

## **PR8072 NEW PRODUCT DEVELOPMENT**

### DETAILED SYLLABUS

#### **OBJECTIVES:**

- This course aims at introducing the students to the basic concepts of engineering design and product development with focus on the front-end processes.
- At the end of this course the student is expected to demonstrate an understanding of the overview of all the product development processes and knowledge of concept generation and selection tools.

#### **UNIT I INTRODUCTION**

Need for developing products – the importance of engineering design – types of design –the design process – relevance of product lifecycle issues in design –designing to codes and standards- societal considerations in engineering design –generic product development process – various phases of product development-planning for products –establishing markets- market segments- relevance of market research

#### **UNIT II CUSTOMER NEEDS**

Identifying customer needs –voice of customer –customer populations- hierarchy of human needs-need gathering methods – affinity diagrams – needs importance- establishing engineering characteristics-competitive benchmarking- quality function deployment- house of quality- product design specification-case studies

#### **UNIT III CREATIVE THINKING**

Creative thinking –creativity and problem solving- creative thinking methods- generating design concepts-systematic methods for designing –functional decomposition – physical decomposition –functional representation –morphological methods-TRIZ- axiomatic design

#### **UNIT IV DECISION MAKING AND PRODUCT ARCHITECTURE**

Decision making –decision theory –utility theory –decision trees –concept evaluation methods –Pugh concept selection method- weighted decision matrix –analytic hierarchy process – introduction to embodiment design –product architecture – types of modular architecture – steps in developing product architecture

#### **UNIT V DESIGN AND COST ANALYSIS**

Industrial design – human factors design –user friendly design – design for serviceability – design for environment – prototyping and testing – cost evaluation –categories of cost – overhead costs – activity-based costing –methods of developing cost estimates – manufacturing cost –value analysis in costing

#### **TEXT BOOKS**

1. Anita Goyal, Karl T Ulrich, Steven D Eppinger, “Product Design and Development “, 4th Edition, 2009, Tata McGraw-Hill Education, ISBN-10-007-14679-9

2. Kevin Otto, Kristin Wood, "Product Design", Indian Reprint 2015, Pearson Education, ISBN 9788177588217

### **REFERENCES**

1. Clive L. Dym, Patrick Little, "Engineering Design: A Project-based Introduction", 3rd Edition, John Wiley & Sons, 2009, ISBN 978-0-470-22596-7.
2. George E. Dieter, Linda C. Schmidt, "Engineering Design", McGraw-Hill International Edition, 4th Edition, 2009, ISBN 978-007-127189-9.
3. Yousef Haik, T. M. M. Shahin, "Engineering Design Process", 2nd Edition Reprint, Cengage Learning, 2010, ISBN 0495668141