Jordan University of Science and Technology

Faculty of Engineering

Aeronautical Engineering Department

AE533 Aircraft Structure 1 - JNQF Level: 7

First Semester 2023-2024

Course Catalog
3 Credit Hours. This course focuses on aerospace structural analysis and design. Topics include structural components of aircraft, airworthiness and airframe Loads, and analysis of structural components with unsymmetrical cross-sections that are subjected to bending, shear, and torsion in open and closed thin-walled beams, covering single and multi-cell cross-sections. The analysis extends to combined section beams, and structural idealization of critical components like wing spars and ribs and box beams, fuselage, and wings. The course equips students with the skills to analyze and design aerospace structures effectively.

Text Book	
Title	Aircraft Structures for Engineering Students
Author(s)	Megson, T. H. G
Edition	6th Edition
Short Name	Textbook
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref #1	Fundamentals of Aircraft Structural Analysis	Curtis, H.D	1st Edition	
Ref #2	Mechanics of Aircraft Structures	Sun, C. T., John	2nd Edition	
Ref #3	Airframe Structural Design	Niu, C.Y	2nd Edition	
Ref #4	Analysis of Aircraft Structures	Donaldson, B.C	2nd Edition	
Ref #5	Analysis and Design of flight vehicle structure	Bruhn, E.F.	1st Edition	

Ref #6	AIAA - American Institute of Aeronautics and Astronautics	Journal	1st Edition	

Instructor	
Name	**Dr. ABDALLAH ALMOMANI**
Office Location	N1- L2
Office Hours	Sun : 08:30 - 09:30 Sun : 10:30 - 11:30 Mon : 11:30 - 13:00 Tue : 08:30 - 09:30 Tue : 10:30 - 11:30 Wed : 11:30 - 13:00 Thu : 08:30 - 09:30
Email	amalmomani0@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Sun, Tue, Thu : 09:30 - 10:30 Room: C5025

Prerequisites		
Line Number	**Course Name**	**Prerequisite Type**
714310	AE431 Machine Elements Design	Prerequisite / Study

Tentative List of Topics Covered		
Weeks	**Topic**	**References**
Week 1	Introduction to aircraft structures	**.** From **Textbook**
Weeks 2, 3	Structural components of Aircraft	**Chapter 12** From **Textbook**
Weeks 3, 4	Airframe loads	**Chapter 14** From **Textbook**
Week 5	Review of stress and strain and their transformation.	**.** From **Textbook**
Weeks 6, 7, 8	Bending of open and closed, thin-walled beams	**Chapter 16** From **Textbook**
Week 9	Deflection of unsymmetrical thin-walled structures	**Chapter 16** From **Textbook**
Weeks 9, 10	Shear open and closed section beams	**Chapter 17** From **Textbook**
Weeks 10, 11	Torsion of thin-walled beams. Open sections and single and multicell sections	**Chapter 18** From **Textbook**

Week 12	Combined open and closed section beams for Bending, Shear, and Torsion	**Chapter 19** From **Textbook**
Week 13	Structural idealization	**Chapter 20** From **Textbook**
Weeks 13, 14	Wing spars and box beams	**Chapter 21** From **Textbook**
Week 14	Fuselages	**Chapter 22** From **Textbook**
Week 15	Wings	**Chapter 23** From **Textbook**
Week 16	Fuselage frames and wing ribs	**Chapter 24** From **Textbook**

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Identify and classify the structural components of aircraft, demonstrating a foundational understanding of aircraft structures. [1SO1] [1L7K1]	5%	
Apply airworthiness principles and evaluate airframe loads on structural components, showcasing comprehension of the factors influencing aircraft structural design. [1SO2] [1L7S2]	5%	
Analyze structural components with symmetrical and unsymmetrical cross-sections subjected to bending, shear, and torsion loadings in open, closed, and combined thin-walled beams, covering single and multi-cell cross-sections. Students will develop expertise in assessing the structural integrity of diverse components under diverse loading conditions. [10SO2] [1L7S2]	60%	
Apply structural idealization techniques to extend structural analysis to combined section beams and to critical components like wing spars, ribs, box beams, fuselage, and wings, gaining proficiency in simplifying complex structures for effective analysis and design. [1SO7] [1L7C4]	30%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
5	65					30

Relationship to NQF Outcomes (Out of 100%)		
L7K1	L7S2	L7C4
5	65	30

Evaluation

Assessment Tool	Weight
First Exam	25%
Second Exam	25%
Assignments	10%
Final Exam	40%

Policy	
Attendance	The student is required to attend all the registered courses. The instructor shall register student attendance or absence electronically. JUST policy requires the faculty member to assign ZERO grade (35) if a student misses 20% of the classes. If you miss a class, it is your responsibility to find out about any announcements or assignments you may have missed.
Exam/Homework	Makeup exam should not be given unless there is a valid excuse according to JUST policies. Arrangements to take an exam at a time other than the one scheduled MUST be made prior to the scheduled exam time. Cheating or copying from neighbor on exam, quiz, or homework is an illegal and unethical activity. Standard JUST policy will be applied. All assignments must be your own work (your own words) Students are responsible for all information provided in lecture. Information presented in class supersedes any information posted elsewhere.

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