School of Engineering

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

Programme Curriculum

BACHELOR OF TECHNOLOGY

PATTERN 2021

Mechanical Engineering

Faculty of Engineering

MIT ART DESIGN & TECHNOLOGY UNIVERSITY, PUNE

MIT SCHOOL OF ENGINEERING PUNE

STRUCTURE & SYLLABUS

FOR

Bachelor of Technology Mechanical Engineering

UNDER FACULTY OF ENGINNERING

4 Year Under Graduate Programme sanctioned by AC & BoS

(w.e.f. 2021-2022)

(160 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) – Mechanical Engineering

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

1. **PSO-1:** Ability to design & analyse components & systems for mechanical performance.
2. **PSO-2:** Ability to apply and solve the problems of heat power and thermal systems.
3. **PSO-3:** Ability to solve real life problems with the exposure to manufacturing industries.

B. Tech. (Mechanical Engineering)

(2021 Regulations)

(Credits: 168)

SEMESTER I								
Course Code	**Course Name**	**Hours/week**				**Maximum Marks**		
		Lecture	**Tutorial**	**Practical**	**Credits**	**CA**	**FE**	**Total**
21BTAS102	Linear Algebra and Calculus	3	1	0	4	40	60	100
21BTCS101	Programming for Problem Solving	2	0	4	4	(40+50P)	60	150
21BTME001	Engineering Graphics	1	0	4	3	40	60	100
21BTIC003	Engineering Workshop	0	0	4	2	50	0	50
21BTAS104	English communication for Engineers	2	0	2	3	40	60	100
21BTUC101	Design Thinking Part I	1	0	2	2	50	-	50
18UCCS102	SHD (Health Practice I)	0	0	2	1			
Total		**9**	**1**	**18**	**19**	**310**	**240**	**550**
SEMESTER II								
Course Code	**Course Name**	**Hours/week**				**Maximum Marks**		
		Lecture	**Tutorial**	**Practical**	**Credits**	**CA**	**FE**	**Total**
21BTAS203	Ordinary Differential Equations and Advanced Calculus	3	1	0	4	40	60	100
21BTCS202	Object Oriented Programming	2	0	2	3	40	60	100
21BTEC001	Basics of Electrical and Electronics Engineering	3	0	2	4	(40+50P)	60	150
21BTAS001	Applied Sciences	4	0	2	5	(40+50P)	60	150
21BTME202	Engineering Mechanics	3	0	2	4	(40+50P)	60	150
21BTUC201	Design Thinking Part II	1	0	2	2	50	-	50
18UCCS201	SHD (Professional English communication for Engineers)	1	0	2	2			
18UCCS202	SHD (Health Practice 2)	0	0	2	1			
Total		**17**	**1**	**14**	**25**	**400**	**300**	**700**

SEMESTER III								
Course Code	**Course Name**	**Hours/week**				**Maximum Marks**		
		Lecture	**Tutorial**	**Practical**	**Credits**	**CA**	**FE**	**Total**
21BTME301	Thermodynamics	3	0	0	3	40	60	100
21BTMT302	Differential Equations and Transform Techniques	3	1	0	4	40	60	100
21BTME303	Mechanics of Solid	3	1	0	4	40	60	100
21BTME304	Manufacturing Processes	3	0	2	4	40	60	100
21BTME305	Engineering Metallurgy	3	0	2	4	40	60	100
21BTME311	Thermodynamics Lab	0	0	2	1	40	60	100
21BTME312	Geometric Modeling Lab	0	0	2	1	25	25	50
21BTME321	Mini Project-I	0	0	4	2	100	--	100
Total		**15**	**2**	**12**	**23**	**365**	**385**	**750**
SEMESTER IV								
21BTME401	Applied Thermodynamics	3	0	0	3	40	60	100
21BTME402	Fluid Mechanics	3	0	0	3	40	60	100
21BTME403	Advanced Manufacturing Processes and Tooling	3	1	0	4	40	60	100
21BTME404	Theory of Machines-I	3	0	2	4	40	60	100
21BTME405	Electrical Machines	3	1	0	4	40	60	100
21BTME406	Environmental Studies	2	0	0	Audit Course			
21BTME411	Applied Thermodynamics Lab	0	0	2	1	25	50	75
21BTME412	Fluid Mechanics Lab	0	0	2	1	25	50	75
21BTME421	Mini Project-II	0	0	4	2	100	--	100
Total		**15**	**2**	**10**	**22**	**350**	**400**	**750**

SEMESTER V								
Course Code	**Course Name**	**Hours/week**				**Maximum Marks**		
		Lecture	**Tutorial**	**Practical**	**Credits**	**CA**	**FE**	**Total**
21BTME501	Heat Transfer	3	0	0	3	40	60	100
21BTME502	Computational Methods & Data Analytics	3	0	2	4	40	60	100
21BTME503	Design of Machine Elements -I	3	0	2	4	40	60	100
21BTME504	Financial Management	3	0	0	3	40	60	100
21BTME505	Theory of Machines-II	3	0	0	3	40	60	100
21BTME511	Heat Transfer Lab	0	0	2	1	40	60	100
21BTME512	Theory of Machines-II Lab	0	0	2	1	40	60	100
21BTME521	Mini Project –III	0	0	4	2	100	--	100
Total		**15**	**0**	**12**	**21**	**380**	**420**	**800**
SEMESTER VI								
21BTME601	Turbo Machines	3	0	2	4	40	60	100
21BTME602	Design of Machine Elements - II	3	0	0	3	40	60	100
21BTME603	Metrology and Quality Control	3	0	2	4	40	60	100
21BTME604	Refrigeration and Air Conditioning	3	0	0	3	40	60	100
21BTME___	Elective-I	3	1	0	4	40	60	100
21BTME611	Design of Machine Elements – II Lab	0	0	2	1	40	60	100
21BTME612	Refrigeration and Air Conditioning Lab	0	0	2	1	40	60	100
21BTME621	Mini Project-IV	0	0	4	2	100	--	100
Total		**15**	**1**	**12**	**22**	**380**	**420**	**800**

SEMESTER VII								
Course Code	**Course Name**	**Hours/week**				**Maximum Marks**		
		Lecture	**Tutorial**	**Practical**	**Credits**	**CA**	**FE**	**Total**
21BTME701	Mechanical System Design	3	0	2	4	40	60	100
21BTME702	Power Plant	3	0	0	3	40	60	100
21BTME703	Mechanical Vibrations	3	0	0	3	40	60	100
21BTME___	Elective-II	3	1	0	4	40	60	100
21BTME___	Elective-III	3	0	0	3	40	60	100
21BTME711	Power Plant Lab	0	0	2	1	40	60	100
21BTME712	Mechanical Vibrations Lab	0	0	2	1	40	60	100
21BTME721	Project Phase-I	0	0	4	2	100	--	100
Total		**15**	**1**	**10**	**21**	**380**	**420**	**800**
SEMESTER VIII								
21BTME____	Open Elective	3	0	0	3	40	60	100
21BTME821	Project Phase-II	0	0	24	12	200	200	400
Total		**3**	**0**	**24**	**15**	**240**	**260**	**500**

ELECTIVES

	Course Code	Course
Elective-I	21BTME631	Artificial Intelligence
	21BTME632	Hydraulics and Pneumatics
	21BTME633	Non-Conventional Energy sources
	21BTME634	Production Planning Control
	21BTME635	Finite Element Method
	21BTME636	Enterprise Resource Planning
Elective-II	21BTME731	Machine Learning
	21BTME732	Mechatronics System
	21BTME733	Energy Audit and Management
	21BTME734	Machine Tool Design
	21BTME735	CAD/CAM
	21BTME736	Cryogenic engineering
	21BTME737	Reliability Engineering
Elective-III	21BTME738	Robotics & Automation
	21BTME739	Computational Fluid Dynamics
	21BTME740	Automobile Engineering
	21BTME741	Product Design and Development
	21BTME742	Supply Chain Management
	21BTME743	Operations Research
Open Elective	21BTME831	Digital Manufacturing
	21BTME832	Entrepreneurship
	18BTMA833	Autotronics

BoS Chairman

HoD
Mechanical Engg. Dept.

Dean

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