# MENG303 – Principles of Computer Aided Engineering

**Eastern Mediterranean University**  
**Faculty of Engineering**  

**Department:**  
Mechanical Engineering  

**Program Name:**  
Mechanical Engineering  

**Course Code:** MENG303  
**Course Title:** Principles of Computer Aided Engineering  
**Credits:** 3 Cr  
**Year/Semester:** 2018-2019 Fall  

<table>
<thead>
<tr>
<th>Area Core</th>
<th>Area Elective</th>
<th>Service Course</th>
<th>University Elective</th>
<th>Compulsory (offered by other academic units)</th>
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**Prerequisite(s):** MENG104  

**Catalog Description:**  
The course covers Mechanical Design Process, Designers & Design Teams, Project Planning, Concept Generation, Evaluation & Selection, FMEA, Robust Design, Design for X, Interactive computer modeling & analysis, Geometrical modeling with wire frame, surface, & solid models, FEM, Integration of CAD, CAE & CAM.  

**Instructor Name:** Assoc. Prof. Dr. Qasim Zeeshan  
**Office no:** ME141  
**Office Tel:** 6301361  
**Course Web Page:**  
https://staff.emu.edu.tr/qasimzeeshan/en  

**Textbook(s):**  

**Indicative Basic Reading List:**  
Topics Covered and Class Schedule:  
(2 hours of lectures per week, 3 hours Lab)  

**LECTURE SCHEDULE**  
Week 1-3  
Mechanical Design Process  
Week 4  
Understanding Mechanical Design  
Week 5  
Designers and Design Teams  
Week 6  
Design Process and Product Discovery:  
Week 7  
Planning for Design  
Week 8  
MIDTERM EXAMINATION  
Week 9  
Development of Engineering Specifications  
Week 10  
Concept Generation  
Week 11  
Concept Evaluation and Selection  
Week 12  
Product Generation  
Week 13  
Product Evaluation for Performance and the Effects of Variation  
Week 14  
Product Evaluation  
Week 15  
Optimization  
Week 16  
FINAL  

**LAB SCHEDULE**  
Week 1-3  
Machine Part Drawings: (3 weeks)  
**Threads, pins, keys, springs, fits and tolerance.**  
Week 4-5  
Basic concepts of Graphics Programming: (2 week)  
**Coordinate systems, graphics libraries, Transformation Matrix.**  
Week 6-7  
SW Part Drawings: (2 weeks)  
**Introduction to Solid works, basic applications, 3D drawings.**  
Week 8  
MIDTERM EXAMINATION  
Week 9  
Introduction to MATLAB  
Week 10-11-12  
Integration of CAD, CAM, and CAE systems (3 weeks)  
**Design and manufacturing interface, Classification for coding.**  
Week 13-14  
SW Assembly drawing (2 weeks) & submission of Term Project  
Each student either individually or as a group work will be given a design project.  
Week 15-16  
SW FEA Modeling and Analysis (2 weeks)  
**Formulation of the FAE method, Automatic Mesh generation, analysis with COSMOS Program and Case study**
## Lecture and Tutorial Learning Outcome

<table>
<thead>
<tr>
<th>Student Outcomes</th>
<th>Performed Assessments and Percentage</th>
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<tbody>
<tr>
<td>1. recognize all mechanical design components</td>
<td>a, c, d, e, f, g, i, k</td>
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<tr>
<td>2. draw 3D solid models</td>
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<tr>
<td>3. draw mechanical assemblies</td>
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<td>4. analyze mechanical components</td>
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<td>5. learn how to write design objectives</td>
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<td>6. learn how to communicate with other disciplines</td>
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<td>7. write design criteria</td>
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<td>8. establish design teams</td>
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<td>9. learn basic actions of problem solving</td>
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<td>10. manage product generation</td>
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<td>11. learn project definition and planning</td>
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<td>12. manage concept generation and concept evaluation</td>
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### Midterm Exam
- 10%

### Homework(s)
- 5%

### Quiz
- 5%

### Final Examination
- 20%
  - (Theory)
  - 1

### Design Project
- 30%
  - (15 % Theory Report + 15 % CAD Models)

## Lab. Experiment Title and Lab. Equipment Used

<table>
<thead>
<tr>
<th>Lab Learning Outcome</th>
<th>Student Outcomes</th>
<th>Performed Assessments and Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SolidWorks</td>
<td>• recognize all mechanical design components&lt;br&gt;• draw 3D solid models&lt;br&gt;• draw mechanical assemblies&lt;br&gt;• analyze mechanical components</td>
<td>k</td>
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## Student Outcomes

- a) Ability to apply mathematics, science and engineering principles.
- b) Ability to design and conduct experiments, analyze and interpret data.
- c) Ability to design a system, component, or process to meet desired needs.
- d) Ability to function on multidisciplinary teams.
- e) Ability to identify, formulate and solve engineering problems.
- f) Understanding of professional and ethical responsibility.
- g) Ability to communicate effectively.
- h) The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- i) Recognition of the need for and an ability to engage in life-long learning.
- j) Knowledge of contemporary issues.
- k) Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

## Contribution of Course to Criterion 5

Credit Hours for:
- Mathematics & Basic Science: 0
- Engineering Sciences and Design: 3
- General Education: 0
Important Notes:

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

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 or School 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, lab exam, homework, 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.

**MAKE-UP Exam**

1. There is no make up or resit for the Quiz and Lab Exam.

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.