MENG 4650

Machine Design

Catalog Description
4650 Machine Design (3) (F) P: MENG 3624. 3 lecture hours per week. Kinematics of mechanisms and machines. Design and analysis of machine components, including shafts, gears, bearings

Text:
1. Mott, Robert L. *Machine Elements in Mechanical Design, 4th Edition*, Pearson Prentice Hall, 2004, ISBN 0-13-061885-3.
2. Hibbeler, R. C. *Engineering Mechanics: Dynamic, 11th Edition*. Prentice Hall, 2007, ISBN: 0132215047.
3. Course Pack – Kinematics
4. National Council of Engineering Examiners. *Fundamental of Engineering Supplied-Reference Handbook, 8th Edition*. 2008, ISBN 978-1-932613-30-8.

Objectives:
At the completion of this course, students will be able to:
- Identify common mechanisms
- Draw kinematic sketches of mechanisms
- Perform position, velocity, and acceleration analyses of mechanisms
- Analyze single-degree-of-freedom spring-mass-damper systems
- Design and analyze gears
- Design and analyze shafts
- Be familiar with various types of bearings
- Select appropriate rolling-element bearings
- Select and analyze threaded fasteners
- Analyze compression springs
- Be familiar with the operation of brakes and clutches

Course Content:
- Classification of mechanisms (2 classes)
- Kinematic sketches (2 classes)
- Position analysis (2 classes)
- Velocity analysis (3 classes)
- Acceleration analysis (4 classes)
- Kinematic analysis with complex numbers (3 classes)
- Vibrations (4 classes)
- Review: Fatigue failure criteria (1 class)
- Spur gears (3 classes)
- Other types of gears (2 classes)
- Shafts and keys (3 classes)
- Bearings (3 classes)
- Threaded fasteners (3 classes)
- Springs (3 classes)
- Clutches and brakes (2 classes)

- Exams (2 classes)

Grading:

Grading			Assessment	
A	90% or better		Homework/Assignments	25%
B	80% or better		Project	15%
C	70% or better		Tests (2)	30%
D	60% or better		Final Exam	30%
F	Less than 60%		Total	100%