



Lahore University of Management Sciences

ENGG204 – Engineering Design

Fall 2023

Instructor	Abdullah Umair Bajwa
Room No.	
Office Hours	To be announced
Email	
Telephone	
Secretary/TA	
TA Office Hours	
Course URL (if any)	LMS

Course Teaching Methodology
Teaching Methodology: In-person with supporting asynchronous tutorial videos.

Course Basics				
Credit Hours	3			
Lecture(s)	Number of lecture(s) per week	2	Duration	75 min
Recitation/Lab (per week)	Number of lecture(s) per week		Duration	
Tutorial (per week)	Number of lecture(s) per week		Duration	

Course Distribution	
Core	
Elective	Elective Course for SBASSE
Open for Student Category	SBASSE BS students
Close for Student Category	

COURSE DESCRIPTION
Design is considered to be the “distinguishing activity of engineering.” The course will introduce students to the engineering design framework, with emphasis on mechanical engineering design considerations. Students will learn how to use various engineering design artifacts to systematically understand design problems; generate, analyze, test, and improve design concepts. Supporting design and analysis skills will be developed by training students in Computer-Aided Design, Engineering, and Manufacturing tools to enable them to expeditiously iterate through the engineering design process. The course will rely heavily on experiential learning pedagogies like learning through making and project based learning.

COURSE PREREQUISITE(S)	
•	PHY100
•	ENGG100

COURSE OBJECTIVES				
CLO's	Related PLO's	Level of learning	Teaching methods	CLO attainment check
CLO1	PLO3 ¹	Cog4	Instruction, assignments, projects	Assignments, Projects, Final exam
CLO2	PLO5 ²	Psych 7	Instruction, assignments (learning through making)	CAD tasks, Projects
CLO3	PLO3	Cog4	Instruction, assignments, projects	Assignments, Projects
CLO4	PLO3	Cog2	Instruction, assignments	Quizzes, Midterm

¹ Design and Development of Solutions

² Modern Tool Usage



Lahore University of Management Sciences

Learning Outcomes

	The students should be able to:
CLO1	Implement the design process through the use of appropriate design artifacts.
CLO2	Construct CAD models and additively manufacture them while complying with design specifications.
CLO3	Analyze the performance of designed parts / assemblies to ensure compliance with design requirements.
CLO4	Describe various mechanical engineering design elements and select appropriate ones based on the design requirements.

Grading Breakup and Policy

Assignment(s): 2x5% = 10%

Mini Project: 1x10% = 10%

Quizzes: 4x3% = 12%

CAD Tasks: 6x5% = 30%

Midterm Examination: 1x7% = 7%

Course Project: 1x20% = 20%

Final Examination: 1x7% = 7%

Class Participation: 4%

Examination Detail

Midterm Exams	Yes/No: Yes Combine Separate: Duration: 60 minutes Preferred Date: TBA Exam Specifications: Closed Book
Final Exam	Yes/No: Yes Combine Separate: Duration: 60 minutes Exam Specifications: Closed book



Lahore University of Management Sciences

COURSE OVERVIEW			
Week	Topics	Recommended Readings	Related CLO's
1	Intro to mechanical engineering design	Shigley – Ch # 1 Dym – Ch # 1-2	CLO1
2	Mechanical design considerations (e.g. material selection, mechanical integrity)	Shigley – Ch # 1, 2, 3 Dym – App-A	CLO1, CLO4
3	Intro to CAD modeling in PTC Creo (extrude and sketching) Intro to FDM printing	3D Printing Manual (ENGR-291)	CLO2
4	Shafts and shaft components Screws, and fasteners	Shigley Ch # 7, 8	CLO4
5	Springs and bearings (types, and design basics) Gears (types, and design basics)	Shigley Ch # 10 - 15	CLO4
6	Creating parts in Creo (revolve, and sweep)	Lecture notes	CLO2
7	Creating parts in Creo (helical sweep) Mid-semester test	Lecture notes	CLO2
8	3D printing practice	Lecture notes	CLO2
9	Assembly in Creo Intro to mechanisms in Creo	Lecture notes	CLO3
10	Making movable assemblies	Norton Ch # 2 Lecture notes	CLO3
11	Motion analysis (Kinematic)	Lecture notes	CLO3
12	Drawings in Creo + Buffer	Lecture notes	CLO2
13	Course project work		CLO1
14	Course project work		CLO1
15	Final Exam		

Textbook(s)/Supplementary Readings
<p>Textbooks: Shigley's Mechanical Engineering Design (Tenth Edition) by Budynas, and Nisbett</p> <p>Supplementary Readings: Engineering Design – A Project-Based Introduction (Fourth Edition) by Dym, Little, and Orwin Design of Machinery (Third Edition) by Robert Norton</p>

Harassment Policy
<p>There is absolutely zero tolerance for any behavior that is intended, or has the expected result of making anyone uncomfortable and negatively impacts the class environment, or any individual's ability to work to the best of his/her potential. If you think you may be a victim of harassment, or if you have observed any harassment occurring in the purview of this class, please reach out and speak to me. If you are a victim, I strongly encourage you to reach out to the Office of Accessibility and Inclusion at oai@lums.edu.pk or the sexual harassment inquiry committee at harassment@lums.edu.pk for any queries, clarifications, or advice. You may choose to file an informal or a formal complaint to put an end to offending behavior. You can find more details regarding the LUMS sexual harassment policy here: https://mgshss.lums.edu.pk/lums-harassment-policy. To file a complaint, please write to harassment@lums.edu.pk. In addition to LUMS resources, SSE's Council on Belonging and Equity is committed to devising ways to provide a safe, inclusive and respectful learning environment for students, faculty and staff. To seek counsel related to any issues, please feel free to approach either a member of the council or email at cbe.sse@lums.edu.pk.</p>