

**CP310: DESIGN ENGINEERING**  
**CREDITS = 4 (L=0, T=0, P=4)**

**Course objective:**

To teach design concepts and methodologies.

**Teaching and Assessment Scheme:**

Teaching Scheme			Credits	Marks Distribution				Total Marks
L	T	P	C	Theory		Practical		
				ESE	CE	ESE	CE	
0	0	4	4	00	00	60	40	100

**Details of Assessment Instruments under CE Practical Component:**

- Experiments during lab sessions and record-keeping of lab work (Term Work): 10 marks
- Assignments / Mini project / Quiz / Practical Test: 10 marks

**Course Contents:**

Sr. No.	Topics	Teaching Hours
1	<b><u>Introduction to Engineering Design:</u></b>  Introduction to design process, Essential features of Design, Case studies.	08
2	<b><u>Problem Definition and Information Gathering:</u></b>  Detailing customer requirements; clarifying the objectives; establishing functions; Identifying needs and constraints; Different methods for information gathering; Empathy, Ideation, AEIOU and Product Development Canvases; Learning Need Matrix(LNM).	12
3	<b><u>Concept Generation and Detail Design for Sustainability and Environment:</u></b>  Design for performance, reliability and safety; Design for ergonomics and aesthetics; Risk Management.	08
4	<b><u>Prototyping and Proofing the Design:</u></b>  UML models: class models; state models; interaction model; data flow diagrams; E-R diagrams.	04
5	<b><u>Economic Decision Making and Cost Evaluation:</u></b>  Cost estimation; The time value of money; Design for production; use and sustainability.	06

6 **Hardware Interfacing:**

Introduction to embedded system; Basics of open source microcontroller boards. 06

7 **Implementation and Outcomes:**

Working model and report writing. 16

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**TOTAL 60**

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**List of References:**

1. Clive L. Dym, Patrick Little, Elizabeth J. Orwin, “*Engineering Design – A Project Based Introduction*”, Wiley India Pvt. Ltd.
2. Susan McCahan, Philip Anderson, Mark Kortschot, Peter E. “*Weiss and Kimberly A. Woodhouse, Designing Engineers – An Introductory Text*”, Wiley India Pvt. Ltd.

**Course Outcomes (COs):**

At the end of this course students will be able to

1. Understand the design thinking process
2. Design a solution to an engineering problem
3. Identify needs and constraints of product development system
4. Create a prototype model
5. Evaluate the designed solution
6. Make economic decision for solution