



**JORDAN UNIVERSITY OF SCIENCE & TECHNOLOGY  
INDUSTRIAL ENGINEERING DEPARTMENT**

<b>Course Number and Name</b>	PDDE 340 Machine Element Design and Selection
<b>Course Description</b>	Design methodologies and failure theories for machine elements under static and dynamic loadings. Topics include design and selection of various machine elements, i.e. shafts, power screws, threaded fasteners, belt and chain drives, bearings, and gears.
<b>Credits and contact hours</b>	3 Credit hours; 3 hours of lectures
<b>Pre- or Co-requisites</b>	IE 216: Mechanics of Materials 2
<b>Required/ Elective</b>	Required

<b>Instructor</b>	
<b>Office Location</b>	
<b>Office Phone</b>	
<b>Email</b>	
<b>Office Hours</b>	

<b>Textbook(s)</b>	Mott, Robert L. et. al. <i>Machine Elements in Mechanical Design</i> , latest edition, Pearson Education.
<b>References</b>	<ol style="list-style-type: none"> <li>"Shigley's Mechanical Engineering Design," by Richard Budynas and Keith Nisbett, 11th Edition, McGraw-Hill Book Company, 2020</li> <li>"Fundamentals of Machine Component Design" by Robert C. Juvinall and Kurt M. Marshek,</li> <li>"Machine Design" by Robert L. Norton</li> <li>"Fundamentals of Mechanical Component Design" by S. Edwards and Others</li> <li>"Standard Handbook of Machine Design" by J. E. SHIGLEY &amp; Charles R. MISCHKE, McGraw-Hill</li> </ol>
<b>Useful links</b>	<p>Fatigue Test Video: <a href="https://www.youtube.com/watch?v=LhUclxBUV_E">https://www.youtube.com/watch?v=LhUclxBUV_E</a></p> <p>Gear Design Videos:  <a href="http://www-mdp.eng.cam.ac.uk/web/library/enginfo/textbooks_dvd_only/DAN/gears/meshing/meshing.html">http://www-mdp.eng.cam.ac.uk/web/library/enginfo/textbooks_dvd_only/DAN/gears/meshing/meshing.html</a>  <a href="https://www.youtube.com/watch?v=GlrzdNutyC4">https://www.youtube.com/watch?v=GlrzdNutyC4</a></p> <p>Worm gears:  <a href="https://www.globalspec.com/learnmore/motion_controls/power_transmission/gears/worms_worm_gears">https://www.globalspec.com/learnmore/motion_controls/power_transmission/gears/worms_worm_gears</a></p> <p>Belt drive basics videos:  V-belt manufacturing: <a href="https://www.youtube.com/watch?v=UGaAY2iEzrk">https://www.youtube.com/watch?v=UGaAY2iEzrk</a>  <a href="https://www.globalspec.com/learnmore/motion_controls/power_transmission_mechanical/v_belt_pulleys">https://www.globalspec.com/learnmore/motion_controls/power_transmission_mechanical/v_belt_pulleys</a></p>

(Course Learning Outcomes (CLOs	JNQF Descriptor
1. Apply failure theories for static and dynamic loadings	L7K1, L7S1
2. Design belt, chain, and wire rope systems using manufacturers catalogs	L7S2
3. Design a power screw or ball screw actuator for a given application	L7S2
4. Analyze gear tooth action and design a gear train for a given application	L7S2
5. Get acquainted with different fit types and tolerance systems	L7K1, L7S1
6. Recognize various types of bearings and use bearing manufacturer's catalogs to select bearings for a given application	L7S2

<b>Class Schedule</b>		
<b>Classroom</b>		

Topics	Chapters in Textbook
Introduction to the design process	Ch. 1
Stress analysis review	Ch. 3, 4
Failure theories	Ch. 5
Design of belt drives	Ch. 7
Design of chain drives	Ch. 7
Design of wire ropes	Ch. 7
Design of power screws and ball screws	Ch. 17
Design of Gears	Ch. 8
Gear Train Design	Ch. 8
Tolerances and fits	Ch. 13
Bearing selection	Ch. 14

<b>Evaluation</b>	
First Exam	25%
Second Exam	25%
Final Exam	40%
Activity	10%