Course code	Course Name	L-T-P-Credits	Year of Introduction
MP482	**PRODUCT DEVELOPMENT AND DESIGN**	**3-0-0-3**	**2016**

Prerequisite: Nil

Course Objective

- To create confidence in developing new products.
- To acquaint with methods and tools for product design and development.
- To equip with practical knowledge in conceptualization, design and development of new product.

Syllabus

Introduction to product design, the need of a product, the product life cycle, the product design process. The application of Value Engineering principles in product design. Application of various tools such as CAD, CAE and DFM. The Ergonomics aspects in context of the product design. The fundamental concept of rapid prototyping techniques.

Expected Outcome

The students will be able to

i. create new products suiting the requirements of society.
ii. enhance value addition in products
iii. coordinate multiple factors like market, design, ergonomics manufacturing in creating a new product.

References:

1. Andreas Gebhardt, Rapid Prototyping, Carl Hanser – Verlag, Munich, 2003.
2. Baldwin E N & Neibel B W "Designing for Production." Edwin Homewood Illinois.
3. Bralla J G (Ed.), "Handbook of Product Design for Manufacture, McGraw Hill, NewYork, 1986
4. D. T. Pham, S.S. Dimov, Rapid Manufacturing-The Technologies and Applications of Rapid Prototyping and Rapid Tooling, Springer – Verlag, London, 2001.
5. David G Ullman, "The Mechanical Design Process." McGraw Hill Inc Singapore 1992
6. Hollins B & Pugh S "Successful Product Design." Butter worths London, 1990
7. Jones J C "Design Methods." Seeds of Human Futures. John Willey, 1970
8. Karl T Ulrich, Steven D Eppinger , " Product Design & Development." Tata McGraw Hill, 2003.
9. Kevin Otto & Kristin Wood Product Design: "Techniques in Reverse Engineering and new Product Development.", Pearson Education New Delhi, 2000
10. N J M Roozenberg , J Ekels , N F M Roozenberg " Product Design Fundamentals and Methods ." John Willey & Sons 1995.

Course Plan

Module	Contents	Hours	End Sem. exam marks
	Introduction: Classification/ Specifications of Products. Product life cycle. Product mix. Introduction to product design. Modern product	7	15%

I	development process. Innovative thinking. Morphology of design.		
II	Conceptual Design: Generation, selection & embodiment of concept. Product architecture. Industrial design: process, need. Robust Design: Taguchi Designs & DOE. Design Optimization	7	15%
First Internal Exam			
III	Design for Manufacturing and Assembly: Methods of designing for Manufacturing and Assembly. Designs for Maintainability. Designs for Environment. Product costing. Ethics in product design, legal factors and social issues.	7	15%
IV	Value Engineering / Value Analysis. : Definition. Methodology, Case studies. Economic analysis: Qualitative & Quantitative.	7	15%
Second Internal Exam			
V	Ergonomics in product design. Aesthetics in product design. Concepts of size and texture, colour .Psychological and Physiological considerations. Creativity Techniques: Creative thinking, conceptualization, brain storming, primary design, drawing, simulation, detail design.	7	20%
VI	Concurrent Engineering, Rapid prototyping: concepts, processes and advantages. Tools for product design – Drafting / Modelling software. Patents & IP Acts. Overview, Disclosure preparation.	7	20%
End Semester Exam			

Question Paper Pattern

Maximum marks: 100 Time: 3 hrs

The question paper should consist of three parts

Part A
There should be 2 questions each from module I and II
Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B
There should be 2 questions each from module III and IV
Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C
There should be 3 questions each from module V and VI
Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions