School of Engineering

MIT-ADT UNIVERSITY
PUNE, INDIA
A Leap Towards World Class Education

Programme Curriculum

MASTER OF TECHNOLOGY

PATTERN 2021

Mechanical Engineering
(Design Engineering)

Faculty of Engineering

MIT ART DESIGN & TECHNOLOGY UNIVERSITY, PUNE

MIT SCHOOL OF ENGINEERING PUNE

STRUCTURE & SYLLABUS

FOR

Master of Technology

Mechanical Engineering

(Design Engineering)

UNDER FACULTY OF ENGINEERING

2 Year Post Graduate Programme sanctioned by AC & BoS

(w.e.f. 2021-2022)

(74 CREDITS)

Department of Mechanical Engineering

VISION

To develop globally competent multi-faceted Mechanical Engineers by nurturing moral and ethical values.

MISSION

1. To provide a conducive academic environment through effective teaching-learning and research culture.
2. To develop world-class mechanical engineers to cater diverse needs of the society by imparting application oriented engineering knowledge and providing academia-industry interaction.
3. To emphasize the importance of ethics and morals by creating awareness and persistent practices.

Program Educational Objectives (PEO's) – Mechanical Engineering

1. **PEO-1:** Graduates of the program will become competent Engineers suitable for core industries and higher education.
2. **PEO-2:** Graduates of the program will acquire the necessary foundation for development of mathematical analytical abilities.
3. **PEO-3:** Graduates of the program will acquire the knowledge and skills to provide sustainable solutions to social problems through Innovations and Entrepreneurship.
4. **PEO-4:** Graduates of the program will learn managerial, financial and ethical practices such as, project and financial management skills, multidisciplinary approach and soft skills.
5. **PEO-5:** Graduates of the program will cater to the need of growing demands of market through lifelong learning approach.

Program Outcomes as defined by NBA (PO)

Engineering Graduates will be able to:

1. **PO1 - Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **PO2 - Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **PO3 - Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **PO4 - Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **PO5 - Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **PO6 - The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **PO7 - Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **PO8 - Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **PO9 - Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **PO10 - Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **PO11 - Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **PO12 - Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO) – Design Engineering

The program is expected to deliver at the time of graduation:

1. **PSO-1:** Utilize mathematical, scientific and engineering principles to analyse and design efficient mechanical systems.

2. **PSO-2:** Apply manufacturing science, advanced tools, computational techniques and sustainable methodologies to innovate processes and develop products.

3. **PSO-3:** Lead and manage projects by integrating engineering management principles while adhering to ethical and professional standards.

M. Tech Mechanical (Design engineering) 2021 Pattern								
Course Code	**Course Name**	**Hours/week**				**Maximum Marks**		
		Lecture	**Tutorial**	**Practical**	**Credits**	**CA**	**FE**	**Total**
SEMESTER-I								
21MTMT106	Advanced Engineering Mathematics	3	1	0	4	40	60	100
21MTMD102	Advanced Stress Analysis	3	0	0	3	40	60	100
21MTMD103	Advanced Mechanical Vibration and Acoustics	3	0	0	3	40	60	100
21MTMD104	Research Methodology	3	0	0	3	40	60	100
21MTMD--	Elective-I:	3	0	0	3	40	60	100
21MTMD--	Elective-II:	3	0	0	3	40	60	100
21MTMD111	Laboratory Practice - I	0	0	6	3	40	60	100
		18	**1**	**6**	**22**	**280**	**420**	**700**
SEMESTER-II								
21MTMD201	Analysis and Synthesis of Mechanisms	3	0	0	3	40	60	100
21MTMD202	Advanced Machine Design	3	0	0	3	40	60	100
21MTMD203	Finite Element Analysis	3	0	0	3	40	60	100
21MTMD204	Applied Economics and Financial Management	2	0	0	2	40	60	100
21MTMD--	Elective-III	3	0	0	3	40	60	100
21MTMD--	Elective-IV	3	0	0	3	40	60	100
21MTMD221	Technical Seminar-I	0	0	4	2	40	60	100
21MTMD211	Laboratory-II	0	0	6	3	40	60	100
		17	**0**	**10**	**22**	**320**	**480**	**800**
SEMESTER-III								
21MTMD321	Technical Seminar-II	0	0	4	2	40	60	100
21MTMD322	Project Phase-I	0	0	24	12	40	60	100
Total		**0**	**0**	**28**	**14**	**80**	**120**	**200**
SEMESTER-IV								
21MTMD421	Project Phase-II	0	0	32	16	100	200	300
Total		**0**	**0**	**32**	**16**	**100**	**200**	**300**
Elective-I								
21MTMD131	Material Handling Equipment Designs	3	0	0	3	40	60	100

21MTMD132	Mechanics of Composites and Smart Materials	3	0	0	3	40	60	100
21MTMD133	Process Equipment Design	3	0	0	3	40	60	100
21MTMD134	Nanomaterials and Nanotechnology	3	0	0	3	40	60	100
21MTMD135	Instrumentation and Control System	3	0	0	3	40	60	100
Elective-II								
21MTMD136	Tribology	3	0	0	3	40	60	100
21MTMD137	Theory of plates and Shells	3	0	0	3	40	60	100
21MTMD138	Rotor Dynamics	3	0	0	3	40	60	100
21MTMD139	Experimental Stress Analysis	3	0	0	3	40	60	100
21MTMD140	Optimization Technique in Design	3	0	0	3	40	60	100
Elective-III								
21MTMD231	Mechanical System Design	3	0	0	3	40	60	100
21MTMD232	Micro Electromechanical system	3	0	0	3	40	60	100
21MTMD233	Vehicle Dynamics	3	0	0	3	40	60	100
21MTMD234	Design of Automotive System	3	0	0	3	40	60	100
21MTMD235	Fracture Mechanics	3	0	0	3	40	60	100
Elective-IV								
21MTMD236	Product Development and Reverse Engineering	3	0	0	3	40	60	100
21MTMD237	Design for Manufacturing & Assembly	3	0	0	3	40	60	100
21MTMD238	Artificial Intelligence	3	0	0	3	40	60	100
21MTMD239	Open Elective	3	0	0	3	40	60	100
21MTMD240	Machine Tool Design	3	0	0	3	40	60	100

BoS Chairman

HoD
Mechanical Engg. Dept.

Dean

DEAN- Engineering
MIT School of Engineering
MIT ADT UNIVERSITY, Pune