

<b>Semester</b>	Spring 2025
<b>Course Title</b>	ME1029 Mechanical Design 2, Section 01
<b>Instructor</b>	Professor Ping C. Sui, Ph.D. Office: N502 (Jiang-An South Campus) e-mail: <a href="mailto:ping.sui@scupi.cn">ping.sui@scupi.cn</a>
<b>Office Hours</b>	Wednesday 13:00-17:00 Thursday 13:00-17:00
<b>Teaching Assistant</b>	徐子翕(E-mail: <a href="mailto:2020141520068@stu.scu.edu.cn">2020141520068@stu.scu.edu.cn</a> )
<b>Lecture Time</b>	Thursday 8:15-11:00AM,
<b>Location</b>	江安现代工学互动教学中心（南楼）S502
<b>Prerequisites</b>	MEMS 1028 Mechanical Design 1 MEMS 0024 Intro to ME Design
<b>Textbook</b>	Shigley's Mechanical Engineering Design by Richard G. Budynas and J. Keith Nisbett, 10th edition, McGraw-Hill Education, 2015.
<b>Course Description</b>	<p>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.</p> <p>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.</p>
<b>Expected Student Outcomes</b>	<p>It is expected that the students will have good understanding of general design practices facilitated by industrial companies.</p> <p>Students will learn to perform detailed analyses and simulations to predict the performance of their designs.</p> <p>Students will develop stronger problem-solving skills, applying engineering principles to solve real-world mechanical design challenges.</p> <p>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.</p>

#### Course Outline

Session	Class Date	Chapter	Topics	Homework
1	Feb 27	Ch.3.16, 7.8	LN00 Course Overview LN01 Interference Fit Design	HW01
2	Mar 06	5.3 – 5.5, 5.7 Ch.08	LN02 Failures Resulting from Static Loading LN03A Nonpermanent Joints	HW02
3	Mar 13	Ch.08	LN03A Nonpermanent Joints	HW03 <a href="#">Design Exercise 1</a>
4	Mar 20	Ch.08	LN03B Nonpermanent Joints LN03C Nonpermanent Joints	HW04
5	Mar 27	Ch.08	LN03C Nonpermanent Joints LN03D Bolt Fatigue Loading of Tension Joints	HW05
6	<b>Apr 03</b>		<b>Section Exam 01</b>	
7	Apr 10	Ch.06	LN04 Review: High-Cycle Fatigue Design <a href="#">DE01 Report Due</a>	HW06
8	Apr 17	Ch.07	LN05A Shafts and Shaft Components	HW07

9	Apr 24	Ch.07 Ch.13	LN05B Shafts and Shaft Components LN06 Gear Fundamentals and Geartrain Force Analysis	HW08
10	May 01	Ch.13	LN06 Gear Fundamentals and Geartrain Force Analysis	HW09 <b>Design Exercise 2</b>
11	<b>May 08</b>		<b>Section Exam 02</b>	
12	May 15	Ch.11	LN07A Rolling Contact Bearings: Ball Bearings	HW10
13	May 22	Ch.11	LN07A Rolling Contact Bearings: Ball Bearings	HW11
14	May 29	Ch.11	LN07B Angular Contact Ball Bearings LN07C Tapered Roller Bearings LN07D Bearing Mounting and Preloading	HW12
			<b>DE02 Report Due</b>	
15	Jun 05	Ch.12	LN08A Lubrication & Journal Bearings	HW13
16	Jun 12	Ch.12	LN08B Lubrication & Journal Bearings	HW14
17	<b>Jun 19</b>		<b>Section Exam 03</b>	
18	Jun 26		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. <u>Late HW will not be accepted.</u> HW missed due to unforeseeable emergencies will be handled on a case-by-case basis.																																																
Design Exercises	Purposes <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> 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. <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. 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%)  <b>No curving of the final grades.</b> 附件：等级成绩和百分成绩、绩点对照表 <table><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	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.