The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Computer Aided Design	0904484	

2019 Course Catalog Description

Fundamentals of Hardware and Software. Techniques for Geometric Modeling (Line, Surface and Volume Modeling). Elements of Interactive Computer Graphics. Entity Manipulation. Introduction to Finite Element Techniques. Using in-house software: Introduction to Graphics User Interface, Sketcher Environment, Parametric & Feature Based Solid Modeling, Surface Modeling, Concept of Parent/Child Relationships, Part Construction Techniques, Patterns, Advanced Features, Cross-Sections, Parametric Relations, Component Assembly Techniques, Drafting (Drawing) Techniques, Animation, Introduction to Mechanism Design and Analysis, Introduction to Structural and Thermal Simulation.

Instructors

Name	E-mail	Sec	Office Hours		Lecture Time	

Text Books

	Text book 1	Text book 2
Title	CADCAM from Principles to Practice	Lecture Notes
Author(s)	Chris McMahon and Jimmie Brown	
Publisher, Year, Edition	Addison-Wesley ©, 1998, 2nd Edition	

References

Books	1. Matlab for Engineers 2. CREO Manual, Pro-Engineer 3. Computer Aided and Integrated Manufacturing Systems, Cornelius T Leondes, World Scientific Principles of Computer Aided Design & Manufacturing, Farid
Journals	
Internet links	http://fetweb.ju.edu.jo/staff/ME/JuTech

Prerequisites

Prerequisites by topic	-
Prerequisites by course	Strength of Materials I 0934372 + Mechanics of Machines 0944331+ Machine Drawing 0904233
Co-requisites by course	-
Prerequisite for	-

Topics Covered

Week	Topics	Chapter in Text	Sections
1	Introduction: Why to model? Types of Modeling: Mathematical, Physical and Geometric Terminologies and Basic Concepts	Chapter1	
2	Dynamical Mechanical Systems Mathematical Modeling, Applications: Using MATLAB/ MathCAD	Chapter 2	
4-5	Dynamical Mechanical Systems Physical Modeling, Applications: Using MATLAB/ MathCAD for simulation of system mechanics	Chapter 3	
5-6	Geometric Modeling. Overview of CAD Systems: Characteristics of CAD, Parametric design, Vibrational design. Applications: Examples	Chapter 4	
7-8	Transformation and Manipulation of Objectives: 2D and 3D transformation, Reflection, projection, zoom, Rotation about arbitrary axis, Successive transformation, Initial and Final positions of objects and Isometric views. Applications	Chapter 5	

9-10	Description of Curves and Surfaces: Regression line, curve fitting polynomials, Parametric versus Nonparametric cubic splines and Bezier curve. Applications	Chapter 6	
11	Introduction to FEM and CAD: Basic concepts in FEM and its use in Design.	Chapter 7	
12-15	Simulation and mechanism design analysis	Chapter 8	

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
1	1. Ability to perform Mathematical, Physical and Geometric Modeling and manipulate 2D and 3D spatial objects such as Curves and Surfaces in CAD systems.
2	2. Ability to Design a multi-component mechanical system that performs useful job.
7	3. Ability to apply modern tools and techniques to model and simulate mechanical systems such as Creo Pro-Engineering.

Evaluation

Assessment Tools	Expected Due Date	Weight
Homework	TPA	5%
Quizzes	TPA	5%
Project	Week 14	20%
Midterm Exam	Week 8-9	30%
Final Exam	Week 16	40 %

Contribution of Course to Meet the Professional Components

The course contributes to build the fundamentals in using modern engineering techniques in CAD that are essential for the analysis, testing and design of mechanical products.

Relationship to Student Outcomes

SOs	1	2	3	4	5	6	7
Availability	X	X					X

Relationship to Mechanical Engineering Program Objectives (MEPOs)

MEPO1	MEPO2	MEPO3	MEPO4	MEPO5

ABET Student Outcomes (SOs)

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

Updated by ABET Committee, 2024