



Jordan University of Science and Technology
Faculty of Engineering
Aeronautical Engineering Department

Course name and number:

AE332 Aircraft Structural Materials
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Credit, contact hours and categorization:

Credit and contact hours	Contact hours	Categorization
3 Credit Hours	Sunday-Tuesday-Thursday 1-hour lecture Or Monday-Wednesday 1.5-hours lecture	Engineering Topic

Instructor's or course coordinator's name:

Name	Dr. Abdallah Almomani
Office location	N1-L2
Email address	amalmomani0@just.edu.jo

Textbook and other supplemental materials:

Textbook			
Title	Materials Science and Engineering: An introduction.		
Author(s)	W. D. Callister		
Edition	9 th Edition		
Other Information	WILEY		
References			
Book Name	Author(s)	Edition	Other Information
Introduction to Engineering Materials	V. B. John	3 rd Edition	Springer
Engineering Materials: An Introduction to Properties, Applications and Design	D.R.H Jones and Michael F. Ashby	4 th Edition	Elsevier

Course information:

Course Catalogue		
Structural materials in aircraft industry, Structure of crystalline solids, Imperfections in solids, Mechanical properties, Strengthening mechanisms, Static and fatigue fracture, Phase diagram, Processing conditions-properties relationship, Creep, Corrosion, Introduction to composite materials.		
Course type : This course is required to fulfill the program.		
Prerequisites or co-requisites		
Line Number	Course Name	Prerequisite Type
712140	AE214 Strength Of Materials	Prerequisite / Pass



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Specific goals of the course :

Specific outcomes of instruction and the student outcomes (SO) mapping		
Outcomes	SO Mapping	Course Outcome Weight (Out of 100%)
Explain the types of atomic bonding and crystalline structure of engineering materials.	5SO 7, 5SO 1	10%
Classify the types of imperfections in in crystalline solid materials.	10SO 1	10%
Explain the diffusion concept and its calculations.	10SO 1	10%
Explain the mechanical behavior of engineering materials.	5SO 7, 5SO 1	10%
Demonstrate the strengthening mechanisms and its relation to dislocations.	5SO 7, 5SO 1	10%
Explain the mechanical failure in the materials.	4SO 4, 3SO 7, 3SO1	10%
Explain the phase diagrams in general and specifically the iron-carbon phase diagram.	10SO 1	10%
Explain the phase transformation of the iron-carbon and its relation to the phase diagram.	5SO 7, 5SO1	10%
Explain the applications and processing of metal alloys.	10SO 1	10%
Introduction to composite materials.	5SO 1	5%
Explain what corrosion and degradation of materials are.	3SO 5, 1SO 7, 1SO1	5%

Brief list of topics to be covered:

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Introduction	Chapter 1 From Textbook
Weeks 2, 3	Crystalline Structures	Chapter 3 From Textbook
Week 4	Imperfections in Solids	Chapter 4 From Textbook
Week 5	Diffusion	Chapter 5 From Textbook
Weeks 6, 7	Mechanical Properties of Metals	Chapter 6 From Textbook
Weeks 8, 9	Dislocations and Strengthening Mechanisms	Chapter 7 From Textbook
Weeks 10, 11	Failure	Chapter 8 From Textbook
Weeks 12, 13	Phase Diagrams and Phase Transformation	Chapter 9, 10 From Textbook
Week 14	Application and processing of metal and alloys	Chapter 11 From Textbook
Week 15	Introduction to composite materials	Chapter 16 From Textbook
Week 16	Corrosion and degradation of materials	Chapter 17 From Textbook