Philadelphia University

Faculty of Engineering and Technology
Department of Mechanical Engineering

Course Information

Course Title:	**Machine design (1) 0620434**
Prerequisite:	Mechanics of solid and material 020213
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 an introduction to design process, Design considerations, Tolerances, Fits and surface finish, Selection of materials, Mechanical properties of engineering materials, Stress analysis of machine elements , deflection equations, failure of machine elements under static loads , Fatigue analysis , shaft design, limits and fits .
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	Materials properties , numbering systems ,codes and standards
3 ,4	Loads and stress analysis , singularity functions , torsion , stress concentration and hertz stress
5 , 6	Deflection and stiffness , strain energy and columns
7 , 8	Failures resulting from static loads , maximum shear stress theory , distortion energy theory and fracture mechanics
9 , 10 ,11	Fatigue failure resulting from variable loading Linear elastic fracture mechanics methods Endurance limit , fatigue failure equations
12 , 13	Shaft design , limits , fits and shaft components
14 ,15	Design of screws fasteners bolts ,and design of non-permanent joints
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 beams columns and shafts .	[1 , 2]
5	Understand and demonstrate the main failure theories under static loads	[1 , 2]
6	have an ability to classify and use fatigue failure equations	[1 , 2]
7	. Understand and model the main stress stain failure equations for shafts , bolts , fasteners and non permanent joints under both static and dynamic loads .	[2]
8	Be able design components such as bolts , fasteners, power screw and joints under static and dynamic loads and use codes and standards for these elements .	[1, 2]
9	Solve a specified home works , projects in team using modern engineering 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 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.