Department of Mechanical Engineering
Phone: +1.903.566.7003
Fax: +1.903.566.7148
Uttyler.edu/engineering

MENG 3309 – Mechanical Systems Design
Course Syllabus

Semester / Year	Spring 2025
Catalog Description	Characterization, design, selection, and integration of mechanical systems and components including shafts, bearings, gears, springs, mechanical fasteners, clutches, and brakes. Three hours of lecture per week.
Prerequisites	MENG 3306/CENG 3306 (C or better), and MENG 3319
Section Number	030
Instructor Name	Dr. Ermias G. Koricho
Contact Information	Email: ekoricho@uttyler.edu Phone: _____ Office:_ A220_____
Class Type / Instruction Mode / Location	Face to face / Lecture/ HEC Ctr 0C204
Class Time	Tuesday and Thursday 11:00AM to 12:20PM
Office Hours	M/F 11:00 AM – 12:00 PM, Tu 2:00 PM – 3 PM or by appointment
No. of Credits	3 credits
Required Textbook	McGraw Hill Connect - Budynas and Nisbett, Shigley's Mechanical Engineering Design, 11th Edition
Optional References	Robert L. Norton, Machine Design: An Integrated Approach, 5th ed
Additional Rules and Requirements	Students may discuss their homework solutions with one another, but each student must submit their own, independent solution (i.e. you may not just copy someone else's homework. Students can use AI programs (ChatGPT, Copilot, etc.) in this course. If you utilize an AI tool to help create content for an assignment, you must acknowledge and cite the tool's contribution to your work.
Evaluation Method	Test I 15% Test II 15% Test III 15% Final Exam 15% Attendance / Participation[1] 5% Homework[1] 5% Quizzes[1] 10% Project / Presentation[2] 20% [1]There will be several homework assignments that are directly related to classroom discussion and test material. Everybody is required to attend all the classes. There will be both announced and unannounced quizzes. These quizzes cannot be made up in any circumstances. [2]The project is a group gearbox project. Detail information about the project will be delivered later.
Grading Policy / Scale	Letter grades, scale: A: 90 – 100; B: 80 – 89; C: 70 – 79; D: 60 – 69; F: < 60

Important Events / Dates	Census date: 01/27/2025 First drop for non-payment: 01/21/2025 Last day to withdraw from one or more classes: 03/31/2025 Spring Break: 03/17/2025-03/21/2025 End of Class: 05/03/2025
Attendance / Makeup policy / other rules	Regular attendance is required. In case you have to miss a class, it is your responsibility to keep up with the class work and be informed of all announcements made in the class. **Homework Assignments:** homework will be assigned according with the topics covered in lectures. Assignments are considered very important for the understanding of the course material. Completing your homework independently is an absolute necessity to do well in this course. **Canvas:** Course syllabus, course material such as handouts and example problems with solutions, homework, assignments, homework solutions, review material will all be posted on Canvas. Please review all the material posted on Canvas on a regular basis.
Course Learning Objectives / ABET & PEOs Relation	Upon completion of this course, the students will be able to: 1. Determine the stress, strain and deflection of machine elements. 2. Design for combined stresses and stress concentration. 3. Design to avoid fatigue failure against fully reversed and fluctuating cyclic loads. 4. Design of multi-step shafts and calculation of their critical speed. 5. Select bearings based on design parameters.
University Policies	https://www.uttyler.edu/offices/academic-affairs/files/syllabus-information.pdf

Course topics and lecture hours devoted to each topic:

Week No	Week	Topics
1	Jan 13-Jan 17	Mechanics of Materials (revision): Introduction, Materials, Load and stress analysis
2	Jan 20-Jan 24	• Prerequisite Quiz: (Bending Moment Diagram, Combined loading, Mohre circle, pressure vessel, Bucklingm, Stress due to Temperature, Truss, and Beam.) • Static Failure Theories: Maximum Normal theory, Maximum Shear Stress Theory, Distortion Energy
3	Jan 27-Jan 31	Static Failure Theories: Coulomb-Mohr theory Modified Mohr theory, Fatigue Failure Theories: Introduction,

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4	Feb 03-Feb 07	Fatigue Failure Theories: Endurance Limit, Modified Goodman, Soderber, Yield Line
5	Feb 10-Feb 14	Fatigue Failure Theories: Gerber, ASME-Elliptic
	Feb 13	Test I (The test will cover Week 1-Week 5)
6	Feb 17-Feb 21	Shaft and keys
7	Feb 24-Feb28	Shaft and keys, Belt
8	Mar 03-Mar 07	Gears
9	Mar 10-Mar 14	Gears Stress Analysis
	March 13	Test II (The test will cover Week 6 -Week 9)
10	***Mar 17-Mar 21***	***Spring Break***
11	Mar 24-Mar 28	Gear (Examples), Springs
12	Mar 31-Apr 04	Springs
13	Apr 07- Apr 11	Screws and Fasteners
	April 03	Test III (The test will cover Week 11-Week 13)
14	Apr 14- Apr 18	Screws and Fasteners, Clutches and Brakes
15	Apr 21- Apr 25	Clutches and Brakes,
16	Apr 28- May 02	Welding Design
	TBA	Final Test (The test will cover Week 14-Week 16)