

The University of Jordan
School of Engineering



Department	Course Name	Course Number	Semester	
Mechanical Engineering	Composite Materials	0994571	Spring	
2025 Course Catalog Description				
Application of composite materials in aerospace industry, Fiber reinforced composites, Stress, strain, and strength of composite laminate, Failure criterion, Environmental effect, Design of composite structure.				
Instructors				
Name	E-mail	Section	Office Hours	Lecture Time
Text Books				
	Text book 1	Text book 2		
Title	Engineering Mechanics of Composite Materials			
Author(s)	Isaac M.Daniel and Ori Ishai			
Publisher, Year, Edition	Oxford University Press 2011, 2 nd Edition.			
References				
Books	<ol style="list-style-type: none"> 1. Mechanics of composite materials, Autar K. Kaw, 2nd Edition, Taylor & Francis Group 2. Advanced Composites, Cindy Foreman, 1st Edition, Sn IAP, Inc training manual. 3. Mechanics of Materials, F.P. Beer, E.R. Johnston, Jr., and J.T., DeWolf, 7th Edition, McGraw-Hill. 4. Manufacturing Technology for Aerospace Structural Materials, Flake C Campbell Jr, 1st Edition, Elsevier. 			
Journals				
Internet links				
Prerequisites				
Prerequisites by topic				
Prerequisites by course	Materials Science for Aeronautical Engineers 0994471			
Co-requisites by course				
Prerequisite for				
Topics Covered				
Lecture	Topics	Chapter in Text		
1	Introduction to composite materials			
2-1	Manufacturing of composite materials			
2	Repair of composite materials			
4-3	A review of stress and strain, A review of Hooks law for isotropic materials			
6-5	Lamina Analysis			
8-7	Micromechanics of elastic properties			
9-8	Lamination theory			

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10	First ply failure in composite laminates	
12-11	Sandwich plates and other higher order theories	
14-13	Interlaminar fracture	
15	Failure mechanisms in composites	
16-15	Hygrothermal effects in composites	

Mapping of Course Outcomes to ABET Student Outcomes

SOs	Course Outcomes
2,4,7	Understand some basic concepts of composite materials, their classifications, their applications, and manufacturing processes, lamina and laminate. Develop the ability to deal with micro and macro- analysis of composites. Develop the ability to deal with and apply the theory of lamination of composite laminates. Apply Generalized Hooks law for both isotropic and anisotropic materials and the transformation of coordinates.

Evaluation

Assessment Tools	Expected Due Date	Weight
First Exam		25
Second Exam		25
Final Exam		50

Contribution of Course to Meet the Professional Components

This course is one of the first opportunities for engineering students to encounter the fundamental principles of design problem solving. It is an important prerequisite course for number of designs related-courses, which occur later in the programs of engineering students.

Relationship to Student Outcomes

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

Relationship to Aeronautical Engineering Program Objectives (AEPOs)

AEPO1	AEPO2	AEPO3	AEPO4	AEPO5

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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, 2025	