



# Lahore University of Management Sciences

## EE 200– Sophomore Design Studio

Fall 2023-24

Instructor	Talha Manzoor
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Course URL (if any)	

Course Basics			
Credit Hours	1		
Lecture(s)	Nbr of Lec(s) Per Week	0	Duration 0 min
Lab (s)	Nbr of Lec(s) Per Week	1	Duration 2 hr 50 min

Course Distribution	
Core	
Elective	
Open for Student Category	Sophomore
Close for Student Category	

COURSE DESCRIPTION
<p>This course exposes undergraduate students to the design, development and prototyping of a basic machine. The content revolves around a single project to solve an open-ended task revealed at the beginning of the semester. The students must come up with their own design and develop a working prototype by the end of the course. In order to stimulate creativity, the students will be constrained to use only the mechanical and electro-mechanical components provided to them in a kit. Students will use the basic rapid prototyping facilities available in the EE workshop to fabricate their prototype. While the course is lab-based, there will be lecture briefings in each session to deliver necessary concepts. This includes basic machine elements, computer-based solid modelling, additive and subtractive manufacturing, and PCB design and fabrication. The evaluations will be based on the lab demonstrations of the project during various points in the semester and in-class quizzes. A heavy emphasis will be placed on effectively logging the entire design, development and experimentation processes in a design notebook. The course will end with a public exhibition in which students will demonstrate their projects to a general audience. A video of the highlights from the previous offering of the course can be found at <a href="https://youtu.be/x1YZQbyulgl">https://youtu.be/x1YZQbyulgl</a></p>

COURSE PREREQUISITE(S)	
•	None

Examination Detail
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Midterm Exam	Yes/No: No
Final Exam	Yes/No: No

### Grading Breakup and Policy

Quizzes/Assignments: 10%  
 Design Notebook: 20%  
 Project Demonstrations and Exhibition: 70%

### Learning Outcomes

- CLO1:** Communicate the concept, design and development process of a basic machine.
- CLO2:** Understand the operation of elementary machine elements such as belts, springs, gears, cams and mechanisms.
- CLO3:** Independently build an electromechanical system using rapid prototyping technologies.
- CLO4:** Refine the design of electromechanical devices through analysis and experimentation

### Relation to EE Program Outcomes

EE 200 CLOs	Related PLOs	Level of Learning	Teaching Methods	CLO Attainment Evaluated in
CLO1	PLO10		Project-based	Lab notebook
CLO2	PLO1		Lecture briefings	Quizzes
CLO3	PLO5		Project, Lecture briefings	Quizzes, Lab demonstrations
CLO4	PLO3		Project	Lab demonstrations

Module	Lecture/Lab	Topics	Deliverables	Related CLOs
	Session 1	Introductory lecture	Design Concept	
Machine Design	Session 2	Actuators: DC motors, servo motors and linear actuators		
	Session 3	Gears/Belts/Chains/Cams		
	Session 4	Mechanisms: 2D mechanisms and synthesis of 4-bar mechanisms		
CAD	Session 5	Sketching and solid modelling	Working Solid Model	



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	Session 6	Creating assemblies		
Rapid Prototyping	Session 7	Manufacturing processes	Mechanical Structure	
	Session 8	Demonstrations: 3D printing and laser cutting		
PCB design and fabrication	Session 9	Basic circuits lab	Electronic Subsystem	
	Session 10	PCB routing		
	Session 11	PCB fabrication		
System Integration	Session 12	Guest Lecture	Working Prototype and Final report	
	Session 13	Final demonstrations		
	Session 14	Exhibition		

Textbook(s)/Supplementary Readings
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Reference Books

1. TBD