MENG303 – Principles of Computer Aided Engineering

Eastern Mediterranean University
Faculty of Engineering

Department: Mechanical Engineering

Program Code: 23	**Program:** Mechanical Engineering	**Year/Semester:** 2019-2020 SPRING

Course Code:	**Course Title:**	**Credit hours**			
		Lec.	**Tut**	**Lab/Activity**	**Total**
MENG303	Principles of Computer Aided Engineering	**2**	**-**	**3**	**3**

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

Hourly Contribution
- ☐ Basic Science (-)
- ☐ College-level Mathematics (-)
- ☐ Complex Engineering Problems (-)
- ☒ Engineering Design (2)
- ☐ Engineering Science (-)
- ☒ Team (1)

Criterion 5 Subject Area:
- ☐ (a) College-level mathematics and basic sciences with experimental experience appropriate to the program.
- ☒ (b) Engineering topics appropriate to the program, consisting of engineering and computer sciences and engineering design, and utilizing modern engineering tools.
- ☐ (c) a broad education component that complements the technical content of the curriculum and is consistent with the program educational objectives.
- ☐ (d) a culminating major engineering design experience that
  - ☐ 1) Incorporates appropriate engineering standards and multiple constraints
  - ☐ 2) Based on the knowledge and skills acquired in earlier course work.

Instructor Name: Assoc. Prof. Dr. Qasim Zeeshan	**Office no:** ME141	**Office Tel:** 6301361

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 Process Selection, Design for Manufacturability and Assembly, Design for Cost, Design for Environment, Design for Reliability, Design for Test and Maintenance, Human Factors in Design, CAD Modeling and Analysis.

Prerequisite(s)	MENG104

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**
2	Understand the fundamentals of mechanical design		X						Theory 10%
3	Define design objectives, design constraints and product specifications according to the stakeholder and project requirements.		X			X			Lab 10%
4	Collect and review related data such as technical information, regulations, and standards etc. from credible literature resources to generate solutions.		X			X		X	**Final Examination**
5	Manage concept generation, evaluation and selection process.	X	X			X			(Theory) 20%
6	Develop an effective design strategy and project plan (work breakdown structure)		X			X			(Lab) 20%
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			**Design Project** 40%
8	Develop detailed manufacturing process 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 and generate engineering drawings according to the technical drawing standards (layout, assembly drawing, parts drawings, etc.)		X			X			
12	Manage design documentation		X	X	X	X			
	%age weight of Student Outcomes	**L**	**H**	**L**	**L**	**H**	**L**	**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	BREAK BECAUSE OF COVID-19 PANDEMIC	
Week 6	BREAK BECAUSE OF COVID-19 PANDEMIC	
Week 7	Planning for Design	Threads and Fasteners
Week 8	Concept Generation	Gears
Week 9	Concept Evaluation and Selection	Spring and Keys
Week 10	Product Generation	Assemblies
Week 11	Design for Cost	Assemblies
Week 12	**Midterm Examination**	**Midterm Lab Exam**
Week 13	Design for Manufacturing and Assembly	Analysis of mechanical parts
Week 14	Design for Reliability, Test & Maintenance	Analysis of mechanical parts
Week 15	Design for Environment and End of Life	**Final Lab Exam**
Week 16	**Final Theory Examination**	

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

Exam and Quiz Policy:

The midterm and final exams are OPEN book.

Makeups:

1. There is no make-up or resit for the Labs and Lab Exams.
2. A student who fails to sit for an examination for a valid reason is given a make-up exam. Within three working days after the examination, students who wish to take a make-up must submit a **written statement** to the course instructor explaining the reason(s) for his/her request.
3. Eligibility to take a **Make-Up Exam**:
   a. Student must contact the Instructor immediately within "**three working days**" after the examination when (s)he has missed the mid-term exam or final exam and to discuss with the faculty about the date and time to take the make-up exam.
   b. Student must secure a "**Make-Up Exam Form**" from the department Office or from instructor website & fill-out the Form. For each Make-Up Exam, please use separate Form.
   c. Student must secure the approval from the instructor for taking the Make-Up Exam.
   d. Failure to take the Make-Up Exam at the agreed date and time will lead to a "NG" Grade for the Make-Up Exam, midterm or final.

NG Policy:

1. **"NG" Nil Grade/ Failing from Absenteeism:** Students who do not comply with the required level attendance and/or not fulfilling the requirements for the evaluation of the course are given the "NG" grade by the Instructor of the Course based on the criteria determined by the Faculty/School Academic Council. Students are informed about the criteria for receiving the "NG" grade by the related course instructor at the beginning of the semester. "NG" grade is included in the computation of GPA and CGPA.
2. Student attendance is monitored and assessed by the course instructor. A student who fails to meet the requirements of a course or who is absent more than the limit specified by the Faculty is considered to be unsuccessful in that course.
3. Students who do not attend any of the above assessment activities (such as mid-term exam, final exam, lab exam, design project report etc.) will be given NG (Nil Grade).
4. Late Submissions of the Assignments, Lab Reports and Project will be graded as zero.

Appeals:

Any appeal against the marks of any assessment component must be made to the course instructor within one week following the announcement of the marks. Any appeal concerning a semester grade must be made to the course instructor no later than the end of the registration period of the following semester.