



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

Course name and number:

AE431 Machine Elements Design

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	Shigleys Mechanical Engineering Design		
Author(s)	R.G. Budynas & J.K. Nisbett		
Edition	9th Edition		
Other Information	McGraw-Hill's		
References			
Book Name	Author(s)	Edition	Other Information
Mechanical Design: an integrated approach	Ansel C. Ugural	1st Edition	McGraw-Hill
Machine Elements in Mechanical Design	Robert L. Mott	5th Edition	Pearson
International Journal of Design Engineering	Journal	Journal	Journal
Journal of Advanced Mechanical Design, Systems, and Manufacturing	Journal	Journal	Journal

Course information:

Course Catalogue
The analysis of design of machine elements including fatigue-failure analysis of shafts, springs, screws, brakes, clutches, chains, belts, welds & rivets, lubrication of journals, ball & roller bearings, and spur, helical, bevel and worm gears.
Course type : This course is required to fulfill the program.



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Prerequisites or co-requisites		
Line Number	Course Name	Prerequisite Type
712040	AE204 Solid Modeling	Prerequisite / Study
713320	AE332 Aircraft Structural Materials	Prerequisite / Study

Specific goals of the course :

Specific outcomes of instruction and the student outcomes (SO) mapping		
Outcomes	SO Mapping	Course Outcome Weight (Out of 100%)
Evaluate machine elements against static and fatigue failures.	50 SO 1	50%
Design of shafts based on subjected loads and generated stresses.	4SO 1, 4SO 2, 2SO 7	10%
Design of non-permanent joints (screws and bolts).	5SO 1, 5SO 2	10%
Perform life analysis for rolling-contact bearing.	4SO 1, 4SO 2, 2SO 6	10%
Design of gears based on loading condition and generated stresses	5SO 1, 5SO 2, 5SO 6, 5SO 7	20%

Brief list of topics to be covered:

Tentative List of Topics Covered		
Weeks	Topic	References
Week 1	Review of deflection of beams and stress analysis	Textbook and Ref 1,2,3
Weeks 2, 3, 4	Failure analysis of static loading	Chapter 5 From Textbook
Weeks 5, 6, 7	Fatigue failure analysis	Chapter 6 From Textbook
Weeks 8, 9	Design of shafts	Chapter 7 From Textbook
Weeks 10, 11, 12	Design of nonpermanent joints	Chapter 8 From Textbook
Weeks 13, 14	Rolling contact and journal bearings	Chapter 11 From Textbook
Weeks 15, 16	Design of gears	Chapter 13,14 From Textbook