

Course Code	Course Title	L	T	P	C
1152EC107	INTEGRATED PRODUCT DEVELOPMENT	3	0	0	3

a) **Course category**

Program Elective

b) **Preamble**

Understanding the global trends and development methodologies of various types of products and services Conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems.

c) **Prerequisite**

Nil

d) **Related courses**

e) **Course Outcomes**

On successful completion of this course, students will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Interpret the various global trends to develop the new product.	K3
CO2	Summarize the types of product requirements, product development methodologies and management.	K2
CO3	Conceptualize the product of integrating hardware, software, controls, electronics and mechanical system and detailed product design and testing.	K3
CO4	Develop product test specifications standards, validate the product and confirm its performance as per design specifications.	K3
CO5	Enumerate the end product development process of trade off, IPR, security and Configuration management.	K2

f) Correlation of CO's with PO's

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	L	H	-	-	M	L	-	-	-	M	L	-	-
CO2	M	-	H	-	M	-	-	-	-	-	-	-	-	-
CO3	H	-	M	-	H	-	-	-	-	M	-	-	-	-
CO4	M	-	L	-	-	M	M	-	-	-	-	M	-	-
CO5	-	-	M	-	M	-	-	H	-	-	-	-	-	-

g) Course Content

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT

9

Analysis and Product decision - Social Trends - Technical Trends - Economic Trends - Environmental Trends - Political/Policy Trends - Introduction to Product Development Methodologies and Management - Overview of Products and Services - Types of Product Development - Overview of Product Development methodologies - Product Life Cycle - Product Development Planning and Management

UNIT II REQUIREMENTS AND SYSTEM DESIGN

9

Requirement Engineering - Types of Requirements - Requirement Engineering - Traceability Matrix and Analysis - Requirement Management - System Design & Modeling - Introduction to System Modeling - System Optimization - System Specification - Sub-System Design - Interface Design

UNIT III DESIGN AND TESTING

9

Conceptualization - Industrial Design and User Interface Design - Introduction to Concept generation Techniques – Challenges in Integration of Engineering Disciplines - Concept Screening & Evaluation - Detailed Design - Component Design and Verification – Mechanical, Electronics and Software Subsystems - High Level Design/Low Level Design of S/W Program - Types of Prototypes, S/W Testing- Hardware Schematic, Component design, Layout and Hardware Testing – Prototyping - Introduction to Rapid Prototyping and Rapid Manufacturing - System Integration, Testing, Certification and Documentation

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL)SUPPORT

9

Introduction to Product verification processes and stages - Introduction to Product validation processes

and stages - Product Testing standards and Certification - Product Documentation - Sustenance - Maintenance and Repair – Enhancements - Product EoL - Obsolescence Management - Configuration Management - EoL Disposal.

UNIT V BUSINESS DYNAMICS ENGINEERING SERVICES INDUSTRY 9

The Industry - Engineering Services Industry - Product development in Industry versus Academia - The IPD Essentials - Introduction to vertical specific product development processes - Manufacturing/Purchase and Assembly of Systems - Integration of Mechanical, Embedded and S/W systems – Product development Trade-offs - Intellectual Property Rights and Confidentiality - Security and configuration management.

Total 45 Hrs

g) Learning Resources

Text Books

1. Karl T Ulrich and Stephen D Eppinger, "Product Design and Development", TataMcGraw Hill, Fifth Edition, New Delhi, 2011 2.
2. John W Newstormand Keith Davis, "Organizational Behavior", Tata McGraw Hill, Eleventh Edition, New Delhi, 2005.

Reference Books

1. Hiriappa B, "Corporate Strategy – Managing the Business", Authorhouse, USA, 2013
2. Peter F Drucker, "People and Performance", Butterworth – Heinemann [Elsevier], Oxford, UK, 2004.
3. Vinod Kumar Garg and Venkitakrishnan N K, "Enterprise Resource Planning – Concepts and Practice", Prentice Hall India, New Delhi, 2003
4. Mark S Sanders and Ernest J McCormick, "Human Factors in Engineering and Design", McGraw Hill Education, Seventh Edition, New Delhi, 2013.