

Semester	Spring 2021
Course Number	ME1029
Course Title	Mechanical Design 2
Instructor	Professor Ping C. Sui, Ph.D. Office: 4-223 e-mail: ping.sui@scupi.cn
Office Hours	Tuesday 1:00-5:00PM Thursday 1:00-5:00PM
Teaching Assistant	Kail Liao E-mail: 1441766804@qq.com
Lecture Time/Room	Wednesday 8:15-11:00AM Zone 3-104
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.

To facilitate the understanding, design practices will be given to students periodically. Students will apply the learned knowledge to size their designs, deliberate the pros and cons of their designs, and systematically draw conclusions per analytical opinions.

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.

Session	Class Date	Chapter	Topics	Homework
1	Mar 10	Ch.3.16, 7.8	LN00 Course Overview LN01 Thick-Walled Cylinder and Press Fits	HW01
2	Mar 17	Ch.3.16, 7.8 5.3 – 5.5, 5.7	LN01 Thick-Walled Cylinder and Press Fits LN02 Static Failure	HW02 Design Exercise 01
3	Mar 24	Ch.06	LN03 Review: High-Cycle Fatigue Design	HW03
4	Mar 31	Ch.06 Ch.07	LN03 Review: High-Cycle Fatigue Design LN04 Shafts and Shaft Components	HW04
5	Apr 7		Section Exam 01	
6	Apr 14	Ch.08	LN05A Nonpermanent Connections	HW05
7	Apr 21	Ch.08	LN05B Nonpermanent Connections	HW06
8	Apr 28	Ch.08	LN05C Screws, Fasteners, and Connections	HW07
9	May 5	Ch.12	LN06A Lubrication & Journal Bearings	HW08 Design Exercise 02
10	May 12	Ch.12	LN06B Lubrication & Journal Bearings	HW09
11	May 19		Section Exam 02	
12	May 26	Ch.11	LN07 Rolling Contact Bearings	HW10
13	Jun 2	Ch.11	LN07B Tapered Roller Bearings; Direct/Indirect Mount; Hertzian Contact	HW11
14	Jun 9		Section Exam 03	Design Exercise 03

15	Jun 16	Ch.11	LN08A Gear Fundamentals	HW12
16	Jun 23	Ch.11	LN08B Spur Gear Design Analysis	
			Sealing Elements (Optional)	

In-Class Exercise	Hands-on calculation questions given in class to familiarize students with the lectured contents																																															
Homework	<p>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.</p> <p>Homework assigned in a particular class is due at 8 AM on the day of the next class period, unless otherwise posted.</p> <p><u>Late HW will not be accepted.</u> HW missed due to unforeseeable emergencies will be handled on a case-by-case basis.</p>																																															
Design Exercises	<p>Purposes</p> <ul style="list-style-type: none"> • apply the learned knowledge to practice sizing their designs, • deliberate the pros and cons of their designs, and • Identify the failure mechanisms and define pass/fail criteria • Draw systematical conclusions per analytical opinions. <p>Duration: ~2 Weeks for each DE Detailed requirements for DE report will be furnished later.</p>																																															
Exams	<p>Three section exams. No final Exam.</p> <p>Section exams will be fast-paced and computation-intensive. Purpose is to test student's proficiency and familiarity with the section contents.</p> <p>The exams in this course will be open-book and open-note.</p> <p><u>No make-up will be given for the missing exam.</u> Exams missed due to unpredictable events will be dealt with on a case-by-case basis.</p>																																															
Exam Calculator	No programmable calculator of any kind is permitted in ME exams. Students can use their calculator of choice for other assignments.																																															
Grades	<p>In-Class Exercise: 15%</p> <p>Homework: 20%</p> <p>Section Exams: 30%</p> <p>Design Exercises: 35%</p> <p>附件：等级成绩和百分成绩、绩点对照表</p> <table border="1" data-bbox="402 1276 1304 1564"> <tr> <td>字母等级</td> <td>A</td> <td>A-</td> <td>B+</td> <td>B</td> <td>B-</td> <td>C+</td> <td>C</td> <td>C-</td> <td>D+</td> <td>D</td> <td>F</td> </tr> <tr> <td>中文等级</td> <td colspan="2">优秀</td> <td colspan="2">良好</td> <td colspan="2">中等</td> <td colspan="3">合格</td> <td>不合格</td> </tr> <tr> <td>百分制</td> <td>100-90</td> <td>89-85</td> <td>84-80</td> <td>79-76</td> <td>75-73</td> <td>72-70</td> <td>69-66</td> <td>65-63</td> <td>62-61</td> <td>60</td> <td><60</td> </tr> <tr> <td>绩点</td> <td>4</td> <td>3.7</td> <td>3.3</td> <td>3</td> <td>2.7</td> <td>2.3</td> <td>2</td> <td>1.7</td> <td>1.3</td> <td>1</td> <td>0</td> </tr> </table>	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
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Class Attendance	<p>Students are expected to attend every class period.</p> <p>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.</p>																																															
Academic Honesty	<p>All of us are equally responsible for ensuring a fair and positive learning environment.</p> <p>Students are permitted to discuss homework assignments together, but should do their own work when preparing a problem solution.</p> <p>All exams are to be completed without unauthorized assistance. Any student caught cheating on an assignment or exam will receive disciplinary action, up to and including receiving a grade of "F" for the course.</p>																																															