MENG410 – Introduction to Capstone Design

Eastern Mediterranean University
Faculty of Engineering

Department: Mechanical Engineering

Program Code: 23	**Program:** Mechanical Engineering	**Year/Semester:** 2020-2021 SPRING
Course Code: MENG410	**Course Title:** Introduction to Capstone Design	**Credit hours**

Lec.	**Tut/Lab**	**Total**
1	**1**	**1**

Categorization of Course:
- ☒ Engineering or Area Core
- ☐ Engineering Course offered by other programs
- ☐ Engineering Area Elective
- ☐ Mathematics and Basic Sciences
- ☐ General Education

Categorization of Credits:
- a. Mathematics & Basic Science: -
- b. **Engineering Topics:** -
- c. General Education: -
- d. **Major Engineering Design:** **1**

Instructor : Project Advisor | **Office no:** - | **Office Tel:** -

Course Web Page: https://me.emu.edu.tr/en/students/capstone-design-and-projects

Textbook(s): There is no mandatory textbook, however, the following are useful.
- David G. ULLMAN, The Mechanical Design Process, 4th edition, Mc Graw Hill, 2010
- Michael F. Ashby, Materials Selection in Mechanical Design, 4th Edition, Elsevier, 2011

Catalog Description: The objective of the capstone design course is to provide students with a realistic independent design experience that allows them to integrate and apply the basic disciplinary material they have learned during their engineering program to design a new product, device or process within multiple realistic constraints, while conforming to relevant standards, ethical issues and environmental policies. Research topics, may be principally experimental, theoretical, applied or simulation, will be chosen in consultation with a project supervisor.

Pre-requisites	Any relevant course as required by the project and/or requested by the supervisor.
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	Define design objectives, design constraints and product specifications according to the stakeholder and project requirements.		x			x			
2	Collect and review related data such as technical information, regulations, and standards etc. from credible literature resources, published research, and patents etc. to generate solutions.		x			x		x	
3	Manage concept generation and concept evaluation process, analyze and compare design alternatives/possible solutions, at the system and subsystem levels, and use measures of performance or other criteria to rank alternatives	x	x			x			
4	Develop an effective design strategy and project plan (work breakdown structure) explaining major milestones of the project with their respective timelines, responsibilities and resource allocation (Cost) to ensure timely and within-budget completion of the project.		x			x			
5	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			**Report** 100%
6	Develop detailed manufacturing/ simulation/ implementation **plan** by selecting the suitable manufacturing/ simulation/ implementation techniques.		x			x			
7	Develop the plan for **verification and validation** of the project objectives according to the relevant **engineering standards/ requirements/ design criteria**.		x			x	x		
8	Understand the significance of relevant engineering standards for materials, components, manufacturing and product qualification		x			x			
9	Understand the major characteristics of engineering drawings and generate engineering drawings according to the technical drawing standards (layout, assembly drawing, parts drawings, etc.)		x			x			
10	Manage design documentation and communication (both orally and in writing) using language and graphics appropriate to the technical discipline, with the necessary supporting material, to achieve desired understanding and impact.		x	x	x	x			
	%age weight of Student Outcomes	**L**	**H**	**L**	**L**	**H**	**L**	**L**	

Important Notes Regarding the Course: University rules and regulations are applied to this course. For details, please see http://mevzuat.emu.edu.tr

Course Rules and Regulations:

1. Each Capstone Team group must have maximum 5 and minimum 3 students.
2. The projects must meet most of the Economic, Availability, Environmental, Sustainability, Manufacturability, Ethical, Social, Political, Health and Safety, Constraints etc.
3. The relevant standards (like ASTM, ANSI, ASME, ASHRAE, TS-EN etc) must be followed during the course of the project and must be referred to in the annexures in the report.
4. Website explaining the Project Team, Scope, Objectives, and highlighting the Economic, Availability, Manufacturing, Ethical, Social, Political Constraints etc should be ready by the ***Third Week*** of the semester. The ***website*** should be regularly updated by the project team on weekly basis.
5. The progress should be demonstrated and weekly updated on the website using a ***Gantt Chart***. The progress will be monitored by the supervisor and the coordinator.
6. Soft copies of the DRAFT REPORT should be submitted to the Supervisor for evaluation before the ***start of Mid Term Exams***.
7. Soft copies of the FINAL REPORT should be submitted to the Supervisor for evaluation ***2 Weeks before the Start of Final Exams***.
8. Each part of the report should be checked by the supervisor for the format, plagiarism and all the necessary requirements before the submission to the coordinator.
9. Soft copies of the FINAL REPORT should be submitted to the Coordinator for evaluation ***1 Week before the Start of Final Exams***.
10. **Deadline for submissions will have no extensions.**
11. For the FINAL REPORTS, 1 to 5 days late, a penalty of 10% (of the overall evaluation) per day will be penalized. Students who submit their reports after 5 days will receive a grade of F.
12. A plagiarized report with more than 20% plagiarism will receive a grade of F.