



Eastern Mediterranean University
Faculty of Engineering
Department of Mechanical Engineering
PRINCIPLES OF COMPUTER AIDED ENGINEERING – MENG303
Spring 2017-2018

Instructor: Assoc. Prof. Dr. Qasim Zeeshan

Assistant/ Lab Instructor: Mr. Mustafa Glaissa

STUDENT'S

Name, Surname:

Student Number:

Q1	
Q2	
Q3	
Q4	
Q5	
Q6	
Q7	
Q8	
Q9	
Q10	
TOTAL	

Assignment 1.

Due Date: 6 April 2018

Instructions:

1. Answers are to be **hand written** in the spaces provided under each question.

- 1. Define Engineering Design. Describe the various Phases of the Design Process using a flowchart, and explain the Conceptual Design Process using a Flowchart. (10 pts.)**

2. Explain the following:

- a. Ten key features of Design Best Practice . (05 pts.)**
- b. Basic Actions of PROBLEM SOLVING ? (05 pts.)**

- 3. Explain Mechanical Design Languages with an example (Do not use same examples given in the book) . (10 pts.)**

4. Briefly explain the difference between SELECTION, CONFIGURATION, PARAMETRIC, ORIGINAL and RE-DESIGN with an example for each. (Do not use same examples given in the book)? (10 pts.)

5. In a minimization problem below, indicate robust and optimal design and explain the difference between Optimal and Robust Design with an example.

6. Explain the following:

a. Our purposes for PHYSICAL MODELS PROTOTYPES? (05 pts.)

b. Difference between Verification and Validation. (05 pts.)

7. Identify major characteristics of the different types of drawings produced during product design and their respective role in the design process. (10 pts.)

Layout Drawings	Detail Drawings	Assembly Drawings

8. Identify the members of Design Team and briefly explain their roles (10 pts.)

9. Explain the Advantages & Disadvantages of Graphical Models Produced in Modern CAD Systems? (10 pts.)

- 10. Consider the Material Selection Design Problem for the FRAME of a Human Powered Road Vehicle. Define the selection criteria, assign weights (importance), and evaluate the following alternatives based on COST, WEIGHT, STRENGTH, AVAILABILITY, MANUFACTURABILITY, ASSEMBLY, TEST & MAINTENANCE, ENVIRONMENT & SUSTAINABILITY, SAFETY & RELIABILITY: (10 pts.)**
- a. Steel**
 - b. Aluminum**
 - c. Titanium**
 - d. Composite- CFRP**

Hint: Appendix A provides the properties (Tensile strength, Yield Strength, Endurance limit. Modulus of elasticity, Density, Coefficient of thermal expansion, Thermal conductivity, Cost per pound, Cost per unit volume etc) of most commonly used materials in mechanical design. Use the information provided in Appendix A to select a suitable Grade of the material for the subject application. You may use ASHBY Charts.

Interactive Ashby Charts are available at http://www-materials.eng.cam.ac.uk/mpsite/interactive_charts/