MENG 303 – Computer Aided Engineering Design

Eastern Mediterranean University
Faculty of Engineering

Department: Mechanical Engineering

Program Code: 23	**Program:** Mechanical Engineering	**Year/Semester:** 2025-26 FALL		
Course Code: MENG303	**Course Title:** Computer Aided Engineering Design	**Credit hours**		
		Lec.	**Tut/Lab**	**Total**
		2	**3**	**3**

Categorization of Course:	**Categorization of Credits:**	
☒ Engineering or Area Core	Mathematics & Basic Science:	-
☐ Engineering Course offered by other programs	Engineering Topics:	-
☐ Engineering Area Elective	General Education:	-
☐ Mathematics and Basic Sciences	**Major Engineering Design:**	**3**
☐ General Education		

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Course Web Page: https://staff.emu.edu.tr/qasimzeeshan/en/teaching/meng-303

Textbook(s): David G. ULLMAN, The Mechanical Design Process, 4th edition, Mc Graw Hill, 2010

Catalog Description: Design Process, Engineering Specifications, Project Planning, Concept Generation, Evaluation & Selection, Material and Manufacturing Process Selection, Design for Manufacturability and Assembly, Design for Cost, Design for Safety and Reliability, Design for Test and Maintenance, Human Factors in Design, Design for Sustainability, Environment and End of Life, Design Optimization, Design of Experiments, AI and Machine Learning, Modeling and Analysis in CAD and MATLAB.

Prerequisite(s)	MENG104, MENG364*		
Type of Course	☒ Required	☐ Selected Elective	☐ Elective

Student Outcomes		
1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	☒
2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	☒
3	an ability to communicate effectively with a range of audiences	☒
4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	☒
5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives	☒
6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	☒
7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	☒

Course Learning Outcomes		Student Outcomes							Assessment and Percentages
		1	2	3	4	5	6	7	
1	Modeling and analysis of mechanical parts and assemblies in CAD software		X				X		Midterm Exam Theory 10% Lab 10% Final Examination (Theory) 20% (Lab) 20% Design Project 40% * Project is group submissions; however, viva voce/ oral examination will be conducted for each group member individually during the Project Presentations.
2	Understand the fundamentals of mechanical design		X						
3	Define design objectives, design constraints and product specifications.		X			X			
4	Collect and review related data such as technical information, regulations, and standards etc. from credible literature resources to generate solutions.		X			X		X	
5	Manage concept generation, evaluation & selection.	X	X			X			
6	Develop an effective design strategy and project plan		X			X			
7	Design a system to meet the design criteria and constraints (such as cost, economic, resource availability, environment, sustainability, safety, manufacturability, assembly, reliability, testing and maintenance, and product life cycle considerations).	X	X		X	X			
8	Develop detailed manufacturing/ simulation plan		X			X			
9	Develop a testing plan for verification and validation		X			X	X		
10	Understand the significance of relevant engineering standards for materials, components, manufacturing and product qualification		X			X			
11	Understand the major characteristics of engineering drawings according to the technical drawing standards		X			X			
12	Manage design documentation		X	X	X	X			
	%age weight of Student Outcomes	**H**	**H**	**L**	**M**	**H**	**H**	**L**	

Topics Covered in Lectures		Topics Covered in Lab
Week 1	Design Process	Introduction to CAD Modeling
Week 2	Understanding Mechanical Design	Sketch entities and tools
Week 3	Designer and Design Teams	Part Modeling
Week 4	Engineering Specifications	Part Modeling
Week 5	Planning for Design	Threads and Fasteners
Week 6	Concept Generation, Evaluation and Selection	Gears
Week 7	Materials and Manufacturing Process Selection	Spring and Keys
Week 8	**Midterm Examination**	**Midterm Lab Exam**
Week 9	Design for Cost	Assemblies
Week 10	Design for Manufacturing & Assembly	Assemblies
Week 11	Design for Safety, Reliability, Test, Maintenance & HFE	Analysis of mechanical parts
Week 12	Design for Sustainability, Environment and End of Life	Introduction to MATLAB
Week 13	Design Optimization	Optimization in MATLAB
Week 14	Design of Experiments (DoE)	DoE in MATLAB
Week 15	AI and Machine Learning	Machine Learning in MATLAB
Week 16	**Final Theory Examination**	**Final Lab Exam**