

MEEN 3130 – Machine Elements
3 credit hours Fall 2017

Instructor: Dr. Mark Wasikowski (mark.wasikowski@unt.edu)

Course Time and Place: Section 1: MW 2.30 – 3:50 B157; Section 2: MW 4.00 – 5:20 F175

Office and Hours: F101L. MW 10-11, TR 1-2, or by appointment

Teaching Assistant: TBD

Catalog Course Description: Applications of the principles of mechanics and mechanics of materials to machine design. The elements of machines are analyzed in terms of their dynamic behavior. Selection and sizing of machine elements. Students use the finite element technique for the analysis of machines and their counterparts.

Pre-requisite:

MEEN (ENGR) 2332 Mechanics III (implies statics too), ENGR 1304: Engineering Graphics

Course Topics and Structure: overall machine design and sizing of components. Failures and failure prevention. Application to machine design and mechanical elements such as power transmission shafting, bearings, gears, fasteners, and springs. Engineering concepts and practical applications are equally important to problem solving.

Required On-line Course Text:

“Mechanical Engineering Design”, 10th, Budynas and Shigley, McGraw Hill
Connect On-Line + e-text (ISBN13: 9780077591649)
Connect On-Line + Loose Leaf text (ISBN13: 9781259290572)
Connect On-Line + hardcopy text (ISBN13: 9781259275944)

Connect on-line course required. Your choice of used or other hardcopy textbook possible. Official 10th domestic version used. Connect on-line course provides complete digital learning experience, on-line practice questions, videos, interactive tutorials, robust learning and progress reports, instant learning feedback, and discounted electronic textbook. Connect used for homework assignment tracking, and perhaps some quizzes.

Communication: Communication is UNT’s Blackboard (BB) system and university email. Must have valid UNT email registered through BB. Verify course enrollment and availability. BB used to post syllabus, homework, lecture slides, grades, etc. REEF used for participation, attendance, and some quizzes. Each student must have a REEF account linked to this course.

Calculators: The only calculators that are approved for this course are those permitted on the Fundamentals of Engineering (FE) exam toward Professional Engineer (PE) licensing:

- 1) Hewlett Packard—HP 33s and HP 35s models, but no others.
- 2) Casio—All fx-115 and fx-991 models. Any Casio calculator must contain fx-115 or fx-991 in its model name.
- 3) Texas Instruments: All TI-30X and TI-36X models. Any TI calculator must contain either TI-30X or TI-36X in its model name

Grades: Standard grading scale used: 90/80/70/60. Re-grade request must be made in class day is returned. No re-grade requests after class dismissed. Entire exam will be re-graded, which may result in lower score than originally assigned. Make-up NOT allowed only exception being University excused absences with documentation provided.

10% Homework: Assigned often through Connect on-line course. Due dates as specified on-line. If in-class handouts provided as homework, it is due beginning of next class. Come to class with any questions on homework.

20% Participation: Lecture is mix of slides, problem solving, and group discussion. Slides available on BB ahead of time. Download and print slides before class. Review slides / read assigned textbook sections ahead of time. Participate through attendance, group problem solving, helping others, and answering questions. UNT's REEF system tracks participation on-line. Create (or update) REEF account and link required.

20% Quizzes: In class closed book quizzes, generally on Wednesday's, to evaluate reading comprehension and problem-solving ability from recently presented homework. Typically, one problem approximately 30 minutes similar to homework.

25% Mid Term 1: Comprehensive in class closed book assessment, evaluating both qualitative engineering applications (multiple choice, essay) and problem-solving ability.

25% Mid Term 2: Comprehensive in class closed book assessment, evaluating both qualitative engineering applications (multiple choice, essay) and problem-solving ability.

Exam Schedule

Quizzes most every Thursday

Mid Term 1: 11 October

Mid Term 2: 11 Dec., 1:30 - 3.30; Section 2: 13 Dec., 1:30 - 3.30

ABET Criteria: MEEN 3130 addresses several ABET program outcomes, including applying knowledge of mathematics, engineering and science as well as identifying, formulating and solving engineering problems. Upon successful course completion:

- State the fundamental principles used in the study of elements for machine design
- Apply principals of mechanics, materials, stress analysis, statics, and dynamics to machine sizing
- Determine loads and define, evaluate, and select appropriate materials for design
- Determine failure modes and deformation of a design
- Apply static and dynamic failure theories in design analysis
- Select appropriate dimensions and size of machine elements

Disability Policy: Reasonable accommodation made to facilitate special needs. If accommodations required, student meet with Office of Disability Accommodation (ODA), (940) 565-4323. After meeting, contact me to discuss accommodations. For more information, see <http://www.unt.edu/oda>.

Academic Dishonesty: UNT core values of trust, honesty, and integrity are necessary for learning to occur. Each student expected to complete own work. Cheating will not be tolerated and will result in score of zero. Student will be reported to Provost Office, Office of Academic Integrity, for appropriate disposition. No exceptions.

Instructor reserves the right change the schedule. Any changes will be announced in class.

Date	Chapter	Topic	Quiz / Exam
8/28	3	Failures, FBD, Load Diagrams	
8/30	3	Stress	
9/4		Labor Day	
9/6	3	Combined Loading	FBD & Loads
9/11	4	Deflection	
9/13	4	Deflection	Combined Loading
9/18	5	Ductile Static Failures	
9/20	5	Ductile Static Failures	Deflection
9/25	6	Fatigue	
9/27	6	Fatigue	Static Failures
10/2	6	Fatigue	
10/4	6	Fatigue	Fatigue
10/9		Review	
10/11			Mid Term 1
10/16	11	Bearings	
10/18	11	Bearings	
10/23	11	Bearings	
10/25	11	Bearings	Bearings
10/30	11	Bearings	
11/1	13	Gears	Bearings
11/6	13	Gears	
11/8	13	Gears	Gears
11/13	13	Gears	
11/15	14-15	Gears	Gears
11/20	14-15	Gears	
11/22	14-15	Gears	Gears
11/27	14-15	Gears	
11/29	14-15	Gears	Gears
12/4		Power Train Systems	
12/6		Review	