The Hashemite University
Faculty of Engineering
Course Syllabus

Course Title:	Machine Design 1	**Course Number:**	110402446
Department:	Mechanical Engineering	**Designation:**	Compulsory
Instructor:	Dr. Mahmoud Rababah	**Instructor's Office:**	E3119
Instructor's e-mail:	m_rababah@hu.edu.jo		
Office Hours:	11:00 – 12:00 Sun - Th.		
Time:	11:00 – 12:30 Mon. and Wed.	**Class Room: E2010**	

Course description: This course introduces forth-year level engineering students to the concept of mechanical design. It includes various materials needed to design mechanical elements. Initially students will be familiar with some concepts and definitions, and then they will be introduced to the considerations & procedures of machine elements design.

Pre-requisites Strength of materials – 110402212

Textbook(s): Mechanical Engineering Design; by Shigley, Mischke & Budynas; 9th Edition (or higher); McGraw-Hill.
(You need to bring your text book each class.

References:
1. Machine Design: An Integrated Approach; R. Norton; Prentice.
2. Mechanical Design: An Integrated Approach; A. Ugural; Hill.
3. Mechanical Design of Machine Elements and Machines; Collins; Wiley.
4. Fundamentals of Machine Elements; Hamrock, Schmid & Jacobson; Hill.
5. Fundamentals of Mechanical Component Design; Edwards & McKee; Hill.

Class schedule: Two class sessions each week; 1.5 hours each

Grading Plan:

First Exam	(30 Points)	
Second Exam	(30 Points)	
Quizzes	**********	
Final exam	(40 Points)	

Course designation according to the professional component:

Professional Component	Course Designation
General Education	-----
Basic Science and Mathematics	----
Engineering Science	√
Engineering Design	√

Course relationship to program outcomes:

	ME Program Outcomes
√	1. Apply knowledge of science, mathematics (including multivariate calculus, linear algebra, differential equations) and engineering fundamentals to mechanical engineering applications. **(a, ME1)**

	2. Design and conduct experiments, as well as analyze and present results in a professional manner. **(b)**
√	3. Design, model, analyze and realize a component, system (thermal or mechanical), or process to meet specific requirements and realistic constraints. **(c, ME2)**
	4. Communicate effectively, and function in multidisciplinary teams. **(d, g)**
√	5. Identify, formulate, and solve engineering problems. **(e)**
√	6. Understand professional and ethical issues and the responsibilities of the engineering practice. **(f)**
√	7. Recognize contemporary issues and environmental, cultural, and economical consideration of the engineering profession. **(j, h)**
	8. Identify the need for professional development and engage in life-long learning. **(i)**
	9. Use the techniques, skills, and modern engineering and computing tools necessary for engineering practice. **(k)**
√	10. Apply the basics of statistics and probability. **(ME3)**
	11. Recognize the need and engage in solving national environmental issues.

Course relationship to 2006/2007 ABET criteria for mechanical engineering programs:

	Programs must demonstrate that graduates have:
√	A. Knowledge of chemistry and calculus-based physics with depth in at least one;
	B. The ability to apply advanced mathematics through multivariate calculus and differential equations;
√	C. Familiarity with statistics and linear algebra;
√	D. The ability to work professionally in both thermal and mechanical systems areas including the design and realization of such systems.

Prepared by: Dr. Mahmoud Rababah **Date:** 5 Feb. 2020

Course Contents:

Ch 1. Introduction

Ch 2. Materials

Ch 3. Load and Stress Analysis

Ch 4. Deflection and Stiffness

Ch 5. Failures Resulting from Static Loading

Ch 6. Fatigue Failure Resulting from Variable Loading

Ch 7. Shafts and shaft components

Ch 8. Screws, Fasteners, and the Design of Nonpermanent Joints

Ch 9. Welding, Bonding, and the Design of Permanent Joints

Ch 10. Mechanical Springs