Birla Institute of Technology & Science, Pilani
Instruction Division
First Semester 2015-2016
Course Handout (Part-II)

Course Code : MF F473
Name of the course : Product Design and Development
Instructor-in-charge : SRINIVAS KOTA

Course Description

Introduction to creative design, user research and requirements analysis, problem specification, creative problem solving, solution synthesis and analysis, design economics, design for X, anthropometric, ergonomic, psychological, physiological considerations in design decision making, engineering ethics and society.

I. Scope and Objective of the course:

This course is designed to impart the knowledge required to develop a new product – understand the opportunity, develop and implement a concept. After successful completion of this course, students shall be able to understand and implement the various processes, tools and techniques required for designing a product: product specification development; concept generation, selection, testing and embodiment; product architecture; industrial design; design for X; physical prototypes, environmental, economic and social issues in product development.

II. Textbook:

T1. Karl T. Ulrich, Steven D. Eppinger and Anita Goyal, **Product Design and Development**, 4th Edition (SIE), McGraw-Hill Education (India), 2013.

III. References:

R1. Kevin Otto and Kristin Wood, “Product Design: Techniques in Reverse Engineering and New Product Development”, Pearson Education, 2001.
R2. David G. Ullman, “The Mechanical Design Process”, 4th Edition, McGraw-Hill Higher Education, 2009.
R3. N. J. M. Roozenburg, J. Eekels, N. F. M. Roozenburg, "Product Design: Fundamentals and Methods", John Wiley and Sons, 1995.

IV. Course Contents

S.No.	Learning Objectives	Topics	Text Book (Chapter)
1-4	Introduction	Characteristics of successful product development, Challenges, Generic Product Development Process	T1(1, 2)
5-6	Product Planning	Identifying Opportunities, Evaluate and Prioritize projects, Allocate resources and Plan timing	T1 (3)
7-8	Identifying Customer Needs	Gathering Data, Interpreting Data, Organising the needs, Establishing the relative importance of needs	T1 (4)
9-11	Product Specification Development	What are Specifications, When are specifications established, Establishing target specifications, Setting the final specifications	T1 (5)
12-16	Concept Generation	Different steps in Concept Generation, Different models	T1 (6)
17-19	Concept Selection	Different Concept Evaluation methods, Concept Screening, Concept Scoring	T1 (7)
20-21	Concept Testing	Different steps in concept testing	T1 (8)
22-23	Product Architecture	Architecture types, modularity design, implications, Establishing Architecture	T1 (9)
24-25	Industrial Design	Need, Industrial Design Process, Management and Assessing the quality of Industrial Design	T1 (10)
26-28	Design for manufacturing	Estimating and reducing the costs in Manufacturing and Assembly	T1 (11)
29-30	Prototyping	Understanding Prototypes, Principles and Technologies of Prototyping	T1 (12)
31-34	Design for Environment	Methods of designing environmentally conscious products	R1 (15)
35-37	Human factors in design	Human anthropometric, ergonomic, psychological, physiological considerations in design	R2, R3
38-40	Product development Economics	Economic analysis process, qualitative and quantitative analysis	T1 (15)

V. Evaluation Scheme and Schedule:

Evaluation Component	Weightage	Date & Time	Type	Remarks
Assignments	25%		Take home / Class	
Design Project	25%		Individual / Group	
Mid-Semester Exam	20%	6/10 8:00 - 9:30 AM	Closed book	
Comprehensive Exam	30%	3/12 FN	Closed book	

VI. Chamber Consultation Hour: will be announced in class.

VII. Notices concerning the course: All notices concerning the course are displayed on the **Mechanical Engineering** notice board.

VIII. Make-up Policy: Make up will be permitted only in genuine cases with prior permission.

Instructor-in-Charge
MF F473