

ME 316: Mechanical Component Analysis and Design

<i>Course description:</i>	Optimal design of machinery; analysis for prevention of machine elements failure.
<i>Number of credits:</i>	3. This course is required.
<i>Course Coordinator:</i>	Lloyd Smith
<i>Prerequisites by course:</i>	CE 215; ME 216 or c//; ME 220 or c//; certified major in Mechanical Engineering
<i>Prerequisites by topic:</i>	<ol style="list-style-type: none">1. Concepts of stress, strain and their relationships2. Axial, bending, torsion, shear loads and their combinations
<i>Postrequisites:</i>	ME 415
<i>Textbooks/other required materials:</i>	Budynas, R.G. and Nisbett, J.K. <i>Shigley's Mechanical Engineering Design</i> . McGraw-Hill, 9/e.
<i>Course objectives:</i>	<ol style="list-style-type: none">1. Review concepts of statics and strength of materials used to determine the stress, strain and deflection of one-dimensional structures.2. Learn fundamental approaches to failure prevention for static and repeated loading.3. Consider the design of common machine elements such as fasteners, springs, bearings and gears.4. Solve an open-ended design problem involving cost, drawings, and structural analysis.
<i>Topics covered:</i>	<ol style="list-style-type: none">1. 2-D stress2. 1-D deflection and stiffness3. Shafts and shafts components4. Failure criteria5. Fatigue6. Fasteners7. Springs8. Bearings9. Gears
<i>Expected learning outcomes:</i>	<ol style="list-style-type: none">1. Determine the stress, strain and deflection of simple machine elements.2. Estimate safety factors of simple structures exposed to static and repeated loads.3. Determine performance requirements in the selection of commercially available machine elements.4. Solve simple, open-ended design problems.

Class schedule: Three 50-minute lectures per week, for one semester

Laboratory schedule: None

Contribution to meeting the professional component: Engineering Topic

Relationship of course to student outcomes:
3 strongly supported; 2 supported; 1 minimally supported

Student Outcomes Pre-Fall 2018
(ABET EC2000)

a	b	c	d	e	f	g	h	i	j	k
2		3		2						

Student Outcomes Fall 2018 forward
(ABET EC2019)

1	2	3	4	5	6	7
2	3					

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