



GOVERNMENT OF TAMILNADU
DIRECTORATE OF TECHNICAL EDUCATION, CHENNAI
STATE PROJECT COORDINATION UNIT
(Established under Canada India Institutional Cooperation Project)

CURRICULUM

Course Name		PRODUCT DESIGN AND DEVELOPMENT				
Course Code		ME/2020/ 035				
Course Duration		45 Hours				
Minimum Eligibility Criteria/Pre-requisites		ITI/10 th /+2/Diploma/Graduates				
Pre-requisites (if any)		-				
Course Objectives		Training module has been designed to provide the participants to • Understand the basic concepts of product design • Learn Product features and its architecture so that student can have a basic knowledge in the common features a product has and how to incorporate them suitably in product. • Understand Intellectual Property Rights				
Course Outcomes		A student passing this module should be able to • Identify and analyse the product design and development processes in manufacturing industry. • Define the components and their functions of product design and development processes and their relationships from concept to customer over whole product lifecycle. • Analyse, evaluate and apply the methodologies for product design, development and management. • Undertake a methodical approach to the management of product development to satisfy customer needs. • Carry out cost and benefit analysis through various cost models. • Design protection and Intellectual Property.				
Expected Job Roles		Product Designer, Product developer				
TEACHING AND SCHEME OF EXAMINATION						
Course Code	Course Name	Hours		Assessment Marks		Duration of the Examination
				Min	Max	
ME/2020/035	PRODUCT DESIGN AND DEVELOPMENT	Theory	45	40	100	3 Hours

ME/2020/035 - PRODUCT DESIGN AND DEVELOPMENTDETAILED SYLLABUS

Unit No.	Modules	No. of Hours (Theory)
I	INTRODUCTION	6 Hours
1.1	Product design vs development, Need, Classification	06
1.2	Product life cycle, cost, quality and servicing	
1.3	Generic product development process, steps, examples.	
II	GATHERING OF CUSTOMER NEEDS and PRODUCT ARCHITECTURE	12 Hours
2.1	GATHERING OF CUSTOMER NEEDS Gathering of customer needs, types of customer needs and analysis,	12
2.2	Grouping of customer needs - Examples	
2.3	PRODUCT ARCHITECTURE: Introduction, product architecture and their types, product modularity, and their types.	
2.4	Product portfolio, types and characteristics, examples.	
III	CONCEPT ENGINEERING	9 Hours
3.1	Tools, Quality function deployment, Failure mode and their effects analysis,	09
3.2	Fault tree analysis, Design for manufacture and assembly	
3.3	Design for safety and environment. Steps and guidelines, examples.	
IV	PROTOTYPE AND TESTING:	6 Hours
4.1	Introduction, need for prototypes, types, prototype development	06
4.2	Physical and digital prototyping, rapid prototyping techniques and characteristics.	
V	MODERN TOOLS and INTELLECTUAL PROPERTY RIGHTS	12 Hours
5.1	MODERN TOOLS Internet, concept of Collaborative product commerce	12
5.2	Product data management and Product Life Cycle Management	
5.3	Need and their benefits, commercial PLM tools, examples.	
5.4	INTELLECTUAL PROPERTY RIGHTS Introduction to IPR. Patent search and application	
5.5	Steps in drafting patent application, Patent infringement	
5.6	National and International patent law, examples.	
Total hours		45

REFERENCE BOOKS

S. No.	Name of the Book	Author	Publisher & Year
1	Product Design and Development	Karl, T U, Steven, D E	5 th edition, Tata McGraw Hill, New Delhi,. 2004
2	Product Design	Kevin Otto, Kristin Wood	2 nd edition, Pearson, New Delhi, 2013
3	Product Design and Manufacturing	Chitale, A K., Gupta, R C	5 th edition, Prentice Hall of India, New Delhi. 2005
4	Product Life Cycle Management	Michael Grieves	Tata McGraw Hill, New Delhi, 2006

ASSESSMENT AND CERTIFICATION

S. No.	Criteria for Assessment
1.	A trainee will be assessed based on the performance in End Examination for Theory and Practical conducted internally in the Project Polytechnic College for a duration of 3 hours
2.	A trainee must have 75% of attendance to appear for End examination in Theory .
3.	The assessment for theory part will be based on the marks scored in the end examination on the knowledge bank of questions.
4.	The assessment for practical part will be based on the marks scored in the end examination conducted by the Project Polytechnic and assessed by the Examiners approved by Strategic Plan Implementation Committee (SPIC) of the project polytechnic.
5.	The passing criteria for successful completion of training is every trainee should score 50% of marks in theory and practical examination.
6.	On successful completion of training, Certificate will be issued to the participants by the Directorate of Technical Education through the Project Polytechnics.

END EXAMINATION

ALLOCATION OF MARKS

S.NO	Description	Max.Marks
1.	Theory Examination	60
2.	Report Preparation / Assignments	40
Total Marks		100

THEORY MODEL QUESTION PAPER

ME/2020/035 – PRODUCT DESIGN AND DEVELOPMENT

(Maximum Marks: 60)

PART - A

Answer any **ten** Questions

(10 x 2 = 20 Marks)

1. Define product development.
2. What is meant by development time in product development?
3. List the number of stages in product design.
4. What is product architecture?
5. Mention the types of architecture.
6. Define QFD.
7. Define process FMEA.
8. Define Prototype.
9. What is Rapid prototyping?
10. List the types of prototypes.
11. Define product lifecycle management.
12. What is Intellectual property?
13. What is Product data Management?

PART – B

Answer any **ten** Questions

(10 x 4 = 40 Marks)

1. Mention the challenges of product development.
2. What are the roles of a product designer?
3. What is meant by slot modular architecture?
4. What are the characteristics of a product portfolio?
5. What is meant by bus modular architecture?
6. What is meant by Failure Mode and Effect Analysis?
7. Draw the event symbols used in FTA.
8. State the advantages of Fault Tree Analysis.
9. What are the types of rapid prototyping technology available?
10. Write the disadvantages of rapid prototyping.
11. What are the applications of internet?
12. What is collaborative commerce?
13. What are the steps involved in drafting patent application?