PRODUCT DESIGN AND DEVELOPMENT

(Elective - I)

Course Code: 15ME2107

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Course Outcomes: At the end of the course, the student will be able to

CO1: Examine the characteristics used for product design and development.

CO2: Recognize the customer requirements in product design.

CO3: Apply structural approach to concept generation, selection and testing.

CO4: Identify various aspects of design such as industrial design, design for manufacture and product architecture.

CO5: Explain various principles and technologies used for the preparation of prototype.

UNIT-I (10-Lectures)

Introduction: Characteristics of successful product development, design and development of products, duration, and cost of product development, the challenges of product development

Development Processes and Organizations: A generic development process, concept development: the front-end process, adopting the generic product development process, the AMF development process, product development organizations, the AMF organization

UNIT-II (10-Lectures)

Product planning: The product planning process, identify opportunities, evaluate and prioritize projects, allocate resources and plan timing, complete pre project planning, reflect all the results and the process

Identifying customer needs: Gather raw data from customers, interpret raw data in terms of customer needs, organize the needs into a hierarchy,

establish the relative importance of the needs and reflect on the results and the process

UNIT-III (10-Lectures)

Concept Generation: The activities of concept generation clarify the problem, search externally, search internally, explore systematically, reflect on the results and the process

Concept selection: Overview of methodology, concept screening, and concept scoring

Concept testing: Define the purpose of concept test, choose a survey population, choose a survey format, communicate the concept, measure customer response, interpret the result, reflect on the results and the process

UNIT-IV (10-Lectures)

Product architecture: implications of the architecture, establishing the architecture, variety and supply chain considerations, platform planning, related system level design issues

Industrial design: Assessing the need for industrial design, the impact of industrial design, industrial design process, managing the industrial design process, assessing the quality of industrial design

Design for manufacturing: Definition, estimation of manufacturing cost, reducing the cost of components, assembly, supporting production, impact of DFM on other factors

UNIT-V (10-Lectures)

Prototyping: Prototyping basics, principles of prototyping, technologies, planning for prototypes

Product development economics: Elements of economic analysis, base case financial mode, sensitive analysis, project trade-offs, influence of qualitative factors on project success, qualitative analysis

TEXT BOOKS:

1. A K Chitale and R C Gupta , " *Product Design and Manufacturing*", PHI, New Delhi, 2003

2. Karl.T.Ulrich and Steven D Eppinger – Irwin, "*Product Design and Development*", McGraw- Hill International, 2002

REFERENCES:

1. George E Deiter, "*Engineering Design*", McGraw-Hill International, 2002
2. Boothroyd G, "*Product design for Manufacture and Assembly*", 1e, Marcel Dekker Inc, New York, 1994