22MBS408	PROBABILITY AND STATISTICS	SEMESTERIV

COURSE OUTCOMES: On completion of the course, the students will be able to:		PO's Mapped
CO1	Remember the concept of probability and understand the general discrete Probability distribution function and continuous probability distribution function.	-
CO2	Apply the concepts of probability mass function sand probability density functions. Discuss the standard distributions and apply them to solve the real time problems in each distribution.	PO1
CO3	Analyze the notion, testing of hypothesis in statistical problems in practice and extend this understanding to the analysis of variance(ANOVA) for one-way,two-way classification and Latin square design.	PO2, PO3
CO4	Develop statistical quality control methods and charts such as R-chart, p, np-Chart and C-Chart .	PO4
CO5	Use the probability concepts and statistical methods and present seminars, assignments, group discussion and quiz.	PO9, PO11

Mapping:

COs/POs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PS O2	PS O3
CO1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	2	-	-
CO3	-	3	2	-	-	-	-	-	-	-	-	1	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	1	-	-
CO5	-	-	-	-	-	-	-	-	2	-	1	1	-	-
AVERAGE	3	3	2	2	-	-	-	-	2	-	1	1.25	-	-

22MPC405	HYDRAULICS AND PNEUMATICS CONTROLS	SEMESTER IV

COURSE OUTCOMES: On completion of the course, the students will be able to:		PO's Mapped
CO1	**Apply** fundamental principles of fluid mechanics and thermodynamics to explain the working of fluid power systems, hydraulic pumps, compressors, and pneumatic components.	PO1
CO2	**Analyze** hydraulic and pneumatic systems to identify system requirements, losses, and performance parameters for different industrial applications.	PO2
CO3	**Design** basic hydraulic and pneumatic circuits using standard symbols and modern engineering tools to meet given operational requirements.	PO3,PO4, PO5
CO4	**Evaluate** environmental and sustainability aspects of hydraulic and pneumatic systems, including energy efficiency, leakage control, and ethical use of resources.	PO7,PO8
CO5	**Demonstrate** effective communication, teamwork, and continuous learning skills while working on fluid power system design projects using PLC, servo systems, and IIoT-based monitoring.	PO9,PO10,PO11

MAPPING

COs/POs	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	2	–	3	–	–	–	–	–	–	-	3	1
CO2	–	3	3	–	2	–	–	–	–	–	2	-	2	3
CO3	–	2	3	3	3	–	–	–	–	–	–	2	2	3
CO4	–	–	–	–	2	3	3	3	–	–	–	-	1	-
CO5	–	–	–	2	2	–	–	–	3	3	3	3	2	2
AVERAGE	1	1	2	1	2	1	1	1	1	1	1	1	2	2

22MPC406	KINEMATICS OF MACHINES	SEMESTER IV

COURSE OUTCOMES: On completion of the course, the students will be able to:		PO's Mapped
CO1	**Explain** the basic terminology, definitions related to mechanisms, including degrees of freedom, mobility criteria and evaluate the effects of friction drives on various materials	PO1
CO2	**Analyze** and determine the velocity and acceleration of different mechanisms and construction of Cam Profile using graphical method understanding the relationship between cam geometry and output motion.	PO2
CO3	**Identify** and classify different types of gears and gear trains, and apply principles of gear mechanics in problem-solving.	PO2,PO3
CO4	**Apply** the concept of various mechanisms, cams, friction drives and gear train with the help of hands-on projects, integrating theoretical and practical knowledge for effective mechanical system application.	PO8,PO11
CO5	**Design and simulate** the various mechanisms, friction drives and cam profile utilizing their understanding of friction and kinematics by using modern design and analysis tools.	PO3,PO5,PO11
CO6	**Present** the Seminar with the help of their hand on projects and modern design tools and content beyond syllabus.	PO7,PO9,PO11

MAPPING

COs/POs	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	3	-	-	-	-	-	-	-	-	-	3	2	-
CO3	-	2	2	-	-	-	-	-	-	-	-	2	2	-
CO4	-	-	2	-	3	-	-	3	-	-	2	2	3	3
CO5	-	-	-	-	-	-	-	-	-	-	2	2	2	3
CO6	-	-	-	-	-	-	2	-	3	-	2	2	3	3
AVERAGE	2	2.5	2	-	3		2	3	3	-	2	2.2	2.4	3

22MPC407	THERMAL ENGINEERING	SEMESTER IV

COURSE OUTCOMES: On completion of the course, the students will be able to:		**PO's Mapped**
CO1	Understand the fundamental concepts and working principles of air standard cycles, internal combustion engines, refrigeration systems, boilers, compressors, nozzles, and turbines.	PO1, PO7
CO2	Apply thermodynamic principles to solve numerical problems related to air standard cycles, IC engine performance parameters, refrigeration cycles, compressors, and turbine systems.	PO1, PO4, PO7
CO3	Analyze the performance characteristics, efficiency, losses, and operational behavior of IC engines, refrigeration systems, boilers, compressors, and turbines using P–V diagrams, energy balances, and performance curves.	PO2, PO5
CO4	Design and select basic components of thermal systems such as boilers, compressors, nozzles and refrigeration systems based on given operating conditions and engineering constraints.	PO3, PO5. PO7
CO5	Simulate the working and performance of thermal engineering systems—such as thermodynamic cycles, internal combustion engines, refrigeration systems, and turbines—using theoretical thermodynamic models, numerical methods, and basic simulation tools such as MATLAB, Scilab, EES (Engineering Equation Solver), and MS Excel.	PO2, PO5, PO7
CO6	Present a seminar on advanced topics related to IC engines, refrigeration, boilers, compressors or turbines by effectively communicating technical concepts, recent developments, and research findings.	PO8, PO9, PO10

MAPPING

COs/POs	**PO 1**	**PO 2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PSO1**	**PSO2**	**PSO3**
CO1	3	-	-	-	-	-	2	1	1	1	1	2	3	3
CO2	3	-	-	2	-	-	2	1	1	1	1	2	3	3
CO3	-	3	-	-	3	-	1	1	1	1	1	2	3	1
CO4	-	-	3	-	3	-	2	1	1	1	1	2	3	3
CO5	-	3	1	2	3	-	2	1	1	1	1	2	3	2
CO6	-	-	-	-	-	1	1	2	2	2	1	1	3	1
AVERAGE	3	3	3	2	3	1	2	1	1	1	1	2	3	3

22MPC408	MANUFACTURING TECHNOLOGY - II	SEMESTER IV

COURSE OUTCOMES: On completion of the course, the students will be able to:		PO's Mapped
CO1	Apply principles of manufacturing science to explain metal cutting mechanisms, tool geometry, tool wear, surface finish, and machinability.	PO1, PO2
CO2	Analyze machining problems related to chip formation, cutting forces, heat generation, and tool failure using fundamental engineering concepts and experimental data.	PO1, PO2, PO4, PO11
CO3	Develop an effective machining solutions for lathe, shaping, planning, drilling, broaching, grinding, milling, and gear generation operations by selecting appropriate machines, tools, workholding device and process parameters to satisfy specified functional and quality requirements.	PO1, PO2, PO3, PO5
CO4	Evaluate conventional and non-conventional machining processes considering sustainability, safety, economic, and environmental constraints in industrial applications.	PO3, PO6, PO7
CO5	Prepare and deliver a seminar on machining processes by collaboratively working in teams, effectively communicating technical concepts, and engaging in independent learning to support lifelong learning	PO6, PO8, PO9, PO11

MAPPING

COs/POs	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PSO1	PSO2	PSO3
CO1	3	2	-	-	-	-	-	-	-	-	-	3	1	2
CO2	2	3	-	2	-	-	-	-	-	-	1	1	3	1
CO3	3	3	3	-	3	-	-	-	-	-	-	1	3	2
CO4	-	-	1	-	-	2	2	-	-	-	-	2	1	2
CO5	-	-	-	-	-	2		3	3	-	2	1	1	1
AVERAGE	2.6	2.6	2	2	3	2	2	3	3	-	1.5	1.6	1.8	1.6

22MPC409	MECHANICAL MEASUREMENTS AND CONTROL	SEMESTER IV

COURSE OUTCOMES: On completion of the course, the students will be able to:		**PO's Mapped**
CO1	**Identify** suitable measurement system to calculate force and torque.	PO1,PO2
CO2	**Apply** the concepts of pressure and flow measurements to evaluate complex engineering system.	PO1,PO2
CO3	**Analyze** temperature and motion measurement techniques to select appropriate instruments for thermal, vibration and acceleration-based applications.	PO1,PO2,PO3
CO4	**Apply** control system concepts to model mechanical and electrical systems.	PO1,PO2,PO3,PO4
CO5	**Evaluate** dynamic system behavior of a control system by analyzing its characteristics.	PO1,PO2,PO3,PO4,PO5

COs/POs	**PO 1**	**PO 2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO 10**	**PO 11**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2	1	1	1	1	1	1	2	3	1	1
CO2	3	2	2	2	1	1	1	1	1	1	2	3	1	1
CO3	3	2	2	2	1	1	1	1	1	1	2	3	1	1
CO4	3	3	3	3	2	1	1	1	1	1	2	3	1	1
CO5	3	3	3	3	3	1	1	1	1	1	2	3	1	1
AVERAGE	3	2	2	2	2	1	1	1	1	1	2	3	1	1

22MPC620	**DESIGN OF TRANSMISSION SYSTEMS** (Use of Approved Design Data Book is Permitted)	**SEMESTER VI**

CO	COURSE OUTCOMES: Upon completion of the course, the students will be able to:	PO's Mapped
CO1	Select appropriate flexible transmission elements for machinery and equipment.	PO1, PO2, PO12
CO2	Perform engineering analysis and estimate the required size and type of spur and helical gears.	PO1, PO2, PO3, PO5, PO12
CO3	Perform engineering analysis and estimate the required size and type of bevel and worm gears.	PO1, PO2, PO3, PO4, PO12
CO4	Design and develop gear box for various machinery and equipment.	PO1, PO2, PO3, PO5, PO12
CO5	Design cams, friction clutches and brake components.	PO1, PO2, PO3, PO5, PO6, PO12
CO6	Present a technical seminar on the topic "Hydrodynamic Analysis of Coupling Performance" demonstrating understanding of torque transmission characteristics, slip, efficiency, and operating conditions.	PO1, PO2, PO10, PO11, PO12

MAPPING															
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	2	2	2	1	1	-	-	-	-	-	1	2	1	-
CO2	2	2	2	1	2	1	-	-	-	-	-	2	1	2	1
CO3	2	2	2	1	2	1	-	-	-	-	-	2	1	2	1
CO4	2	2	2	1	2	1	-	-	-	-	-	2	1	2	1
CO5	2	2	2	1	2	1	-	-	-	-	-	2	1	2	1
CO6	1	2	-	-	-	-	-	-	-	3	1	2	1	1	2
Average	1.5	2.0	2.0	1.2	1.8	1.0	-	-	-	3.0	1.0	1.8	1.2	1.7	1.2
1 – Slight, 2 – Moderate, 3 – Substantial															

22MPC618	METROLOGY AND QUALITY CONTROL	SEMESTER VI

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		PO's Mapped
CO1	Explain principles of measurements, standards, units andoperating principles of linear and angular metrological instruments.	**PO1, PO6**
CO2	Interpret mechanical, optical, electrical and pneumatic magnification methods to measure gears, threads, surface finish, and form errors including runout, pitch, profile, backlash, straightness, flatness, and roundness using standard inspection instruments.	**PO1, PO2, PO3, PO6**
CO3	Apply advanced measurement methods and modern instruments such as CMM, laser interferometers, machine vision, and computer-aided inspection tools to inspect and improve product quality.	**PO1, PO2, PO3, PO4, PO5, PO12**
CO4	Assess the importance of quality control, statistical quality control, and reliability concepts in ensuring safe, reliable, and high-quality products for societal and industrial needs.	**PO1, PO2, PO5, PO6, PO7, PO8, PO12**
CO5	Evaluate quality, reliability, and sampling methods with respect to sustainable manufacturing practices, ethical responsibility, cost of quality, and efficient use of resources.	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO10, PO12**
CO6	Demonstrate teamwork, communication, and continuous learning skills by applying Six Sigma concepts, reliability analysis, and acceptance sampling plans in quality improvement projects.	**PO1, PO2, PO3, PO9, PO10, PO11, PO12**

MAPPING															
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	**3**	**1**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**1**	**1**
CO2	**2**	**1**	**2**	**-**		**2**	**-**	**-**	**1**	**1**	**1**	**2**	**3**	**2**	**3**
CO3	**3**	**2**	**2**	**3**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**3**	**1**
CO4	**3**	**1**	**-**	**1**	**2**	**2**	**3**	**3**	**-**	**-**	**-**	**2**	**2**	**2**	**3**
CO5	**2**	**2**	**1**	**2**	**2**	**2**	**2**	**2**	**-**	**1**	**-**	**2**	**3**	**2**	**1**
CO6	**2**	**2**	**2**	**-**	**-**	**-**	**-**	**-**	**1**	**3**	**1**	**2**	**3**	**2**	**2**
Average	**2.5**	**2.0**	**1.7**	**2.0**	**1.5**	**1.8**	**2.5**	**2.5**	**1.0**	**1.7**	**1.0**	**1.8**	**2.7**	**2.0**	**1.8**
1 – Slight, 2 – Moderate, 3 – Substantial															

22MPC619	FINITE ELEMENT ANALYSIS	SEMESTER VI

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		PO's Mapped
CO1	Formulate, analyse and design finite element models for complex engineering problems using engineering mathematics and fundamentals to ensure accurate and convergent solutions that meet specified requirements.	**PO1, PO2,PO6,PO9**
CO2	Use modern computational tools to investigate and validate results of FE problems.	**PO3,PO4,PO7,PO9,PO11**
CO3	Apply FE Techniques to use resources efficiently to reduce environmental impact and improves sustainibilty.	**PO1, PO2, PO3, PO4, PO5,PO9, PO12**
CO4	Develop finite element models and communicate technical findings clearly through reports and presentations.	**PO1, PO2, PO5, PO6, PO7, PO8, PO12**
CO5	Apply basic project management principles and modern learning resources to plan, execute and continuously improve finite element- based engineering analysis in professional practice.	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO10, PO11,PO12**

MAPPING															
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	2	-	-	2	-	-	-	-	-	-
CO2	-	-	2	2	-	-	2	-	2	-	-	-	-	-	-
CO3	3	2	2	2	3	-	-	-	2	2	3	1	3	3	1
CO4	2	1	-	-	1	2	3	3	-	-	-	2	1	1	3
CO5	2	2	1	2	1	2	2	2	-	1	2	2	2	2	2
Average	**2.0**	**1.2**	**1.0**	**1.2**	**1.0**	**1.2**	**1.4**	**1.0**	**1.2**	**1.7**	**1.0**	**1.0**	**1.2**	**1.2**	**1.2**
1 – Slight, 2 – Moderate, 3 – Substantial															

22MPC621	MECHATRONICS	SEMESTER VI

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		PO's Mapped
CO1	Apply fundamental engineering knowledge and problem analysis techniques to understand and analyze the concepts, principles, and methodologies presented in the syllabus.	**PO1, PO2**
CO2	Design and investigate engineering solutions related to the syllabus using appropriate analytical methods, experimentation, and modern engineering tools.	**PO3, PO4**
CO3	Apply engineering judgement to address practical engineering problems arising from the syllabus, considering professional responsibilities and real-world constraints.	**PO5**
CO4	Evaluate engineering concepts and practices presented in the syllabus with respect to environmental sustainability, professional ethics, and effective technical communication.	**PO6, PO7**
CO5	Function effectively as an individual and as a member of a team to plan, manage, and improve engineering activities related to the syllabus using appropriate engineering management and economic principle	**PO8, PO9**
CO6	Communicate business strategies effectively, work in teams, and engage in continuous learning for venture growth, succession planning, and exit strategies.	**PO10, PO11**

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	**3**	**2**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	2	1	1
CO2	**–**	**3**	**2**	**2**	**3**	**–**	**–**	**–**	**–**	**–**	**–**	3	2	2
CO3	**–**	**–**	**3**	**3**	**–**	**2**	**–**	**–**	**–**	**–**	**–**	3	3	1
CO4	**–**	**–**	**–**	**–**	**–**	**–**	**3**	**2**	**–**	**3**	**–**	1	1	3
CO5	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**3**	**–**	**3**	2	2	2
CO6	**3**	**2**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	1	1	2
Average	2	1	2	1	2	1	2	1	1	2	2	2	2	2

22MPE637	TOTAL QUALITY MANAGEMENT	SEMESTER VI

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		**PO's Mapped**
CO1	Explain the fundamental concepts of quality, Total Quality Management (TQM), quality frameworks, and the contributions of quality pioneers such as Deming, Juran, and Crosby.	**PO1, PO2, PO12**
CO2	Apply the TQM principles like strategic quality planning and Continuous Process improvement (PDCA, 5S, Kaizen) Quality Circles to foster effective teamwork and organizational growth.	**PO1, PO2, PO3, PO5, PO9, PO10, PO11, PO12**
CO3	Analyze quality-related problems using statistical tools, control charts, process capability indices(Six Sigma), QFD, FMEA and TPM.	**PO1, PO2, PO3, PO4, PO5, PO12**
CO4	Apply ethical and sustainability principles in quality systems using ISO standards, continuous improvement processes, waste reduction techniques, and environmental management practices.	**PO1, PO2, PO5, PO6, PO7, PO8, PO12**
CO5	*Analyze* a case study to examine how quality management systems influence customer satisfaction, organizational performance, and societal well-being in industrial and service sectors.	**PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO10, PO12**
CO6	A seminar to be presented to evaluate the effectiveness and challenges of implementing Total Quality Management (TQM) in the manufacturing industry.	**PO1, PO2, PO10, PO11, PO12**

CO MAPPING															
COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	-	-	-	-	-	-	-	-	-	2	2	1	1
CO2	2	1	2	-	1	-	-	-	1	1	1	2	3	2	2
CO3	3	2	2	2	3	-	-	-	-	-	-	1	3	3	1
CO4	2	1	-	-	1	2	3	3	-	-	-	2	1	1	3
CO5	2	2	1	2	1	2	2	2	-	1	-	2	2	2	2
CO6	2	2	-	-	-	-	-	-	-	3	1	2	1	1	2
Average	**2.3**	**2.0**	**1.7**	**2.0**	**1.5**	**2.0**	**2.5**	**2.0**	**1.0**	**1.7**	**1.0**	**2.2**	**1.8**	**1.7**	**2.0**
1 – Slight, 2 – Moderate, 3 – Substantial															

22MPE$40	ENTREPRENEURIAL DEVELOPMENT	SEMESTER VI

COURSE OUTCOMES: Upon completion of the course, the students will be able to:		PO's Mapped
CO1	Explain the evolution, characteristics, and types of entrepreneurs, entrepreneurial competencies, and business models.	**PO1, PO2**
CO2	Analyse business opportunities, conduct feasibility and project appraisal, and identify appropriate sources of finance.	**PO3, PO4**
CO3	Apply legal, institutional, financial, and management principles to design and organize a new venture	**PO5**
CO4	Evaluate the role of entrepreneurship in economic and social development and assess the impact of policies and support systems.	**PO6, PO7**
CO5	Demonstrate ethical, sustainable, and socially responsible practices while managing growth, resources, and workforce in ventures.	**PO8, PO9**
CO6	Communicate business strategies effectively, work in teams, and engage in continuous learning for venture growth, succession planning, and exit strategies.	**PO10, PO11**

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	2	-	-	-	-	-	-	-	-	-	2	1	1
CO2	-	-	2	1	-	-	-	-	-	-	-	3	2	2
CO3	-	-	-	-	3	-	-	-	-	-	-	3	3	1
CO4	-	-	-	-	-	2	3	-	-	-	-	1	1	3
CO5	-	-	-	-	-	-	-	2	1	-	-	2	2	2
CO6	-	-	-	-	-	-	-	-	-	2	2	1	1	2
Average	1	1	2	1	2	1	2	1	1	2	2	2	2	2

22MPE$20	LEAN MANUFACTURING (Common to Mech& Prod)

COURSE OUTCOMES:

Upon completion of the course, the students will be able to:

CO1	**Adopt the systematic waste-elimination methodologies and foster a culture of continuous improvement in the organization which can significantly enhance productivity and operational excellence**	**PO1, PO2, PO3, PO4, PO5**
CO2	**Exhibit the capacity to adapt effectively to a rapidly evolving industrial environment while consistently adhering to ethical standards, social responsibility, environmental sustainability, and professional integrity.**	**PO6, PO7**
CO3	**Ensure effective communication among members within the organization as well as with external stakeholders, thereby enhancing overall organizational performance and relationships.**	**PO8, PO9**
CO4	**Examine industrial case studies and address their operational challenges through the systematic application of lean manufacturing methodologies.**	**PO10, PO11**
CO5	**Emphasize the lean culture by sustained acquisition, updating, and application of knowledge.**	**PO12**

COURSE ARTICULATION MATRIX:

CO and PO Mapping															
COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	3	3	3	3	3								1	3	1
CO2						2	2							2	
CO3								3	3					1	
CO4										3	3			2	
CO5												3		1	
22MPE$20	3	3	3	3	3	2	2	3	3	3	3	3	1	2	1
1 – Slight, 2 – Moderate, 3 – Substantial															

22MPE$38	GAS DYNAMICS AND JET PROPULSION	VI

COURSE OUTCOMES: On completion of the course, the students will be able to:		Bloom's Taxonomy Mapped
CO1	Understand the basic principles of compressible flowin variable and constant area ducts,the characteristics of shock waves andthe working principles of jet and rocket propulsion systems.	PO1,
CO2	Apply compressible flow principles in nozzles, diffusers, combustion chambers, heat exchangers and jet and rocket propulsion systems.	PO1, PO4, PO11
CO3	Analyze compressible flow behaviour in various systems, examine the effects of shock waves and analyze the performance of jet and space propulsion systems.	PO2, PO5, PO11
CO4	Design variable and constant area ducts such as nozzles, diffusers, and combustion chambers and develop basic designs for jet and space propulsion systems including turbojet, ramjet and rocket engines.	PO3,PO5,PO11
CO5	Simulate the performance of constant and variable area ducts, as well as jet and space propulsion systems, using CFD tools and aerodynamic principles.	PO2,PO3,PO4,PO5
CO6	Present a seminar on the behavior of C-D nozzles with varying back pressure, flow variations in constant area ducts, characteristics of shock waves, and the theory of jet and rocket propulsion systems.	PO6,PO7,PO8,PO9,PO10

COURSE ARTICULATION MATRIX:

COs/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	2	-	-	-	-	-	-	2	3	-	2
CO3	-	3	-	-	2	-	-	-	-	-	2	2	-	-
CO4	-	-	3	-	2	-	-	-	-	-	2	1	2	3
CO5	-	2	2	3	3	-	-	-	-	-	2	1	3	2
CO6	-	-	-	-	-	2	2	3	3	3	2	-	-	-
22MES308	3	3	3	2	-	2	2	3	3	3	2	2	3	2