

Branch Name:	Mechanical Engineering
Semester/Year:	Semester VII / Forth Year
Subject Title:	Product Design and Value Engineering
Subject Code:	1ET1010710
Pre-requisite:	Zeal to Learn Subject

Course Objectives:

1. To create new product based on mechanical design engineering.
2. To understand all mechanical aspects of product design by incorporating concept, creativity, structural, manufacturing, aesthetic etc.
3. To study the techniques for solving open-ended problem belongs to design engineering that meet the requirements.
4. To understand contemporary issues and their impact on provided solution.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	00	00	03	70	30	--	--	100

Subject Contents			
Sr. No	Topic	Total Hours	Weightage (%)
1	Product Design: Introduction, Product life cycles, Characteristics of Successful Product development, Design and development of Products, Types of Design and Redesigns, Engineering Designs, Duration and cost of product development, the challenges of Product development.	05	10
2	Product Design for Manufacturing and Assembly: Methods for designing for manufacturing and assembly, design for Maintainability, Design for Environment, Legal factors and social issues, Engineering Ethics and Issues of society related to design of products, Design for safety, Vision and Illumination design: Climate, Noise, Motion, Sound and Vibration, Product Costing.	08	20
3	Product Development Processes and Product Planning: A Generic development process, Concept development, the front end processes- Identifying Customer Needs, Product Specifications, Generate-select-test product concepts, The Product Planning Process.	08	20
4	Value Engineering and Value Analysis: Definition, Value Engineering Function: Approach of Function, Evaluation of Function, Determining Function, Classifying Function, Evaluation of costs, Evaluation of Worth, Determining Worth, and Evaluation of Value.	08	20

5	Value Engineering Job Plan: Introduction, orientation, information phase, Function phase, creation phase, evaluation phase, Investigation phase, implementation phase, speculation phase, analysis phase.	08	20
6	Value Engineering Projects: Project selection, Methods selection, value standards, application of Value Engineering methodology. Fast Diagramming: Cost models, life cycle costs	05	10

Course Outcomes:

The student shall be able to

1. Create new product based on mechanical design engineering.
2. Acquire knowledge of all mechanical aspects of product design by incorporating concept, creativity, structural, manufacturing, aesthetic etc.
3. Solve open-ended problem belongs to design engineering that meet the requirements.
4. Understand contemporary issues and their impact on provided solution.

List of Reference Books:

1. Ulrich, K.T., 2003. Product design and development. Tata McGraw-Hill Education.
2. Chitale, A. K., and R. C. Gupta. Product design and manufacturing. PHI Learning Pvt. Ltd., 2011.
3. Niebel B.W., Draper A.B., Product design and process Engineering. New York: McGraw-Hill; 1974.
4. Heller E.D., Value management: value engineering and cost reduction. Addison-Wesley Publishing Company; 1971.
5. Iyer S. S., Value Engineering: a how to manual. New Age International Limited Publ.; 2009.
6. Mudge A.E., Arthur E., Value engineering: a systematic approach. Pittsburgh. PA: J. Pohl. 1989.
7. Boothroyd G, Dewhurst P, Knight W.A., Product Design for Manufacture and Assembly, revised and expanded. CRC press; 2001.

E-Resources:

1. <https://nptel.ac.in/courses/112104230/13>
2. <https://nptel.ac.in/courses/112107217/5>
3. <https://nptel.ac.in/courses/112107217/10>