Semester Spring 2024
Course Title ME1029 Mechanical Design 2

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Office Hours Wednesday 13:00-17:00, Thursday 13:00-17:00

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Lecture Time/Room Thursday 8:15-11:00AM, Room: Zone 4-204

Prerequisites MEMS 1028 Mechanical Design 1
MEMS 0024 Intro to ME Design

Textbook Shigley's Mechanical Engineering Design by Richard G. Budynas and J. Keith Nisbett,10th edition, McGraw-Hill Education, 2015.

Course Description This course is a 3-credit hour class. It is an advanced study with focus to introduce elements frequently used in mechanical designs. As the class evolves, students will develop (1) functionality understanding of components in static and dynamic mechanical applications, (2) thought process in the decision of selecting components for the targeted applications, and (3) analysis and synthesis methodologies for evaluation of the structural risks of the selected components.
Students will also involve in an extensive design project in this class. Students in teams will compete to develop a design for a product, applying structured design practices to real hardware.

Course Outcome It is expected that the students will have good understanding of general design practices facilitated by industrial companies. Students will effectively apply the learned knowledge to size their designs, deliberate the pros and cons of their designs, and systematically draw conclusions per analytical opinions.

Course Outline

Session	Class Date	Chapter	Topics	Homework
1	Feb 29		LN00 Course Overview	
2	Mar 07	Ch.3.16, 7.8 5.3 – 5.5, 5.7	LN01 Interference Fit Design LN02 Failures Resulting from Static Loading	HW01
3	Mar 14	Ch.08	LN07A Nonpermanent Joints	HW02
4	Mar 21	Ch.08	LN07B Nonpermanent Joints	HW03
5	Mar 28	Ch.08	LN07B Nonpermanent Joints Preparation of Design Exercises	HW04
6	**Apr 04 (Holiday) TBD**		**Section Exam 01**	
7	Apr 11	Ch.06	LN03 Review: High-Cycle Fatigue Design	HW05
8	Apr 18	Ch.06 Ch.07	LN03 Review: High-Cycle Fatigue Design LN04 Shafts and Shaft Components	HW06
9	Apr 25	Ch.07	LN04 Shafts and Shaft Components	HW07
10	May 02	Ch.11	LN08A Gear Fundamentals LN08B Geartrain Force Analysis	HW08
11	May 09		**Section Exam 02**	
12	May 16	Ch.11	LN05A Rolling Contact Bearings: Ball Bearings	
13	May 23	Ch.11	LN05A Rolling Contact Bearings: Ball Bearings	HW09
14	May 30	Ch.11	LN05A Rolling Contact Bearings: Ball Bearings LN05B Rolling Contact Bearings: Tapered	HW10

			Roller Bearings; Direct/Indirect Mount	
15	Jun 06	Ch.12	LN06A Lubrication & Journal Bearings	HW11
16	Jun 13	Ch.12	LN06B Lubrication & Journal Bearings	HW12
17	Jun 20		**Section Exam 03**	
18	Jun 27		No Class	

In-Class Exercises	Hands-on calculation questions given in class to familiarize students with the lectured contents
Homework	Problem sets will be distributed each week after the class. Each problem set is designed to build upon the material covered in the preceding lectures and recitations. Homework assigned in a particular class is due at 8 AM on the day of the next class period, unless otherwise posted. Late HW will not be accepted. HW missed due to unforeseeable emergencies will be handled on a case-by-case basis.
Design Exercises	Purposes • apply the learned knowledge to practice sizing their designs, • deliberate the pros and cons of their designs, • Identify the failure mechanisms and define pass/fail criteria, and • Draw systematical conclusions per analytical opinions. Duration: ~2-3 Weeks for each DE Detailed requirements for DE report will be furnished later.
Section Exams	Three section exams. Section exams will be fast-paced and computation-intensive. Purpose is to test student's proficiency and familiarity with the section contents. The exams in this course will be open-book and open-note. No make-up will be given for the missing exam. Exams missed due to unpredictable events will be dealt with on a case-by-case basis. Bring one engineering calculator to the exams. You will need it. No programmable calculator of any kind is permitted in ME exams.
Grades	In-Class Exercises: 10% Homework: 15% Section Exams: 45% Design Exercises: 30% (DE01: 10%, DE02: 20%) **No curving of the final grades.** 附件：等级成绩和百分成绩、绩点对照表
Class Attendance	Students are expected to attend every class period. Early is on time, on time is late. As a courtesy to your fellow classmates, be punctual and arrive no later than the class starting time.
Academic Honesty	All of us are equally responsible for ensuring a fair and positive learning environment. Students involved in or with academic dishonesty will be dealt with in the strictest manner regardless the extent of involvement. Students are permitted to discuss homework assignments together but should do their own work when preparing a problem solution. Students caught cheating will receive disciplinary action, including receiving a grade of "F" for the course.

字母等级	A	A-	B+	B	B-	C+	C	C-	D+	D	F
中文等级	优秀		良好		中等		合格				不合格
百分制	100~90	89~85	84~80	79~76	75~73	72~70	69~66	65~63	62~61	60	<60
绩点	4	3.7	3.3	3	2.7	2.3	2	1.7	1.3	1	0