

COURSE NUMBER	ME 316		
COURSE TITLE	Machine Design		
COURSE STRUCTURE	(3-0-3) (lecture hr/wk - lab hr/wk – course credits)		
COURSE COORDINATOR	Prof Raj Sodhi		
COURSE DESCRIPTION	Aspects of the design process and design of machine elements. Mini-projects are used to introduce engineering design procedures		
PREREQUISITE(S)	ME 231 Kinematics of Machinery, ME315 Stress Analysis.		
COREQUISITE(S)	None		
REQUIRED, ELECTIVE OR SELECTED ELECTIVE	Required		
REQUIRED MATERIALS	Design of Machine Elements, 8 th Edition, by M. F. Spotts, T. E. Shoup, and L. E. Hornberger, Prentice Hall, Upper Saddle River, NJ, 2004.		
Other supplemental materials (not Required)	Handouts prepared by instructor.		
COMPUTER USAGE	Textbook based machine design analysis software.		
COURSE LEARNING OUTCOMES/ EXPECTED PERFORMANCE CRITERIA:	Course Learning Outcomes	SOs*	Expected Performance Criteria
	1. Demonstrate a thorough understanding of fundamental principles of strength of materials and solid mechanics as they pertain to the design of machine elements	a, e, k	Exam Question (80% of students will earn a grade of 75% or better on this question)
	2. Design new components while considering their functional requirements and constraints placed over them	a, c, d, e, g, k	Design Project (80% of students will earn a grade of 75% or better on this project)
	3. Apply appropriate theories of failure in the design of new machine components under both static and dynamic loading	a, c, e, k	Exam Question (80% of students will earn a grade of 75% or better on this question)
	4. Select a component from available designs such as bearings, gears, fasteners and springs	a, c, e, k	Exam Question (80% of students will earn 75% or better on this question)

	5. Describe the impact of issues such as safety legislation, design codes and the environment on the mechanical design process and on the profession,	f, g, h, i, j	Report (Concepts so important to practicing engineers that nearly 100% of students must show understanding)								
	6. Select appropriate materials for the designed components	a c, d, e, g, k	Project (80% of students will earn a grade of 75% or better on this project)								
	7. Explain the manufacturing process required for producing the desired part	a, d, g, k	Project (80% of students will earn a grade of 75% or better on this project)								
	8. Define tolerances and clearances for the designed part	a, e, k	Homework Assignment (80% of students will earn at grade of 75% or better on this problem)								
	9. Use of existing engineering analysis software to assist in the design of mechanical components.	a, c, d, e, g, k	Project (80% of students will earn a grade of 75% or better on this project)								
CLASS TOPICS	<ol style="list-style-type: none"> 1. Fundamental Principles 2. Working Stresses and Failure Theories, Fatigue 3. Shafts, keys and couplings 4. Springs 5. Power screws and bolted connections 6. Belt and chain drives 7. Brakes and clutches 8. Welded and Riveted Connections 9. Journal bearings and lubrication 10. Ball and Roller bearings 11. Spur Gears 12. Helical, Bevel and Worm Gears 13. Miscellaneous Machine Elements 										
STUDENT OUTCOMES (SCALE: 1-3)	a	b	c	d	e	f	g	h	i	j	k
	3	1	3	2	3	2	2	2	2	2	2
	3 – Strongly supported					2 – Supported			1 – Minimally supported		

* Student Outcomes.