Devi Ahilya University, Indore, India Institute of Engineering & Technology				**IV Year B.E. (Mechanical Engg.) (Part Time)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
MEP8E3 PRODUCT DEVELOPMENT	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
	2	**1**	**1**	**2**	**1**	**1**	**4**
Duration of Theory Paper: 3 Hours							

Learning Objectives:

1. This course provides hands-on and real world experience in the development of innovative and realistic customer-driven engineered products.
2. Design concepts and techniques are introduced, and the student's design ability is developed in a design project or feasibility study chosen to emphasize ingenuity
3. Design concepts and techniques are introduced, and the student's design ability is developed in a design project or feasibility study chosen to provide wide coverage of engineering and business topics.

Pre requisites: Industrial Engineering & Management, Materials Management, Operations Research.

COURSE CONTENTS

UNIT- I

Introduction Definitions, market needs, product cycle, design methodologies, product specification, conceptual and development phases. Product planning and design decision making. Marketing, forecasting & market research for a new product. Purchasing and sales procedure. Demand analysis for new product.

UNIT- II

Product Design: Introduction to PD, Applications, Relevance, Product Definition, Scope, Terminology. Design definitions, the role and nature of design, old and new design methods, Design by evolution. Need based development, technology based developments. Physical reliability & Economic feasibility of design concepts.

UNIT- III

Development of Prototype Product: Divergent, transformation and convergent phases of product design. Identification of need, Analysis of need. Design for what? Design criteria, functional aspects. Aesthetics, ergonomics, form (structure). Shape, size, color. Mental blocks, Removal of blocks, Ideation Techniques, Creativity.

UNIT- IV

Transformations: Brainstorming & Synectics . Morphological techniques. Utility concept, Utility value, Utility index . Decision making under multiple criteria. Economic aspects of design. Fixed and variable costs. Break-
EvenAnalysis.

UNIT- V

Product Appraisal: Information and literature search, patents, standards and codes. Environment and safety considerations. Existing techniques such as work-study, SQC etc. which could be used to improve method & quality of product. Innovation versus Invention. Technological Forecasting.

Learning Outcomes:

Upon completing the course student will be able to:

1. Understand the fundamentals of product cycle.
2. Apply techniques of demand forecasting in practical situations.
3. Understand the phenomenon of prototype product
4. Know the basics of techniques related product development.
5. Know the various standard procedures related to patenting, environmental and other standards for product appraisal.

BOOKS RECOMMENDED:

[1] Chitale A.K. & Gupta R.C., Product Design & Manufacturing, PHI (EEE),1e, 2007.
[2] Crewford R.P., The Technology of Creation Thinking, Prentice Hall, 2e,2004.
[3] Walls Grohem, The Art of Thought, Bruce & Co., New York.
[4] Starr M.K., Product Design & Decision Theory, Prentice Hall,2e, 2006.
[5] Cain C .D., Engineering Product Design , Bussiness Books.
[6] Ulrich, K.T. and Eppinger, S.D., Product Design and Development, McGraw-Hill/Irwin, 4th ed, 2007 (ISBN 978-0073101422).

LIST OF PRACTICAL ASSIGNMENTS:

(1) Study and Analysis of product cycle of different product.
(2) Study and Analysis of forecasting & market research methods for a new product.
(3) Case studies related to Product Design applications.
(4) Case studies related to Prototype Development methods for new product.
(5) Analysis of methods related to transformation of Product idea into product concept & Prototype development.
(6) Case studies related to standards and codes for product development.
(7) Case studies related to Environment and safety considerations for product development
(8) Case studies related to Technological Forecasting for product development.