

**The University of Jordan
School of Engineering**



Department	Course Name	Course Number	Semester
Mechanical Engineering	Failure and Fracture Analysis	0904481	

2005 Course Catalog Description

Introducing students to the classical failure theorems; static and dynamics. Introducing students to the concept of notches and its effect. Introducing students to the concept of linear elastic fracture mechanics with applications. Introducing students to the concept of elastic plastic fracture mechanics with applications. Introducing students to the concept of remaining life in fatigue analysis.

Instructors

Name	E-mail	Sec	Office Hours		Lecture Time	

Text Books

	Text book 1	Text book 2
Title		
Author(s)		
Publisher, Year, Edition		

References

Books	1. Brooks and Choudhury, Failure Analysis of Engineering Materials, 2002. 2. Timmins, P.F, Solutions to Equipment Failures, 1999. 3. Lin, Alan F., Structural Life Assessment Methods, 1998. 4. Hertzberg, R.W., Deformation and Fracture Mechanics of Engineering Materials, 1996. 5. Failure of Materials In Mechanical Design, 1993, Collines, J. 6. Brooks and Choudhury, Metallurgical Failure Analysis, 1993. 7. Bannantine, Comer and Handrock, Fundamentals of Metal Fatigue Analysis, 1990.
Journals	Engineering Failure Analysis, Journal of Failure Analysis and Prevention,
Internet links	http://www.journals.elsevier.com/engineering-failure-analysis/ http://www.researchgate.net/journal/5555-1313_Journal_of_Failure_Analysis_and_Prevention

Prerequisites

Prerequisites by topic	-
Prerequisites by course	Strength of Materials, 0904372
Co-requisites by course	-
Prerequisite for	-

Topics Covered

Week	Topics	Chapter in Text	Sections
1-4	Introduction to the classical failure theorems; static and dynamics	1-4	
5-6	Introduction to the concept of notches and its effect	5-6	
7-13	Introduction the concept of linear elastic and elastic plastic fracture mechanics with applications.	7-13	
14-15	Introduction to the concept of remaining life in fatigue analysis.	14-15	

Mapping of Course Outcomes to ABET Student Outcomes							
SOs	Course Outcomes						
1	1. Introducing students to the classical failure theorems, static and dynamics.						
2	2. Introducing students to the concept of notches and its effect. 3. Introducing students to the concept of linear elastic fracture mechanics with applications. 4. Introducing students to the concept of elastic plastic fracture mechanics with applications. 5. Introducing students to the concept of remaining life in fatigue analysis.						
Evaluation							
Assessment Tools		Expected Due Date				Weight	
Homework& Quizzes						10%	
Project						10%	
Midterm Exam						30%	
Final Exam						50%	
Contribution of Course to Meet the Professional Components							
The course contributes to building the skills of failure analysis of machine components, dealing with engineering standards and converting open-ended problems into a set of design specifications.							
Relationship to Student Outcomes							
SOs	1	2	3	4	5	6	7
Availability	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, 2021							