COURSECODE 1154ME101	INTEGRATED PRODUCT DEVELOPMENT	L	T	P	C
		3	0	0	3

1. Preamble

This course is designed to provide the knowledge about the concepts of various tools and approaches available for product development.

2. Prerequisite

Basic Mechanical Engineering.

3. Link to other Courses

Project Work

4. Course Educational Objectives

Students undergoing this course are expected to

- Understand the concepts of tools and techniques in the Integrated Product Development area of the Engineering Services industry.
- Relate the engineering topics into real world engineering applications.

5. Course Outcomes

Upon the successful completion of the course, learners will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Summarise the various trends affecting product decision	K2
CO2	Identify the requirements to create new product	K3
CO3	Compare different techniques involved in design creation and design testing	K2
CO4	Rephrase the methods of model creation and integration between software and hardware.	K2
CO5	Illustrate the need of end of life and patenting.	K2

(K1 – Remember; K2 – Understand; K3 – Apply ;)

6. Correlation of COs with Programme Outcomes

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

H- High; M-Medium; L-Low

7. Course Content

UNIT I: FUNDAMENTALS OF PRODUCT DEVELOPMENT L-9

Global Trends Analysis and Product decision: Types of various trends affecting product decision - Social Trends-Technical Trends- Economic Trends- Environmental Trends- Political/ Policy Trends-PESTLE Analysis. 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 L-9

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

UNIT III: DESIGN AND TESTING L-9

Conceptualization -Industrial Design and User Interface Design- Introduction to Concept generation Techniques-Concept Screening & Evaluation- Concept Design- S/W Architecture- Hardware Schematics and simulation-Detailed Design: Component Design and Verification- High Level Design/Low Level Design of S/W Programs- S/W Testing-Hardware Schematic- Component design-Layout and Hardware Testing.

UNIT IV: IMPLEMENTATION & INTEGRATION L-9

Prototyping: Types of Prototypes -Introduction to Rapid Prototyping and Rapid Manufacturing. System Integration- Testing- Certification and Documentation: Introduction to Manufacturing /Purchase and Assembly of Systems- Integration of Mechanical, Embedded and S/W systems-Introduction to Product verification and validation processes - Product Testing standards, Certification and Documentation.

UNIT V: SUSTENANCE ENGINEERING AND BUSINESS DYNAMICS L-9

Sustenance -Maintenance and Repair- Enhancements Product End of Life (EoL): Obsolescence Management-Configuration Management- EoL Disposal.

The Industry - Engineering Services Industry overview- Product development in Industry versus Academia The IPD Essentials- Introduction to vertical specific product development processes-Product development Trade-offs- Intellectual Property Rights and Confidentiality- Security and configuration management

TOTAL=45 periods

8. Text Books

1. NASSCOM student Handbook "Foundation Skills in Integrated Product Development".
2. Anita Goyal, Karl T Ulrich, Steven D Eppinger, “Product Design and Development “, 4th Edition, 2009, Tata McGraw-Hill Education, ISBN-10-007-14679-9

9. References

1. George E.Dieter, Linda C.Schmidt, "Engineering Design", McGraw-Hill International Edition, 4th Edition, 2009, ISBN 978-007-127189-9
2. Kevin Otto, Kristin Wood, "Product Design", Indian Reprint 2004, Pearson Education,ISBN. 9788177588217
3. Yousef Haik, T. M. M. Shahin, "Engineering Design Process", 2nd Edition Reprint, Cengage Learning, 2010, ISBN 0495668141
4. Clive L.Dym, Patrick Little, "Engineering Design: A Project-based Introduction", 3rd Edition, John Wiley & Sons, 2009, ISBN 978-0-470-22596-7
5. Product Design Techniques in Reverse Engineering and New Product Development, KEVIN OTTO & KRISTIN WOOD, Pearson Education (LPE), 2001.
6. The Management and control of Quality-6th edition-James R. Evens, William M Lindsay Pub:son south-western(www.swlearning.com)

10. Revised Bloom's based Assessment Pattern

Revised Bloom's Category	Internal				University Examination %
	Unit Test-I %	Mid Term Test I %	Unit Test-II %	Mid Term Test II %	
Remember	40	20	20	10	10
Understand	60	40	20	20	20
Apply		40	40	30	30
Analyse			20	40	40
Evaluate					
Create					

Revised Bloom's Category	Assignments	
	1(CO1 &CO2) (max marks in %)	2(CO3&CO4) (max marks in %)
Remember		
Understand		
Apply	60	40
Analyse	40	60
Evaluate		
Create		