GUJARAT TECHNOLOGICAL UNIVERSITY

MASTER OF BUSINESS ADMINISTRATION

Year – 2 (Semester – IV) (W.E.F. Academic Year 2018-19)

Specialization: Production and Operations Management
Subject Name: Product Design and Development (PDD)
Subject Code: 3549272

1. **Learning Outcome:**
   - Identify and analyze 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.
   - Analyze, 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.

2. **Course Duration:** The course duration is of **36 sessions of 75 minutes** each.

3. **Course Contents:**

Module No.	Modules / Sub-Modules	No. of Sessions	70 Marks (External Evaluation)
I	**Introduction to Product Design:** Aimow's Model:-Definition of Product Design, Design by Evolution, Design by Innovation, Essential Factors of Product Design. Production –Consumption Cycle, Flow and Value Addition in the Production –Consumption Cycle, The Morphology of Design (The Seven Phases), Primary Design Phases and Flowcharting, Role of Allowance, Process Capability, and Tolerance in Detailed Design and Assembly, Summary of Detailed Design Phases. **Product Design Practice and Industry:** Product Strategies, Time to Market, Analysis of the Product, The Three S's Standardization, Renard Series (Preferred Number), Simplification, The Designer and his Role ,The Designer: Myth and Reality, The Industrial Design Organization ,Basic Design Considerations, Problems Faced by Industrial Designer, Procedure Adopted by Industrial Designers, Types of Models Designed by Industrial Designers, What the Designer	9	17

	Contributes, Role of Aesthetics in Product Design, Role of Ergonomics in Product Design, Functional Design Practice.		
II	Quality Assurance in Product Design and Manufacturing: - Evolution of Quality Concepts and Applications, Quality and Design Spiral, Theory of Sampling Inspection, Control Charts and in –Process Monitoring of Quality, Quality of Performance: Reliability and Allied Topics, Taguchi Method of Robust Design of Products, Six Sigma Quality Concepts.	9	18
III	**Human Engineering Considerations in Product Design:** Human Being as Applicator of Forces, Anthropometry: Man as Occupant of Space, The Design of Controls, The Design of Display, Man/Machine Information Exchange, Workplace Layout from Ergonomic Considerations, Noise, Heating and Ventilating, Lighting, Concluding Remark. **Value Engineering and Product Design:** Historical Perspective, what is Value? Nature and Measurement of Value, Maximum Value, Normal Degree of Value, Importance of Value, The Value Analysis Job Plan, Creativity, steps to Problem –Solving and Value Analysis, Value Analysis Tests, Value Engineering Idea Generation Check –List, Cost Reduction through Value Engineering Case Study, Material and Process Selection in Value Engineering.	9	18
IV	Role of Computer in Product Design, Manufacturing and Management:-CAD/CAM: Some Definitions, Product Cycle and CAD/CAM ,Role of Computer in Manufacturing, Role of Computer in Design Process, Creation of a Manufacturing Database, Computer Integrated Manufactured, Communication Network, Group Technology, Production Flow Analysis (PFA),Computer Added Process Planning (CAPP), Material Requirement Planning, Moving Towards Total Automation :Role of Artificial Intelligence, Flexible Manufacturing Systems, Just –In –TIME((JIT) Manufacturing. Modern Approaches to Product Design: -Concurrent Design, Quality Function Deployment (QFD), Rapid Prototyping.	9	17
V	**Practical:** • Students can visit manufacturing firms and identify how product design and new product development in undertaken. • Students can carry out product evaluations of existing products from ergonomic perspective. • Students can identify the role of technology in product design and development.	---	(30 marks CEC)

4. Teaching Methods:

The course will use the following pedagogical tools:

- Lectures
- Case Discussions and Role Playing
- Audio-visual Material (Using CDs/Clippings/ online videos)
- Assignments and Presentations

5. Evaluation:

The evaluation of participants will be on continuous basis comprising of the following elements:

A	Continuous Evaluation Component comprising of Projects / Assignments / Quiz / Class Participation / Class test / Presentation on specific topic etc.	(Internal Assessment- 50 Marks)
B	Mid-Semester examination	(Internal Assessment-30 Marks)
C	End –Semester Examination	(External Assessment-70 Marks)

6. Reference Books:

Sr. No.	Author	Name of the Book	Publisher	Year of Publication
1	Karl Ulrich, Steven Eppinger	Product Design and Development	McGraw Hill	2017
2	William F. Smith, Javed Hashemi and Ravi Prakash	Materials Science and Engineering	McGraw Hill	2017
3	Kevin Otto and Kristin Wood	Product Design : Techniques in Reverse Engineering and New Product Development	Pearson	Latest Edition
4	Dr. Ali Jamnia	Introduction to Product Design and Development for Engineers	Taylor & Francis	Latest Edition
5	Stefan Thomke	Managing Product and Service Development: Text and Cases	McGraw-Hill	Latest Edition
6	Marco Cantamessa and Francesca Montagna	Management of Innovation and Product Development	Springer-Verlag Londin	2016
7	Mukesh Chaturvedi, Aseem Kumar and Manmohan Rahul	Managing Innovations and New Product Development: Concepts and Cases	PHI	2009
8	Joan Knutson	Succeeding in project-driven organizations: people, processes and politics	Wiley	Latest
9	Marcus Pessoa and Luis Gonzaga Trabasso	The Lean Product Design and Development Journey	Springer	2017

Note: Wherever the standard books are not available for the topic appropriate print and online resources, journals and books published by different authors may be prescribed.

7. List of Journals / Periodicals / Magazines / Newspapers, etc.

1. Journal on Product Design and Development
2. International Journal of Product Development
3. Journal of Product Innovation Management
4. Design Management and New Product Development