

MENG303 – Principles of Computer Aided Engineering

Eastern Mediterranean University
Faculty of Engineering

Department:

Mechanical Engineering

Program Name:

Mechanical Engineering

Program Code: 23

Course Code:

MENG303

Course Title:

Principles of Computer Aided Engineering

Credits:

3 Cr
(2 /3/ 0) 3

Year/Semester:

2018-2019 Fall

- Area Core
 Area Elective
 Service Course
 University Elective
 Compulsory (offered by other academic units)

Prerequisite(s): MENG104

Catalog Description:

Integration of computers into the design cycle. Interactive computer modeling and analysis. Geometrical modeling with wire frame, surface, and solid models. Finite element modeling and analysis. Curves and surfaces and CAD/CAM data exchange. The integration of CAD, CAE and CAM systems.

Instructor Name:

Assoc. Prof. Dr. Qasim Zeeshan

Office no:

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Office Tel:

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Course Web Page:

<https://staff.emu.edu.tr/qasimzeeshan/en>

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

Indicative Basic Reading List :

Anupam Saxena, Birendra Sahay, Computer Aided Engineering Design, Springer, Anamaya, 2003

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	Student Outcomes	Performed Assessments and Percentage
1. recognize all mechanical design components 2. draw 3D solid models 3. draw mechanical assemblies 4. analyze mechanical components 5. learn how to write design objectives 6. learn how to communicate with other disciplines 7. write design criteria 8. establish design teams 9. learn basic actions of problem solving 10. manage product generation 11. learn project definition and planning 12. manage concept generation and concept evaluation	a, c, d, e, f, g, i, k	Midterm Exam 1 10 % Homework(s) 2 5 % Quiz 2 5 % Final Examination (Theory) 1 20 % Design Project 1 30 % (15 % Theory Report + 15 % CAD Models)

Lab. Experiment Title and Lab. Equipment Used	Lab Learning Outcome	Student Outcomes	Performed Assessments and Percentage
1. SolidWorks	<ul style="list-style-type: none"> • recognize all mechanical design components • draw 3D solid models • draw mechanical assemblies • analyze mechanical components 	k	Lab Exam 1 10 % Final Examination (Lab) 20 %

Student Outcomes

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