Philadelphia University

Faculty of Engineering and Technology
Department of Mechanical Engineering

Course Information

Course Title:	**Machine design (2) 0620435**
Prerequisite:	Machine design (1) 0620434
Credit Hours:	3 credit hours (16 weeks per semester, approximately 44 contact hours)
Textbook:	"mechanical engineering design by shigley", tenth Edition, , 2017
References:	:fundamental of machine design by Steven R .Schmidt 2008
Course Description:	This course involves design of mechanical engineering elements which include , design of permanent joints , welding and adhesive bonding . design of mechanical springs , ball bearing , journal bearings , gear design especially spur gear , helical and bevel gear , clutches brakes , flywheel an belts.
Course requirements:	Computer, internet connection
Instructor:	**Dr. Muhammad Mustafa Gogazeh** **Office**: Mechanical Engineering building, room E61208 , ext. : 2545 **Office hours**:

Course Topics:

Week	Topic
1	Introduction to machine design 2
2 ,3	Welding , bonding and design of permanent joints
4,5	Mechanical spring : Stresses, curvature effect, deflection, materials, helical spring design, critical frequency and fatigue loading of helical compression springs.
6,7	Rolling contact bearings : Bearing types , life , ratings , reliability and combined radial and thrust loading .
8 , 9	Lubrication and journal bearings: Types of lubrication , Reynolds equation ,stable lubrication , thin film lubrication , hydrodynamic theory and journal bearings curves relations and variables .
10 , 11, 12	Gears – general : nomenclature , conjugate action , involute , interference and force analysis . Spur gear , helical gear , bevel gear and worm gear

13 , 14	Clutches , brakes and fly wheel and couplings
15	Flexible mechanical elements , belts , flat v- belt and chains
16	Review project and final exam

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

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

1.	Be able to Classify and use the different machine design codes and standards	[1 , 2]
2.	Understand the main concepts of material science related to machine design	[1 , 2]
3	Construct and solve the main general equations of stress analysis for wide range of machine design applications.	[1 , 2]
4.	Be able model and solve deflection equations for different types of machine elements for different applications .	[1 , 2]
5	Understand and demonstrate the main failure theories under static and dynamic loads ,	[1 , 2]
6	have an ability to classify and use fatigue failure equations for wide range of mechanical engineering elements and applications .	[1 , 2]
7	Be able to classify and design different types of gears, belts , bearings and their applications.	[5]
8	Solve a specified homework's , projects in teams using modern engineering methods and software	[5 ,7]

Teaching methodology: Online, Blended or both

Electronic platform: Microsoft-teams

Evaluation methods:

Evaluation of student's performance (final grade) will be based on the following categories:

Mid-term exam:	Shall be given at the end of the seventh week of the course in the form of multiple choice questions and (or) specific problems to be solved and uploaded by the student using the University electronic platform.
Quizzes:	A number of 10-minute quizzes in the form of multiple choice questions or an assignment using the University electronic platform. will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).
Homework:	Problem sets will be given to students in the form of assignments using the University Electronic platform. Homework should be solved by each student individually and submitted using the platform before the due date.
	Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework
Participation:	Questions will be asked during the online session (lecture) and the student is assessed based on his/her response
Final Exam:	The final exam will cover all the class material.

Grading policy:

Mid-term Exam.	30%
Home works, Quizzes project and participation	30%
Final Exam	40%
Total:	100%

Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Date of production/revision: 28 March 2021