Course Outcome of the Courses of B.Tech. 8th Semester and Mapping of the Course Outcome with Programme Outcome

Sl. No.	Sub-Code	Subject	Hours per Week			Credit	Marks	
			L	T	P	C	CE	ESE
Theory								
1	ME181801	Manufacturing Methods	3	0	0	3	30	70
2	ME1818PE2*	Program Elective - 2	3	0	0	3	30	70
3	ME1818PE3*	Program Elective - 3	3	0	0	3	30	70
4	ME1818OE2*	Open Elective - 2	3	0	0	3	30	70
Practical								
1	ME181822	Project -2	0	0	12	6	100	50
2	ME181823	Grand Viva Voce-II	0	0	0	1	-	50
TOTAL			**12**	**0**	**12**	**19**	**220**	**380**
Total Contact Hours per week: 24								
Total Credits: 19								

Program Elective-2 Subjects		
Sl. No.	**Subject Code**	**Subject**
1	ME1818PE21	Air Conditioning
2	ME1818PE22	Mechatronics
3	ME1818PE23	Robotics and Applications
4	ME1818PE24	Compressors and Gas Turbines
5	ME1818PE25	Computational Fluid Dynamics
6	ME1818PE2*	Any other subject offered from time to time with the approval of the University

Program Elective-3 Subjects		
Sl. No.	**Subject Code**	**Subject**
1	ME1818PE31	Computer Integrated Manufacturing
2	ME1818PE32	Operations Management
3	ME1818PE33	Internal Combustion Engines
4	ME1818PE34	Composite Materials
5	ME1818PE35	Tribology
6	ME1818PE3*	Any other subject offered from time to time with the approval of the University

Open Elective-2 Subjects		
Sl. No.	**Subject Code**	**Subject**
1	ME1818OE21	Noise and Vibration Control
2	ME1818OE22	Industrial Safety Engineering
3	ME1818OE23	Engineering Economic Analysis
4	ME1818OE24	Automotive Mechanics
5	ME1818OE25	Machining and machine tools
6	ME1818OE2*	Any other subject offered from time to time with the approval of theUniversity

MANUFACTURING METHODS [ME181801]

Course Outcome (COs): At the end of the course, the student will be able to

CO 1	Design a riser for vertical and bottom gating sand moulds.
CO 2	Compute power, force, maximum reduction, maximum draft possible and average flow stress in rolling, forging, extrusion and drawing.
CO 3	Explain the principle of operation of different Press working and sheet metal operations, and defects of metal formed parts.
CO 4	Explain the principle and operation of lapping, honing, superfinishing, polishing, buffing, tumbling and burnishing and choose suitable surface finishing operation for intended product surface quality.
CO 5	Explain different threads and gears manufacturing methods.
CO 6	Explain the Powder production method, characteristics and techniques of mixing blending, briquetting, sintering, infiltration and impregnation, Advantages and applications of powder metallurgy product.

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	1	2	3	-	-	-	-	1	1	1	-	1
CO 2	3	1	-	-	-	-	-	1	1	1	-	1
CO 3	2	-	-	-	-	-	-	1	1	1	-	1
CO 4	2	-	-	-	-	-	-	1	1	1	-	1
CO 5	2	-	-	-	-	-	-	1	1	1	-	1
CO 6	2	-	-	-	-	-	-	1	1	1	-	1

AIR CONDITIONING [ME1818PE21]

Course Outcome (COs): At the end of the course, the student will be able to

CO1	Illustrate psychrometric, comfort charts and calculate psychrometric properties using equations and/or psychrometric chart.
CO2	Solve problems on different psychrometric processes by using psychrometric chart.
CO3	Design an air conditioning system for a room for given indoor and outdoor design conditions.
CO4	Design a duct system by using any one of the different duct design methods namely equal friction method, velocity reduction and static regain method.
CO5	Explain and select various equipment, instruments and controls used in Air Conditioning system.

Mapping of COs with Pos

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PS01	PS02
CO1	3	2						2		2		2		
CO2	3	3						2		2		2		
CO3	3	3	3		3			2		2		2		
CO4	3	3	3		3			2		2		2		
CO5	3	2						2		2		2		

MECHATRONICS [ME1818PE22]

Course Outcomes (COs) : At the end of the course, the student will be able to:

CO1	**Define** components of integrated systems.
CO2	**Analyse** the response of sensors and actuators
CO3	**Define** PLC, PID and closed loop control processes
CO4	**Explain** the types of different pneumatic and hydraulic systems
CO5	**Explain** the function of CNC machines and Industrial Robotics

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	-	1	1	-	1
CO2	2	2	-	-	-	-	-	-	1	1	-	1
CO3	2	-	-	-	-	-	-	-	1	1	-	1
CO4	2		-	-	-	-	-	-	1	1	-	1
CO5	2	1	-		1	-	-	-	1	1	-	1

COMPUTATIONAL FLUID DYNAMICS [ME1818PE25]

Course Outcomes (COs) : At the end of the course, the student will be able to:

CO1	**Derive** the basics equations of mass conservation, momentum and energy.
CO2	**Explain** mathematical nature of Euler equations and Approximations of Navier-Stokes (NS) equation & Reynold's averaged NS equation
CO3	**Formulate** the discretization by using finite difference method and finite volume method.
CO4	**Analysis** and **application** of different type of numerical schemes.
CO5	**Solve** 1-D heat conduction equation, wave equation and Laplace equation using various schemes.
CO6	**Apply** FDM and FEM in 1-D heat transfer.

Mapping of COs with POs

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**3**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO2	**2**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO3	**2**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO4	**2**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO5	**2**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**
CO6	**2**	**1**	**-**	**-**	**1**	**-**	**-**	**-**	**1**	**1**	**-**	**1**

INTERNAL COMBUSTION ENGINES [ME1818PE33]

Course Outcomes (COs) : At the end of the course, the students will be able to:

CO1	Analyze and compare the real cycles with ideal air standard cycles to estimate the losses occurring during the run of an I.C. Engine.
CO2	Apply the properties of fuels and analyses the combustion processes in automotive IC engines including the state-of-the-art technologies of MPFI, CRDI and DGI engines to understand their effect on engine efficiency and emissions.
CO3	Estimate the primary design parameters, namely, stroke, bore, compression ratio, air-fuel ratio and rated speed of components of internal combustion engines from required performance parameters.
CO4	Critically examine the causes of unwanted exhaust emissions, their effects on the environment and measures to reduce such emissions from the study of chemistry of combustion and emission control technologies.

Mapping of PO's with CO's

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	-	-	-	-	1	1	1	-	1
CO2	2	3	1	-	-	1	1	1	1	1	-	1
CO3	3	2	2	-	-	-	1	1	1	1	-	1
CO4	2	3	-	-	-	1	2	1	2	1	-	1

OPERATIONS MANAGEMENT [ME1818PE32]

Course Outcomes (COs) : At the end of the course, the students will be able to:

CO1	**Explain** the distinction between goods and services, basic idea of operations management and the role of operations management in gaining competitive advantage in business.
CO2	**Explain** and **analyse** different forecasting methods and Inventory management
CO3	**Explain** the role of project management in any organization and **analyse** various plant layouts
CO4	**Explain** the role of TQM principles and value analysis in any organization
CO5	**Explain** the importance of effective SCM and Operations Scheduling for gaining competitive advantage in the market

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	-	1	1	1	-	1
CO2	2	1	--	--	--	--	--	1	1	1	--	1
CO3	2	1	-	-	-	-	-	1	1	1	-	1
CO4	3	-	-	-	-	-	-	1	1	1	-	1
CO5	3	-	-	-	-	-	-	1	1	1	-	1

AUTOMOTIVE MECHANICS [ME1818OE24]

Course Outcomes (COs): At the completion of the course the student will be able to

CO1	Explain the concept of internal combustion of fuel air mixture for energy production andsubsequent controlled use.
CO2	Explain various types of engines and sub-systems with respect to desired objective andperformance.
CO3	Examine various, dis-assembled components and assess their condition of components forreplacement/repair.
CO4	Explain primary and peripheral components of an automobile needed for control, safety,comfort, economy and efficiency.
CO5	Describe the basic of E-vehicle Technology

Mapping of COs with POs:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	–	–	–	–	–	–	1	1	1	–	1
CO2	2	–	–	–	–	–	–	1	1	1	–	1
CO3	2	1	–	–	–	–	–	1	1	1	–	1
CO4	2	-	–	–	–	–	–	1	1	1	–	1
CO5	2	–	–	–	–	–	–	1	1	1	–	1

INDUSTRIAL SAFETY ENGINEERING [ME1818OE22]

Course Outcomes (COs) : At the completion of the course the student will be able to

CO1	Explain the basic concepts and terminologies in industrial safety engineering.
CO2	Apply various techniques to analyses failure modes.
CO3	Assess industrial risk and losses.
CO4	Identify unsafe components in industry and conduct safety audit.
CO5	Develop fire protection systems in industry.

Mapping of COs with Pos

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	–	–	–	–	–	–	1	1	1	–	1
CO2	2	3	–	–	–	–	–	1	1	1	–	1
CO3	2	3	–	–	–	–	–	1	1	1	–	1
CO4	2	2	–	–	–	–	–	1	1	1	–	1
CO5	2	–	–	–	–	–	–	1	1	1	–	1

ENGINEERING ECONOMIC ANALYSIS [ME1818OE23]

Course outcomes (COs): After completion of the course, the students will be able to

CO1	Apply the concept of time value of money in managerial decision making
CO2	Make decisions on economic equivalence of physical assets for selection of alternatives
CO3	Make decisions on economic replacement of physical assets for acquiring new ones
CO4	Apply the concept of depreciation for economic decisions on the life of an asset
CO5	Make decisions on economically viable optimum quantity of production for manufacturing

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	–	–	–	–	–	1	1	1	3	1
CO2	-	-	–	–	-	–	–	1	1	1	3	1
CO3	-	-	–	–	-	–	–	1	1	1	3	1
CO4	-	-	–	–	–	–	–	1	1	1	3	1
CO5	-	-	–	–	-	–	–	1	1	1	3	1

COMPRESSORS AND GAS TURBINES ME1818PE24

Course outcomes (COs): After completion of the course, the students will be able to

CO1	**Derive** the governing equations of Turbo machines (Compressor and Gas turbine: Euler's equation.
CO2	**Explain** velocity diagram, enthalpy-entropy diagram and **Calculate** the slip, pressure rise, temperature rise, work done and efficiency in centrifugal and axial compressors.
CO3	**Explain** the velocity diagram, enthalpy-entropy diagram, staging for axial flow compressor and **calculate** the degree of reaction, work done and efficiency for axial flow turbines (Impulse and Reaction)
CO4	**Explain** the types of combustion chamber used in turbine and compressor and selection of appropriate blading material for particular applications of turbine and compressor.
CO5	**Explain** basic details of Turboprop, Turbofan, Turbojet and Ramjet systems.

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	–	–	–	–	–	–	1	1	1	–	1
CO2	3	1	–	–	–	–	–	1	1	1	–	1
CO3	3	1	–	–	–	–	–	1	1	1	–	1
CO4	2	-	–	–	–	–	–	1	1	1	–	1
CO5	2	–	–	–	–	–	–	1	1	1	–	1

PROJECT-I [ME181722]

Course Outcomes: Upon completion of the project, students shall be able to:

CO1	**Apply** engineering knowledge, and modern engineering and IT tools and techniques to **investigate** complex system, **analyze** data to produce useful information and **draw** conclusion and also **develop** system or system components.
CO2	**Communicate** results, concepts, analyses and ideas in written and oral form through report preparation, project presentation and paper publication
CO3	**Develop** the attributes of the capability of working in team, project management through information, knowledge and skill sharing to achieve the goal of the project assigned.

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	2	1	1	1	2	-	1	2	3
CO2	3	3	3	2	1	1	1	2	3	1	2	3
CO3	-	-	-	-	-	-	-	3	3	-	3	3

GRAND VIVA VOCE-I [ME181723]

Course Outcomes: Upon completion of the course, students shall be able to:

CO1	Develop self-learning skills
CO2	Demonstrate domain knowledge and skills in interview
CO3	Communicate effectively in personnel interview

Mapping of COs with POs

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	-	-	-	1	-	-	-	3	-	3
CO2	2	-	-	-	-	1	-	-	-	3	-	3
CO3	2	-	-	-	-	1	-	-	-	3	-	3