The University of Jordan
School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Aircraft Structure I	0994481	Fall

2025 Course Catalog Description

Basics of elasticity. Bending, buckling, and Vibration of Euler-Bernoulli beam. Aerodynamic loads. Functions of structural components. Fabrication of structural components. Principles of stressed skin construction; bending, shear, and torsion of open and closed thin-walled, single and multi-cell, cross section beams, including shear center and structural idealization.

Instructors

Name	E-mail	Section	Office Hours	Lecture Time

Text Books

	Text book 1	Text book 2
Title	Aircraft Structures for Engineering Students	
Author(s)	Megson, T. H. G	
Publisher, Year, Edition	5th Edition, Elsevier Aerospace Engineering Series	

References

Books	1. Fundamentals of Aircraft Structural Analysis, Curtis, H. D, 1st Edition McGraw Hill. 2. Mechanics of Aircraft Structures Sun, C. T., John, 2nd Edition, Wiley & Sons. 3. Airframe Structural Design, Niu, C.Y, 2nd Edition, Conmilit Press Ltd, Hong Kong.
Journals	
Internet links	

Prerequisites

Prerequisites by topic	
Prerequisites by course	Engineering Math II for Aeronautical Engineering Students 0994202 + Field Aeronautics Lab. II 0994365
Co-requisites by course	
Prerequisite for	Aircraft Stability and Control Aircraft Maintenance Systems Aeroelasticity Finite Elements Methods in Aerospace Structures Aircraft Structures II Fracture Mechanics

Topics Covered

Week	Topics	Chapter in Text
1	Structural components of Aircraft	
2	Airframe loads	
4-3	Bending of Open and Closed Thin Walled	

6-5	Shear of Beams	
7	Torsion of Beams	
8	Combined Open and Closed Section Beams	
10-9	Structural Idealization	
12-11	Wing Spars and Box Beam	
13	Fuselage	
14	Wings	
15	Fuselage Frame and Wing Ribs	
16	Laminate Composite Structures	

Mapping of Course Outcomes to ABET Student Outcomes	
SOs	**Course Outcomes**
2,4	Understand the components of the airplane structure and identify its structural function and Fabrication techniques. Understand the basic elasticity. Understand and implement the principle of component idealization. Understand and develop the macro approach of composite material mechanics. Develop the ability to conduct analysis of thin-walled beams; open and single cell closed beams. Develop the students' ability to conduct torsion and shearing analysis of thin-walled beams; open and closed components.

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			

Relationship to Aeronautical Engineering Program Objectives (AEPOs)

AEPO1	**AEPO2**	**AEPO3**	**AEPO4**	**AEPO5**

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	