2019
MU

Strictly as per the New Revised Syllabus (Rev - 2016) of Mumbai University
w.e.f. academic year 2019-2020 (As per Choice Based Credit and Grading System)

PRODUCT LIFE CYCLE MANAGEMENT

(Institute Level Optional Course I) (Code : ILO7011)

Semester VII - Mechanical Engineering

Mandar M. Bidwe

PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar

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Product Life Cycle Management (Institute Level Optional Course - I)

Prof. Mandar M. Bidwe

Semester VII - Mechanical Engineering (MU)

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(Book Code : MO138A)

Module	Detailed Contents	Hrs
03	**Product Data Management (PDM)** Product and Product Data, PDM systems and importance, Components of PDM, Reason for implementing a PDM system, financial justification of PDM, barriers to PDM implementation. **(Refer Chapter 3)**	05
04	**Virtual Product Development Tools** For components, machines, and manufacturing plants, 3D CAD systems and realistic rendering techniques, Digital mock-up, Model building, Model analysis, Modeling and simulations in Product Design, Examples/Case studies. **(Refer Chapter 4)**	05
05	**Integration of Environmental Aspects in Product Design** Sustainable Development, Design for Environment, Need for Life Cycle Environmental Strategies, Useful Life Extension Strategies, End-of-Life Strategies, Introduction of Environmental Strategies into the Design Process, Life Cycle Environmental Strategies and Considerations for Product Design. **(Refer Chapter 5)**	05
06	**Life Cycle Assessment and Life Cycle Cost Analysis** Properties, and Framework of Life Cycle Assessment, Phases of LCA in ISO Standards, Fields of Application and Limitations of Life Cycle Assessment, Cost Analysis and the Life Cycle Approach, General Framework for LCCA, Evolution of Models for Product Life Cycle Cost Analysis. **(Refer Chapter 6)**	05

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2.6.1 Relation with the Development Process Planning Phase 2-11

2.6.2 Relation with the Post Design Planning Phase 2-12

2.7 Methodological Evolution in Product Design 2-13

2.8 Concurrent Engineering 2-14

2.8.1 Essential Principles of Concurrent Engineering (CE) 2-15

2.9 Concurrent Design 2-16

2.9.1 Characteristic Features of Concurrent Engineering 2-16

2.9.2 Concurrent Engineering and Life Cycle Approach 2-18

2.10 New Product Development and Strategies (NPD) 2-19

2.11 Product Configuration and Variant Management 2-21

2.11.1 Product Configuration 2-21

2.11.2 Variant Management 2-22

2.12 The Design for 'X' System 2-24

2.12.1 Objective Properties and Design for 'X' Tools 2-24

2.13 Design for Manufacture (DFM) 2-26

2.13.1 Design for Manufacturability Considerations (DFM Guidelines) 2-27

2.14 Design for Assembly (DFA) 2-28

2.15 Design for Robustness 2-30

2.16 Design for Safety 2-32

2.17 Design for Reliability 2-33

2.18 Design for Environment (DFE) 2-35

2.19 Design for Recycling 2-37

2.20 Design for Remanufacturing 2-37

2.21 Design for Piece Part Production 2-38

2.22 Choice of Design for X Tools and their Use in Design Process 2-39

Module III

Chapter 3 : Product Data Management (PDM) 3-1 to 3-12

Syllabus : Product and Product Data, PDM system and importance, Components of PDM, Reason for implementing a PDM system financial justification of PDM, Barriers to PDM implementation.

3.1 Product and Product Data 3-1

3.2 Product Data Management (PDM) 3-3

3.2.1 PDM System 3-3

3.2.2 Importance of PDM 3-4

3.3 Components of PDM 3-5

3.4 Reasons for Implementing a PDM System 3-6

3.5 Financial Justification of PDM 3-9

3.6 Barriers to PDM Implementation 3-11

3.7 Features of PDM 3-12

Module IV

Chapter 4 : Virtual Product Development Tools 4-1 to 4-17

Syllabus : For components, machines and manufacturing plants, 3D CAD systems and realistic rendering techniques, Digital mock-up, Model building, Model analysis, Modeling and simulation in Products Design, Examples/Case studies.

4.1 Virtual Product Development 4-1

4.1.1 Tools for Virtual Product Development 4-2

4.1.2 Product Development Tools for Components and Machines 4-4

4.1.3 Product Development Tools for Manufacturing 4-6

4.2 3D CAD System 4-6

4.3 Realistic Rendering Techniques 4-8

4.3.1 Ray Tracing 4-9

4.3.2 Ray Casting 4-9

4.3.3 Radiosity 4-10

4.4 Digital Mock-up (DMU) 4-11

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Machine Design - II
R. B. Patil

CAD/CAM/CAE
R. B. Patil, Neha Patil

Production Planning and Control
Dr. Anand K. Bewoor, Abhijeet B. Ranveer

Mechanical Vibrations (Dept. Elective III)
Dr. F. B. Sayyad

Automobile Engineering (Dept. Elective III)
S. D. Ambatkar

Product Lifecycle Management (Inst. Elective I)
Mandar M. Bidwe

Operation Research (Inst. Elective I)
Girish Phatak

Energy Audit and Management (Inst. Elective I)
B. L. Singhal, Amit L. Nehete

About the Author

Prof. Mandar M. Bidwe

has completed B.E. (Mechanical) from Swami Ramanand Teerth Marathwada, University Nanded and M.Tech. (Product Design and Manufacturing) from RVCE, Bangalore. He is a Hard core teacher with ten years Experience in teaching various subjects like, Product Design & Development, Fluid Mechanics, CAD/CAM & Automation, FEM, Turbo machines etc. He is acclaimed as a distinguish professor in engineering and has taught at various institutes like, Pravara Rural Engineering College, Loni and presently working as Assistant Professor at Dr. Vitthalrao Vikhe patil college of Engineering , Ahmednagar. He has also served as Principal at YSPS Polytechnic, Tal. Babhalgaon, Dist. Latur. He has to his credit several research papers, Articles, and books.

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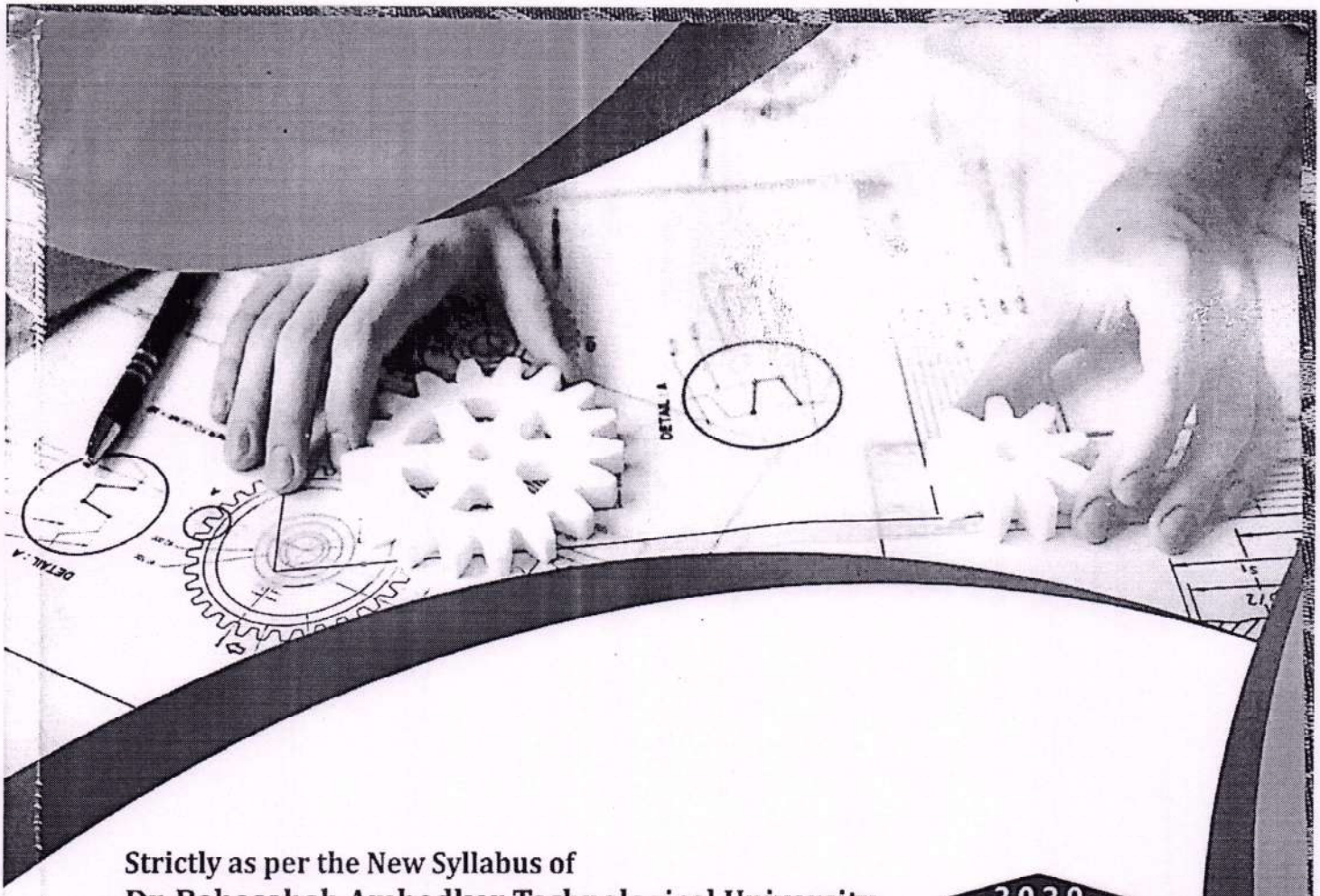

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Product Design Engineering

Second Year B. Tech. - Semester IV - Common to All Branches

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