

**Semester** Fall 2024  
**Course Title** ME1029 Mechanical Design 2, Section 02

**Instructor** Professor Ping C. Sui, Ph.D.  
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**Office Hours** Tuesday 13:00-17:00  
Wednesday 13:00-17:00

**Teaching Assistant** 徐子翕(E-mail: [2020141520068@stu.scu.edu.cn](mailto:2020141520068@stu.scu.edu.cn))

**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	Sep 05	Ch.3.16, 7.8	LN00 Course Overview LN01 Interference Fit Design	HW01
2	Sep 12	5.3 – 5.5, 5.7 Ch.08	LN02 Failures Resulting from Static Loading LN03A Nonpermanent Joints	HW02
3	Sep 19	Ch.08	LN03A Nonpermanent Joints LN03B Nonpermanent Joints	HW03 <b>Design Exercise 1</b>
4	Sep 26	Ch.08	LN03B Nonpermanent Joints LN03C Nonpermanent Joints Preparation of Design Exercises	HW04
5	<b>Oct 03</b>		<b>Holiday</b>	
6	Oct 10	Ch.06	LN04 Review: High-Cycle Fatigue Design	HW05
	<b>Friday PM Oct 11</b>		<b>Section Exam 01</b>	
7	Oct 17		<b>No Class (Substitute by Oct 11 Exam)</b>	
8	Oct 24	Ch.07	LN05 Shafts and Shaft Components	HW06
9	Oct 31	Ch.07	LN05 Shafts and Shaft Components	HW07
10	Nov 07	Ch.11	LN06A Gear Fundamentals LN06B Geartrain Force Analysis	HW08
11	<b>Nov 14</b>	Ch.11	<b>Section Exam 02</b>	HW09
12	Nov 21		LN07A Rolling Contact Bearings: Ball Bearings	<b>Design Exercise 2</b>

13	Nov 28	Ch.11	LN07A Rolling Contact Bearings: Ball Bearings	HW10
14	Dec 05	Ch.11	LN07B Rolling Contact Bearings: Tapered Roller Bearings; Direct/Indirect Mount	HW11
15	Dec 12		LN08A Lubrication & Journal Bearings	HW12 <b>Design Exercise 2 Due</b>
16	Dec 19	Ch.12	LN08B Lubrication & Journal Bearings	HW13
17	<b>Dec 26</b>	Ch.12	<b>Section Exam 03</b>	
18	Jan 02		No Class	

In-Class Exercises	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"> <li>• apply the learned knowledge to practice sizing their designs,</li> <li>• deliberate the pros and cons of their designs,</li> <li>• Identify the failure mechanisms and define pass/fail criteria, and</li> <li>• Draw systematical conclusions per analytical opinions.</li> </ul> <p>Duration: ~2-3 Weeks for each DE Detailed requirements for DE report will be furnished later.</p>																																																
Section Exams	<p>Three section exams.</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> <p>Bring one engineering calculator to the exams. You will need it.</p> <p>No programmable calculator of any kind is permitted in ME exams.</p>																																																
Grades	<p>In-Class Exercises: 10%</p> <p>Homework: 15%</p> <p>Section Exams: 45%</p> <p>Design Exercises: 30% (DE01: 10%, DE02: 20%)</p> <p><b>No curving of the final grades.</b></p> <p>附件：等级成绩和百分成绩、绩点对照表</p> <table border="1" data-bbox="405 1536 1318 1823"> <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 colspan="2">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>&lt;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 involved in or with academic dishonesty will be dealt with in the strictest manner regardless the extent of involvement.</p> <p>Students are permitted to discuss homework assignments together but should do their own work when preparing a problem solution.</p>																																																

	Students caught cheating will receive disciplinary action, including receiving a grade of "F" for the course.
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