

<b>COURSE NUMBER</b>	<b>ME 316</b>
<b>COURSE TITLE</b>	<b>Machine Design</b>
<b>COURSE STRUCTURE</b>	(3-0-3) (lecture hr/wk - lab hr/wk – course credits)
<b>COURSE COORDINATOR</b>	Siva Nadimpalli
<b>COURSE DESCRIPTION</b>	Aspects of the design process and design of machine elements. Mini-projects are used to introduce engineering design procedures
<b>PREREQUISITE(S)</b>	ME 231 Kinematics of Machinery, ME315 Stress Analysis.
<b>COREQUISITE(S)</b>	None
<b>REQUIRED, ELECTIVE OR SELECTED ELECTIVE</b>	Required
<b>REQUIRED MATERIALS</b>	Machine Design, 5th edition, Robert L. Norton, Pearson Prentice Hall 2014
<b>Other supplemental materials (not Required)</b>	Handouts prepared by instructor.
<b>COMPUTER USAGE</b>	Machine design analysis software.

COURSE LEARNING OUTCOMES/ EXPECTED PERFORMANCE CRITERIA:	<b>Course Learning Outcomes:</b> Upon completing this course, students will be able to:	SOs*	Expected Performance Criteria
	1. <b>Demonstrate</b> a thorough understanding of fundamental principles of strength of materials and solid mechanics as they pertain to the design of machine elements	1	<b>Exam Question</b> (80% of students will earn a grade of 75% or better on this question)
	2. <b>Design</b> new components while considering their functional requirements and constraints placed over them	1,2,4, and 7	<b>Design Project</b> (80% of students will earn a grade of 75% or better on this project)
	3. <b>Apply</b> appropriate theories of failure in the design of new machine components under both static and dynamic loading	1 and 2	<b>Exam Question</b> (80% of students will earn a grade of 75% or better on this question)
	4. <b>Select</b> a component from available designs such as bearings, gears, fasteners and springs	1 and 2	<b>Exam Question</b> (80% of students will earn 75% or better on this question)
	5. <b>Describe</b> the impact of issues such as safety legislation, design codes and the environment on the mechanical design process and on the profession,	4,5, and 6	<b>Report</b> (Concepts so important to practicing engineers that nearly 100% of students must show understanding)
	6. <b>Select</b> appropriate materials for the designed components	1,2,4, and 7	<b>Project</b> (80% of students will earn a grade of 75% or better on this project)
	7. <b>Explain</b> the manufacturing process required for producing the desired part	1,4, and 7	<b>Project</b> (80% of students will earn a grade of 75% or better on this project)
	8. <b>Define</b> tolerances and clearances for the designed part	1	<b>Homework Assignment or Project</b> (80% of students will earn at grade of 75% or better on this problem)
	9. <b>Use</b> of existing engineering analysis software to assist in the design of mechanical components.	1,2,4, and 7	<b>Project</b> (80% of students will earn a grade of 75% or better on this project)

<b>CLASS TOPICS</b>	<ol style="list-style-type: none"> <li>1. Kinematics and load determination</li> <li>2. Stress, strain, and deflection</li> <li>3. Static failure theories</li> <li>4. Fatigue failure theories</li> <li>5. Shafts, keys, and couplings</li> <li>6. Bearings and lubrication</li> <li>7. Ball and roller bearings</li> <li>8. Surface failure theories</li> <li>8. Screws and fasteners</li> <li>9. Weldments</li> <li>10. Gears (Spur, helical, and worm)</li> <li>11. Clutches and brakes</li> <li>12. Springs</li> <li>13. Miscellaneous Machine Elements</li> </ol>						
<b>STUDENT OUTCOMES (SCALE: 1-3)</b>	1	2	3	4	5	6	7
	3	3	1	2	2	2	2
	3 – Strongly supported      2 – Supported 1 – Minimally supported						

\* Student Outcomes.