G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Non-Traditional Machining Processes (PE-II)	
Course Code: MED431	
CO's	**Statements**
431.1	Acquire a functional understanding of non-traditional manufacturing Processes and identify various energy involved in non-traditional machining process.
431.2	Know about various process parameters and their influence on performance and their applications
431.3	Apply mathematical relationships to determine the MRR of the process.
431.4	Select appropriate machining process for specific purpose based on MRR and other constraints.
431.5	Choose an appropriate process for the prototyping based on material constraints.
431.6	Able to differentiate between various nontraditional processes based on various energy techniques involved.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
431.1	3												-	-	3
431.2	3												-	-	3
431.3	3												-	-	3
431.4			3				3						-	-	3
431.5	2	3	2										-	-	3
431.6			3				3						-	-	3

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Tool Design (PE-II)	
Course Code: MED432	
CO's	**Statements**
432.1	Define key terminology and principles related to tool design, including materials, heat treatment, and manufacturing processes.
432.2	Explain the functional requirements for cutting tools, jigs, fixtures, press tool, Gauges, forging dies die casting Dies and injection molds.
432.3	Calculate the influence of tool geometry on cutting forces, chip formation, and tool life.
432.4	Classify different types of tools and tool components.
432.5	Construct the tool geometry of single point and multi-point cutting tools.
432.6	Design and Draw Jigs/Fixtures/ Gauge/ tooling for sheet metal working for a given part.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
432.1	3	3	3							1		1	3		
432.2	3	2	3							1		1	3		
432.3	3		3							1		1	3		
432.4	3	2	3							1		1	3		
432.5	3	2	2							1		1	3		
432.6	3	2	2							1		1	3		

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Heating Ventilation and Air Conditioning (PE-II)	
Course Code: MED433	
CO's	**Statements**
433.1	Define fundamentals of thermodynamics, heat transfer and refrigeration.
433.2	Understand the thermodynamic and psychrometric process carried out during refrigeration and air conditioning.
433.3	Apply knowledge of fundamentals of thermodynamic and psychrometric processes.
433.4	Estimate heating and cooling load used partially in design and development of refrigeration and air conditioning systems.
433.5	Design air distribution and ventilation system.
433.6	Install heating, ventilation and air conditioning system.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
433.1	2	-												-	
433.2		2												2	
433.3		1	2											-	
433.4			3											-	
433.5	2		2											2	
433.6		2												3	

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Control System Engineering (PE-III)	
Course Code: MED434	
CO's	**Statements**
434.1	Explain mathematical model of a system.
434.2	Analyze control system with the help of Block diagram analysis.
434.3	Demonstrate working of different components of controllers in control system.
434.4	Differentiate the use of different controllers in control systems.
434.5	Interpret the response of different order systems for test signals.
434.6	Determine the stability of the system.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
434.1	2	3	-	-	-	-	-	-	-	-	-	-	2	-	-
434.2	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-
434.3	-	-	1	2	1	-	-	-	-	-	-	-	2	-	-
434.4	1	2	-	-	-	-	-	-	-	-	-	-	1	-	-
434.5	-	1	1	-	-	-	-	-	-	-	-	-	1	-	-
434.6	-	-	-	2	-	-	-	-	-	-	-	-	2	-	-

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Automobile Engineering (PE-III)	
Course Code: MED435	
CO's	**Statements**
435.1	Define the terms an identify the systems and components of an automobile.
435.2	Understand various types of I.C. Engines, its fuel feed system, cooling and lubrication systems.
435.3	Explain the types of different components and their functions in automobile.
435.4	Illustrate and describe the constructions and working of different systems and structures of an automobile.
435.5	Identify and summarize the troubleshooting and its remedies of different components of automobile.
435.6	To study the modern trends in automobile.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
435.1	2												1		
435.2	2												1		
435.3	2												1		
435.4	2												1		
435.5	2											2	1		
435.6	2											2	1		

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Refrigeration and Applications (PE-III)	
Course Code: MED436	
CO's	**Statements**
436.1	Describe fundamentals of refrigeration and air conditioning systems such as vapor compression and vapor absorption systems.
436.2	Illustrate the thermodynamic and psychrometric processes carried out during refrigeration and air conditioning.
436.3	Apply knowledge of fundamentals of thermodynamic and psychrometric processes to understand working principle of various refrigeration and air conditioning cycles.
436.4	Analysis of refrigeration and air conditioning cycles and refrigerants.
436.5	Evaluate the performance of different refrigeration and air conditioning systems.
436.6	Develop concept of heating and cooling load calculations used partially in design and development of refrigeration and air conditioning systems.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
436.1	2													2	
436.2		2												2	
436.3		1	2											2	
436.4			3											2	
436.5	2		2											2	
436.6		2												2	

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Tribology (PE-IV)	
Course Code: MED437	
CO's	**Statements**
437.1	Recall the concept of tribology and its applications.
437.2	Explain the different components of tribology and Tribological issues in the design of machine components.
437.3	Solve the Tribological issues in the design of machine components.
437.4	Analyze the need of Tribological components to industrial machines using case study.
437.5	Evaluate the better performance of industrial machines using the concept of tribology.
437.6	Formulate the new approaches or components of tribology to extend its applications.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
437.1	3	-	3	-	-	-	-	-	-	-	-	-	-	-	-
437.2	3	-	3	-	-	-	-	-	-	-	-	-	3	-	-
437.3	3	3	3	-	-	-	-	-	-	-	-	-	3	-	-
437.4	3	3	3	-	-	-	-	-	-	-	-	-	-	-	2
437.5	3	3	3	-	-	-	-	-	-	-	-	-	-	-	2
437.6	3	3	3	-	-	-	-	-	-	-	-	-	-	-	2

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Design for Innovation (PE-IV)	
Course Code: MED438	
CO's	**Statements**
438.1	Remember the stages of the design process and their sequence.
438.2	Explain the importance of user-centered design in product innovation.
438.3	Apply design thinking principles to solve a given engineering problem.
438.4	Identify and analyze the effectiveness of different design concepts based on specified criteria.
438.5	Evaluate and select design concepts based on criteria such as feasibility, sustainability, and user experience.
438.6	Effectively present and communicate design solutions and showcasing innovative ideas.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
438.1	2										3				3
438.2		2	3								3			1	2
438.3	1		2							2	3				3
438.4				3							3				3
438.5				3	3						3	2			2
438.6				2						1	3			1	1

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: PE	
Course Name: Computational Fluid Dynamics (PE-IV)	
Course Code: MED439	
CO's	**Statements**
439.1	Understand the classification of PDEs, governing equations and the basic principles of computational methods.
439.2	Interpret the knowledge, capability of analysing and solving any concept or problem associated with dynamics.
439.3	Apply finite volume method to solve steady and unsteady diffusion, advection-diffusion problems
439.4	Solve engineering problems using CFD software
439.5	Acquire basic skills on programming of numerical methods used to solve the Governing equations
439.6	Illustrate the working concepts of thermal engineering

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
439.1	2													2	
439.2		2												2	
439.3		1	2											2	
439.4			3											2	
439.5	2		2											2	
439.6		2												2	

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: OE	
Course Name: Electrical Vehicles (OE-IV)	
Course Code: MED441	
CO's	**Statements**
441.1	Explain the basic concepts of Conventional, Electric, Hybrid EV and Autonomous Vehicles.
441.2	Describe the different motors, drives and architecture for electric vehicles.
441.3	Explain the different energy storage systems and the concepts of battery management systems.
441.4	Compare various EV systems, energy storage and EV charging systems.
441.5	Identify the global scenario and predict future of electric vehicles.
441.6	Discuss the different battery testing methods, its disposal and recycling processes.

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
441.1	3												1		
441.2	3												1		
441.3	3												1		
441.4	3												1		
441.5	3											2	1		
441.6	3											2	1		

G. S. Mandal's

Maharashtra Institute of Technology (An Autonomous Institute)

Chhatrapati Sambhajinagar (Aurangabad)

Department of Mechanical Engineering

Articulation Matrix for B.Tech Part – I for A. Y. 2024-25

Course Category: OE	
Course Name: Management Techniques (OE-V)	
Course Code: MED442	
CO's	**Statements**
442.1	Recognize the concept of Modern Management System
442.2	Understand the concept and theory of various manufacturing support system and manufacturing management system
442.3	Understand the concept of flow of information and money in a supply chain and Kanban system to improvement JIT
442.4	Carry out the implementation process of 5S, Value Engineering through various case studies
442.5	Find out the machine maintenance routines and compare with standard TPM pillars to understand Lean manufacturing process
442.6	Justify the decision making procedures and types of thinking process for given problem

CO-PO-PSO Mapping

COs	**POs**												**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
442.1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
442.2	3	1	2	-	-	-	-	-	-	-	-	-	-	-	-
442.3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	1
442.4	3	1	2	-	-	-	-	-	-	-	-	-	-	-	3
442.5	3	1	1	-	-	-	-	-	-	-	-	-	-	-	2
442.6	3	1	2	-	-	-	-	-	-	-	-	-	-	-	3