer. Use an internal bearing puller to remove a roller bearing. Install a roller bearing on a shaft using an arbor press. Install a roller bearing using hot mounting. Pack a tapered roller bearing with grease. Install and align an indirect mount tapered roller bearing system. Install and align a direct mount tapered roller bearing system using a cup follower retainer.
- 4. Mount and remove an angular contact bearing. Install and adjust angular contact bearings. Select a lubricant for an antifriction bearing for a given application. Select a ball bearing for a given application. Select a tapered roller bearing for a given application. Troubleshoot an antifriction bearing installation.
- Cut a gasket to a specific shape. Assemble two parts with a gasket. Install, remove and inspect an o-ring seal. Install, remove and inspect a mechanical seal system. Troubleshoot a given seal installation. Select a seal for a given application.
- 6. Install and align a parallel shaft helical gear drive system. Install and align a right-angle bevel gear drive system. Calculate the output speed and torque of a worm gear speed reducer. Disassemble, inspect, and reassemble a worm gear speed reducer.
- 7. Calculate diametral pitch. Identify the size and type of gear given a sample. Select a gear pair for a given application. Select a method of gear lubrication for a given application. Select a lubricant for a given gear drive lubrication. Troubleshoot a gear drive system.
- 8. Calculate the torque created by an inertial load. Install and adjust an electromagnetic brake. Install and adjust an electromagnetic plate clutch. Install and adjust a cam clutch.
- 9. Select a clutch or brake given a sample. Size a clutch or brake for a given application. Inspect and troubleshoot a clutch or brake.
- 10. Linear drive component identification. Install and adjust a linear ball bushing and a linear slide. Identify a linear ball bushing given a sample. Lubricate a linear ball bushing. Select a linear ball bushing for a required application.
- 11. Ball screw-drive component identification. Install and adjust a ball screw drive. Specify a ball screw-drive given a sample. Select a ball screw-drive for a given application. Troubleshoot a ball-screw drive system. Disassemble, inspect, reassemble, and lubricate a ball screw drive.
- 12. SKF Shaft alignment system component identification. Install and align a power transmission system using a jack bolt motor base. Use a laser alignment system to correct soft foot. Align tow shafts using a laser alignment system. Determine shaft alignment tolerances for a given machine installation.