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

Course Code : DE G531
Name of the course : Product Design
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, cost analysis, cost reduction and value analysis techniques, design for manufacture, design for environment, 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 the 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, concept selection, concept testing and embodiment; product architecture; industrial design; design for X; analytical and numerical models; physical prototypes, models and experimentation; environmental, economic and social issues in product development; patents and intellectual properties.

II. Textbook:

T1. Kevin Otto and Kristin Wood, “Product Design: Techniques in Reverse Engineering and New Product Development”, Pearson Education, 2001.

III. References:

R1. Karl T. Ulrich and Steven D. Eppinger, “Product Design and Development”, 4th Edition (SIE), McGraw Hill Education (India), 2013.
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.	Topics	Learning Objectives	Book (Chapter)
1-2	Introduction	Introduction to design, modern product development process, innovative thinking	T1 (1)
3-4	Product Development Process and Product Planning	Product development teams, Product development planning process and basic tools	T1 (2)
5-6	Scoping Product Development	What to develop? Mission statement, Technical questioning, Business case analysis, Design drivers	T1 (3)
7-11	Product Specification Development	Identifying the customer needs, establishing product function, Benchmarking, establishing product specification	T1 (4, 5, 6, 7)
12-13	Product Architecture	Architecture types, modularity design, implications	T1 (9)
14-20	Conceptual Design	Concept generation, concept evaluation, selection, testing and embodiment	T1 (10, 11, 12)
21	Prototyping	Types of prototypes, Uses of Prototypes, Techniques	T1 (17)
22-23	Industrial Design	Need for industrial design, industrial design process, management and assessing the quality of industrial design	R1 (10)
24-27	Design for manufacturing and Assembly	Methods of designing for manufacturing and assembly	T1 (14)
28-33	Design for Environment	Methods of designing environmentally conscious products	T1 (15)
34-36	Human factors in design	Human anthropometric, ergonomic, psychological, physiological considerations in design	R2, R3
37-40	Product development Economics	Economic analysis process, qualitative and quantitative analysis	R1 (15)

V. Evaluation Scheme and Schedule:

Evaluation Component	Weightage	Date & Time	Type	Remarks
Assignments	20%		Take Home	
Design Project	40%		Open book	
Mid-Semester Exam	20%	10/10 4:00 - 5:30 PM	Closed book	
Comprehensive Exam	20%	14/12 AN	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
DE G531