

SYLLABUS

Code/Name	MCE 304 / Machine Elements II
Type	Required
Credit/ECTS	3/5
Hour per Week	3 (3+0+0)
Level/Year	Undergraduate/3
Semester	Spring
Classroom	D204
Content	Analysis and design of machine elements. Power transmission equipment (shafts, axles and spindles). Prime mover types and characteristics. Design of gear drives (spur, helical, bevel, and worm). Design of couplings, clutches, and brakes. Design of belt drives, flat belts, and v-belts. Design of chain drives and rope drives. Friction and wear, and lubrication. Rolling and journal bearings. Utilization of commercial computer-aided design software.
Prerequisites	MEC 305 Machine Elements I
Textbooks	Primary Ansel C. Ugural, Mechanical Design of Machine Components, CRC Press, 2nd Ed., 2014. Supplementary R. G. Budynas, J. K. Nisbett, Shigley's Mechanical. Engineering Design, McGraw Hill 9th SI Edition, 2014.
Objectives	<ul style="list-style-type: none"> • To teach the characteristics of the principal types of mechanical members. • To teach the design methods of machine members including shafts, mechanical springs, gears, journal bearings, selection of rolling contact bearings etc.
Course Outcomes	<p>In this course you will be able to:</p> <p>C01 Ability to construct a design strategy for common mechanical elements.</p> <p>C02 Ability to perform strain and stress analysis, introductory fluid dynamics analysis in mechanical components and relate design variables with the strength and the cost of the component.</p> <p>C03 A good understanding of roles of mechanical components in functioning machines.</p> <p>C04 Ability to perform analysis of shafts, permanent and non-permanent joints, springs, bearings, lubrication, gears, clutches, breaks, couplings and flywheels and flexible mechanical systems.</p> <p>C05 Gaining a perspective on the overall design of complex mechanical subsystems.</p>

Weekly Schedule of Topics

W	Topic
1	Introduction, stress analysis for shafts and axels.
2	Design layout of shaft and selection of shaft components.
3	Design of power screws, fasteners and nonpermanent joints.
4	Bolted and Riveted Joints.
5	Welding, bonding and the design of permanent joints.
6	Mechanical Springs.
7	Bearing nomenclature, rolling contact bearings.
8	Bearing selection, lubrication, journal bearings.
9	Gears nomenclature, spur and helical gears.
10	Bevel and worm gears.

11	Clutches and breaks.
12	Couplings and flywheels.
13	Flexible mechanical elements.
14	Application of Flexible mechanical elements.

Professional Contribution	Ability to analyze and design machine parts and complex mechanical systems; prevent failure.
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Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5	0	5	4	2	0	0	3	0	3	5
CO2	5	0	4	0	5	0	0	3	0	3	3
CO3	5	0	3	0	5	0	0	0	0	4	3
CO4	5	0	3	1	4	0	0	0	0	2	3
CO5	5	0	5	1	4	0	0	3	0	5	5

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	<ul style="list-style-type: none"> Students work in groups for presentation and assignment. The consequence of violation of the attendance rule is to receive a grade of NA. 										
Requirements	Basic knowledge of statics										
Evaluation	<table> <tr> <td>Midterm Exam</td> <td>30%</td> </tr> <tr> <td>Assignment</td> <td>10%</td> </tr> <tr> <td>Presentation</td> <td>20%</td> </tr> <tr> <td><u>Final Exam</u></td> <td><u>50%</u></td> </tr> <tr> <td>Total</td> <td>100%</td> </tr> </table>	Midterm Exam	30%	Assignment	10%	Presentation	20%	<u>Final Exam</u>	<u>50%</u>	Total	100%
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<u>Final Exam</u>	<u>50%</u>										
Total	100%										
Rubric	A rubric will be announced prior to presentation sessions. The rubric has 2 main parts for the grading: technical assessment (50%) and writing or presentation performance (50%)										
Course Policy	<ol style="list-style-type: none"> You must attend at least 70% of the sessions including add-drop period. Be in the class on time. English should always be used to communicate with one another. Mobile phone should be switched off and put away during the class. You cannot talk to your friends during class no matter what the subject is. 										
Cheating & Plagiarism	<ul style="list-style-type: none"> Copying or letting someone to copy your work on exams, assignments, or reports is cheating. Cutting and pasting text, figures and tables from the web sources or any other electronic source is plagiarism. The consequence of academic dishonesty is to receive a grade of F for the course. 										

Instructor

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Prepared by Sefa Yıldırım