

Tatyasaheb Kore Institute of Engineering and Technology, Warananagar

DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAM OUTCOMES

After completion of the Program, graduates will have

1. an ability to apply knowledge of mathematics , science and engineering fundamentals to solve complex engineering problems
2. an ability to analyze the mechanical problem, interpret data through synthesis and evaluate to make conclusion
3. capability to solve complex engineering problems and design system components or processes as per specified requirements addressing public health, safety, cultural, societal and environmental issues
4. an ability to identify the problems and apply the research methodology to formulate, investigate and validate the outcomes .
5. an ability to make use of advanced techniques and tools necessary in engineering practices
6. an ability to understand societal, health, safety, legal and cultural issues while providing solutions for mechanical engineering problems
7. an ability to develop sustainable solutions and identify with their effects on society and environment
8. an apply ethical principles and commit to professional ethics and responsibilities of the engineering practice
9. an ability to function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. an ability to comprehend technical ideas, communicate through effective design documentation and oral presentation.
11. an ability to lead and manage multidisciplinary teams by applying engineering and management principles.
12. an ability to engage in independent and life - long learning in the broadest context of advancement in technology.

PROGRAM EDUCATIONAL OBJECTIVES

Graduates will be able to,

1. make successful careers in Indian and multinational companies
2. be competent with strong technological background to solve industrial and societal problems
3. Succeed in a post graduate as well as research programs.
4. Be sensitive towards professional ethics and environmental issues.
5. lead teams for executing multidisciplinary projects

PROGRAM SPECIFIC OUTCOMES

1. Graduates will be able to model and analyze the machine design problems.
2. Graduates will be able to demonstrate the working of energy conversion devices.
3. Graduates will be able to manufacture the products using different machine tools.

**COURSE
OUTCOMES
SY B. Tech**

Second Year B. Tech. (Mechanical Engineering) Semester-III

List of Subjects

Course Code	Category	Course Title
ME301	BSC	Engineering Mathematics - III
ME302	PCC	Applied Thermodynamics
ME303	PCC	Material Science and Metallurgy
ME304	ESC	Fluid Mechanics
ME305	ESC	Electrical Technology
ME301T	BSC	Engineering Mathematics – III Tutorial
ME302T	PCC	Applied Thermodynamics Lab
ME305T	ESC	Electrical Technology Lab
ME303P	PCC	Material Science and Metallurgy Lab
ME304P	ESC	Fluid Mechanics Lab
ME306	PCC	Industrial Drawing
ME307	ESC	Programming in C++
ME308	PCC	Manufacturing Skill Development Lab -I
ME309A	--	Audit Course - III

COURSE OUTCOMES:

ME302	PCC	Applied Thermodynamics
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1. The student will be able to Define and state thermodynamics concepts, fundamental laws, basic principles
2. The student will be able to Summarize the construction and working of steam power plant, steam boilers, steam condensers, steam nozzles, steam turbines
3. The student will be able to Apply theory of thermodynamics to calculate different performance parameters for steam boiler, steam condenser, steam nozzle and steam turbine
4. The student will be able to Compare the device such as steam condensers, steam nozzles, steam turbines used in steam power plant for better performance.
5. The student will be able to Estimate the design parameters calculations of Steam nozzles and steam turbine for given operating conditions
6. The student will be able to Plot the velocity diagrams for impulse and reaction steam turbines

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	--	--	--	--	--	--	--	--	--	--	--	--	3	--
CO2	3	1	--	--	--	--	--	--	--	--	--	--	--	3	--
CO3	2	3	2	1	--	--	--	--	--	--	--	--	1	2	--
CO4	2	3	2	1	--	--	--	--	--	--	--	--	1	2	--
CO5	2	3	2	1	--	--	--	--	--	--	--	--	1	2	--
CO6	2	1	2	2	--	--	--	--	--	--	--	--	1	1	--

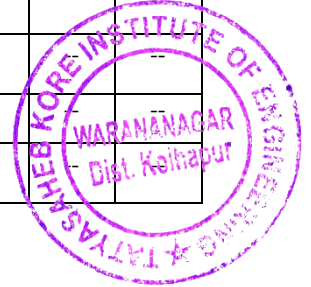
COURSE OUTCOMES:

ME305	ESC	Electrical Technology
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1. The student will be able to Define and Deals the basic principles of Electromagnetic Induction.
2. The student will be able to Describe the construction, working and characteristics of various Electric motors.
3. The student will be able to Describe and Identify the suitable Electric heating and welding methods for different Mechanical Applications.
4. The student will be able to Apply Various speed control techniques for DC and AC motors in various mechanical systems.
5. The student will be able to Analyze and select suitable types of motors for different mechanical systems by considering different speed torque characteristics.
6. The student will be able to Determine the Efficiency of 3 Phase Induction motor by using various input and output parameters.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CO2	3	2	--	1	--	--	--	--	--	--	--	--	--	--	--
CO3	3	1	1	--	2	--	--	--	--	--	--	--	--	--	--
CO4	3	2	--	1	2	--	--	--	--	--	--	--	--	--	--
CO5	--	2	--	1	2	--	--	--	--	--	--	--	--	--	--
CO6	--	2	--	1	2	--	--	--	--	--	--	--	--	--	--



COURSE OUTCOMES:

ME306	PCC	Industrial Drawing
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1. The student will be able to Draw BIS conventions and Standard machine components
2. The student will be able to Analyze and interpret production Drawing
3. The student will be able to understand the use of limit fits and tolerances on production drawing.
4. The student will be able to develop the skills for drawing assembly from details and details from assembly drawing.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	--	2	--	2	--	--	--	--	2	--	--	2	--	--
CO2	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--
CO3	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--
CO4	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--

COURSE OUTCOMES:

ME307	ESC	Programming in C++
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1. The student will be able to Develop logic for solving problems using object oriented language
2. The student will be able to Plot algorithms and flowcharts for programs involving decision control statements, loop control statements and case Control structures.
3. The student will be able to Compile and debug programs in C++ language
4. The student will be able to Apply their knowledge and programming skills to solve various computing problems in the field of Mechanical Engineering.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	3	1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	2	3	1	2	2	-	-	-	-	-	-	-	-	-	-
CO3	2	2	2	2	3	-	-	-	-	-	1	-	2	2	2
CO4	2	3	1	2	-	-	-	-	-	-	-	-	2	2	2

COURSE OUTCOMES:

ME309A	--	Audit Course - III
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1. The student will be able to relate the interdependency of environmental components.
2. The student will be able to Identify the environmental problems and prevent environmental pollution
3. The student will be able to interpret impacts of waste on environmental components.
4. The student will be able to analyze environmental change and its social impacts

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	--	--	--	--	--	--	--	1	--	--	--	--	--	--
CO2	--	2	--	--	--	--	--	--	2	--	--	--	--	--	--
CO3	--	--	--	--	--	--	--	--	2	--	--	--	--	--	--
CO4	--	--	--	--	--	1	--	--	3	--	--	--	--	--	--

Second Year B. Tech. (Mechanical Engineering) Semester-IV

List of Subjects

Course Code	Category	Course Title
ME401	ESC	Computational Techniques and Programming
ME402	PCC	Analysis of Mechanical Elements
ME403	PCC	Fluid and Turbo Machinery
ME404	PCC	Theory of Machines –I
ME405	PCC	Manufacturing Processes and Machine Tools
ME401T	ESC	Computational Techniques and Programming Lab
ME402T	PCC	Analysis of Mechanical Elements Lab
ME403T	PCC	Fluid and Turbo Machinery Lab
ME406	ESC	Programming in Python
ME404P	PCC	Theory of Machines –I Lab
ME407P	PCC	Manufacturing Skill Development Lab -II
ME408P	PCC	Computer Aided Drafting
ME409A	--	Audit Course – IV

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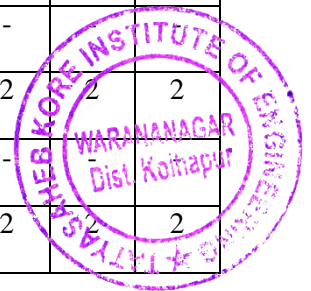
COURSE OUTCOMES:

ME401	ESC	Computational Techniques and Programming
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1. The student will be able to Differentiate between direct methods and numerical methods with their significance
2. The student will be able to State different numerical methods used to solve engineering problems
3. The student will be able to describe mathematical process of above methods to solve problems
4. The student will be able to relate a specific method to solve an engineering specific problem with greater emphasis on mechanical Engineering.
5. The student will be able to develop the logic behind a method for its coding through flowcharts.
6. The student will be able to prepare computer program for these numerical methods using C++/ Python

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	2	-	-	-	-	-	-	-	-	-	-	-
CO4	2	3	1	2	-	-	-	-	-	-	-	-	2	2	2
CO5	2	3	1	2	2	-	-	-	-	-	-	-	-	-	-
CO6	2	2	2	2	3	-	-	-	-	-	1	-	2	-	2



COURSE OUTCOMES:

ME402	PCC	Analysis of Mechanical Elements
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1. The student will be able to Define different types of stresses and strains induced in any machine component due to various loading conditions.
2. The student will be able to interpret the nature of internal stresses that will develop within the mechanical components for different types of loading.
3. The student will be able to utilize mathematics and basic engineering principle to evaluate stress, strain, torque, buckling load, slope and deflection.
4. The student will be able to examine the effect of different loading conditions in various machine elements such as simple machine components, beams, shafts, columns.
5. The student will be able to determine the mechanical design parameters of structural member under different loadings.
6. The student will be able to Apply and Construct graphical solutions for given loading conditions of structure.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	2	--	1	1	--	--	--	--	--	--	--	1	--	--
CO2	2	3	--	--	--	--	--	--	--	--	--	--	1	--	--
CO3	3	2	--	2	1	--	--	--	--	--	--	--	1	--	--
CO4	1	3	2	2	--	--	--	--	--	--	--	--	2	--	--
CO5	1	2	1	3	--	--	--	--	--	--	--	--	1	--	--
CO6	1	1	2	1	--	--	2	--	--	--	--	--	1	--	--

COURSE OUTCOMES:

ME403	PCC	Fluid and Turbo Machinery
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1. The student will be able to Define and state the applications of pump, compressor, water turbine and gas turbine.
2. The student will be able to explain working principle and classifications of turbo machines.
3. The student will be able to apply the Euler's theory to estimate the work done by plotting velocity triangles for various turbo machines.
4. The student will be able to analyze the performance parameters such as work done, power and efficiency of turbo machines.
5. The student will be able to Compare various turbo machines and recommend suitable device for required application.
6. The student will be able to Design turbo machines for specified conditions

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	2	--	--	--	--	2	--	--	--	--	--	--	1	--
CO2	3	1	--	--	--	--	2	--	--	--	--	--	--	1	--
CO3	1	2	3	--	--	--	--	--	--	--	--	--	--	2	--
CO4	1	3	3	1	--	--	--	--	--	--	--	--	1	3	--
CO5	2	2	2	--	--	--	--	--	--	--	--	--	--	2	--
CO6	1	1	2	3	--	--	--	--	--	--	--	--	2	2	--

COURSE OUTCOMES:

ME404	PCC	Theory of Machines –I
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1. The student will be able to List different types of mechanisms and their applications in mechanical engineering
2. The student will be able to Describe and apply kinematic theories of mechanism to plot velocity and acceleration diagrams
1. The student will be able to Apply knowledge of cam to draw the Cam Profile with follower for different applications
2. The student will be able to Compare power transmitting elements used in different machines and select the appropriate as per requirement
3. The student will be able to Evaluate suitability of given governing mechanisms based on speed control parameter analysis
4. The student will be able to Select and design an appropriate mechanism for given proposed machine

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	1	--	--	--	--	1	--	--	--	--	--	--	--	--
CO2	3	2	2	1	--	--	--	--	--	--	--	--	1	--	--
CO3	2	2	1	2	--	--	--	--	--	--	--	--	2	--	--
CO4	2	2	3	1	--	--	--	--	--	--	--	--	2	--	--
CO5	1	3	1	2	--	--	--	--	--	--	--	--	3	--	--
CO6	1	2	3	3	--	--	--	--	--	--	--	--	3	--	--

COURSE OUTCOMES:

ME405	PCC	Manufacturing Processes and Machine Tools
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1. The student will be able to Explain the construction & working of various machine tools used in manufacturing processes.
2. The student will be able to describe various metal casting, metal cutting, metal forming & metal joining processes.
3. The student will be able to Discuss various plastic processing and tools includes thermoforming, extrusion etc.
4. The student will be able to apply the fundamental theory of machining processes to calculate machining time and metal removal rate.
5. The student will be able to summarize various Gear manufacturing processes and select the appropriate process as per the requirement.
6. The student will be able to illustrate the principles and applications of Non- traditional machining (NTM) processes

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	2	--	--	2	--	--	--	--	--	--	--	--	--	
CO2	2	2	--	--	3	--	--	--	--	--	--	--	--	--	2
CO3	2	2	--	--	3	--	--	--	--	--	--	--	--	--	2
CO4	3	2	--	--	--	--	--	--	--	--	--	--	--	--	3
CO5	3	3	--	--	2	--	--	--	--	--	--	--	--	--	2
CO6	3	2	1	--	3	1	1	--	--	--	1	--	--	--	2

COURSE OUTCOMES:

ME406	ESC	Programming in Python
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1. The student will be able to State and use different Input/output functions, Standard data types, Strings, basic operators in python programming
2. The student will be able to implement Python programs with conditionals and loops
3. The student will be able to utilize the Python strings and Python list concept in programming
4. The student will be able to Develop code for user defined function in python and implement it in simple programs

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CO2	3	2	--	--	--	--	--	--	--	--	--	--	--	--	--
CO3	3	2	1	2	--	--	--	--	--	--	--	--	--	--	--
CO4	2	3	1	2	2	--	--	--	--	--	--	--	2	--	--

COURSE OUTCOMES:

ME407P	PCC	Manufacturing Skill Development Lab -II
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1. The student will be able to Understand Machine layout, method of Machine Tool installation, selection of Tools for various machining operation.
2. The student will be able to Selection of Machine tools such as Lathe Machine, Drilling Machine and Milling Machine for specific component operations
3. The student will be able to Perform various machining operations to prepare Job using plain turning, taper turning, external threading, knurling, slotting, Keyway and Tapping etc.
4. The student will be able to Apply quality inspection techniques on a component using principles of metrology.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	3	1	2	--	--	--	--	--	--	--	--	--	--	--
CO2	2	3	1	2	2	--	--	--	--	--	--	--	--	--	--
CO3	2	3	1	2	2	--	--	--	--	--	--	--	2	2	2
CO4	2	2	2	2	3	--	--	--	--	--	4	--	2	2	2

COURSE OUTCOMES:

ME408P	PCC	Computer Aided Drafting
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1. The student will be able to draw 2D drawings and 3D models of simple components.
2. The student will be able to Analyze and interpret production Drawing
3. The student will be able to Use modern engineering techniques, tools and skills for engineering practice.
4. The student will be able to develop the skills for drafting using CAD software and get the knowledge to enhance the CAD utilities.

Mapping of Pos & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	1	--	2	--	2	--	--	--	--	2	--	--	2	--	--
CO2	--	3	--	--	--	--	--	--	--	--	--	--	--	--	--
CO3	--	--	--	--	3	--	--	--	--	--	--	--	--	--	--
CO4	--	--	--	--	--	--	--	--	--	--	--	1	--	--	--

**COURSE
OUTCOMES
TY B. Tech**

Third Year B. Tech. (Mechanical Engineering) Semester-V

List of Subject

Course Code	Category	Course Title
ME501	PCC	Theory of Machine– II
ME502	ESC	Heat and Mass Transfer
ME503	PCC	Design of Machine Elements-I
ME504	OEC-I	Industrial Instrumentation and Control / Modeling and Simulation of Manufacturing Systems
ME505	PEC-I	Manufacturing Engineering / Computer Integrated Manufacturing
ME501P	PCC	Theory of Machine– II Lab
ME502P	ESC	Heat and Mass Transfer Lab
ME503T	PCC	Design of Machine Elements-I Lab
ME504T	OEC-I	Industrial Instrumentation and Control / Modeling and Simulation of Manufacturing Systems
ME506P	ESC	Arduino Model Making Lab
ME507T	PCC	Manufacturing Skill Development Lab-III
ME508T	PW	Mini-Project Phase -I
ME508A	--	Audit Course - V

COURSE OUTCOMES:

ME501	PCC	Theory of Machine– II
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1. The student will be able to Identify the various types of gears and gear trains.
2. The student will be able to Study the Dynamic analysis of mechanisms used in various machines .
3. The student will be able to Select gear drives for engineering applications to meet the power transmission requirements.
4. The student will be able to Analyze the gyroscopic effects on mechanical rotating Equipments.
5. The student will be able to Solve a balancing problems developed in reciprocating and rotating components.
6. The student will be able to Develop a suitable Flywheel as per Industrial needs.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	1	1	--	--	--	--	--	--	--	--	--	2	--	--
CO2	1	2	3	--	--	--	--	--	--	--	--	--	3	--	--
CO3	3	1	2	--	--	--	--	--	--	--	--	--	3	--	--
CO4	1	2	3	--	--	--	--	--	--	--	--	--	2	--	--
CO5	1	-	3	--	--	--	--	--	--	--	--	--	2	--	--
CO6	1	2	3	1	--	--	--	--	--	--	--	--	2	--	--



COURSE OUTCOMES:

ME503	PCC	Design of Machine Elements-I
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1. The student will be able to Identify and apply basic principles of machine design
2. The student will be able to Design machine elements on the basis of strength concept.
3. The student will be able to Solve the design problems for various machine elements used in industries
4. The student will be able to Prepare assembly and detail drawings for different machine elements.
5. The student will be able to Use design data books and standard practices.
6. The student will be able to Select machine elements from Manufacturers catalogue by applying standard design criteria.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	2	2	2	--	--	--	---	1	--	--	--	3	--	2
CO2	2	2	2	2	--	--	--	--	1	--	--	--	3	--	2
CO3	2	2	3	2	--	--	--	--	1	--	--	--	3	--	2
CO4	2	2	2	2	--	--	--	--	1	--	--	--	3	--	2
CO5	2	2	2	2	--	--	--	--	1	--	--	--	3	--	2
CO6	2	2	2	2	--	--	--	--	1	--	--	--	3	--	2

COURSE OUTCOMES:

ME504	OEC-I	Industrial Instrumentation and Control
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1. The student will be able to Classify various types measuring system and their static characteristics and types of errors occurring in the system.
2. The student will be able to Classify and select proper measuring instrument for linear and angular displacement, acceleration
3. The student will be able to Classify and select proper measuring instrument for pressure and temperature measurement
4. The student will be able to Design mathematical model of system/process for standard input responses
5. The student will be able to Analyze error and differentiate various types of control systems and time domain specifications
6. The student will be able to Analyze the problems associated with root locus stability

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	2	--	--	--	--	--	---	1	--	--	--	2	1	--
CO2	1	1	1	--	--	--	--	--	1	--	--	--	2	1	--
CO3	1	1	1	--	--	--	--	--	1	--	--	--	2	1	--
CO4	3	2	2	--	1	--	--	--	1	--	--	--	2	1	--
CO5	2	2	1	--		--	--	--	2	--	--	--	2	1	--
CO6	2	2	2	1	1	--	--	--	1	--	--	--	2	1	--

COURSE OUTCOMES:

ME505	PEC-I	Computer Integrated Manufacturing
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1. The student will be able to Summarize the definition of CIM, implementation of CIM and Economic and social justification of CIM.
2. The student will be able to Understandthe scope of CAD / CAM and CIM
3. The student will be able to Apply the group technology concept and computer aided process planning techniques in manufacturing.
4. The student will be able to Identify the functions of FMS and Flexible assembly system
5. The student will be able to Describe various robots and automated guided vehicle used in industries
6. The student will be able to Illustratedata and data base management system,network concept and role of communication in CIM

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	--	2	--	2	2	--	--	--	--	1	--	--	--	--
CO2	3	2	2	2	2	--	--	--	--	--	--	--	--	--	--
CO3	2	2	2	--	3	--	--	--	--	--	--	--	--	--	--
CO4	2	2	2	2	2	--	--	--	--	--	1	--	--	--	--
CO5	2	2	2	2	3	3	--	--	--	--	1	--	--	--	--
CO6	2	--	2	--	2	2	--	--	--	--	2	--	2	--	--

COURSE OUTCOMES:

ME507T	PCC	Manufacturing Skill Development Lab-III
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1. The student will be able to Demonstration of Milling machine, Shaping Machine, and Grinding Machine.
2. The student will be able to Perform turning facing & other operations on the lathe machine
3. The student will be able to Prepare the Spur Gear on Milling machine and Carry key way operation on shaping machine
4. The student will be able to Demonstration of CNC and VMC with Elements, power drives, spindle drives.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	--	--	--	2	--	--	---	--	--	--	1	--	--	--
CO2	3	1	--	--	2	--	--	---	--	--	--	--	---	--	2
CO3	2	1	--	1	--	--	--	---	--	--	--	--	---	--	--
CO4	3	-	-	1	--	--	--	---	--	--	--	--	---	--	--

COURSE OUTCOMES:

ME508T	PW	Mini-Project Phase -I
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1. The student will be able to Identify small real engineering and societal problems through different types of surveys (Literature survey, Industrial survey etc.)
2. The student will be able to Solve and Analyze these problems by using software/analytical/computational tools and techniques by applying engineering principles.
3. The student will be able to The student will be able to Develop model / technical reports withpresenting skills to defend their work in front of technically qualified audience.
4. The student will be able to Develop problem solving capabilities by self-learning in a team as well as an individual, which leads to lifelong learning.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	2	1	3	1	2	3	--	--	--	--	--	2	--	--
CO2	1	3	3	2	3	--	2	2	--	--	--	--	3	1	3
CO3	--	--	--	--	--	2	3	1	1	3	--	--	--	--	--
CO4	--	--	--	--	--	--	2	---	3	--	3	3	--	--	--

Third Year B. Tech. (Mechanical Engineering) Semester-VI

List of Subject

Course Code	Category	Course Title
ME601	PEC-II	Industrial Fluid Power/Process Planning and Cost Estimation
ME602	PCC	Metrology and Quality Control
ME603	PCC	Design of Machine Elements–II
ME604	PCC	Internal Combustion Engines
ME605	OEC-II	Industrial Management and Operation Research / Smart Materials
ME601T	PCC	Industrial Fluid Power Lab/Process Planning and Cost Estimation Lab
ME602P	PCC	Metrology and Quality Control Lab
ME603T	PCC	Design of Machine Elements–II Lab
ME604P	PCC	Internal Combustion Engines Lab
ME606T	PCC	CAD/CAM and 3D Printing Lab
ME607T	II	Industrial Training – I
ME608T	PW	Mini-Project Phase - II
ME609A	--	Audit Course – VI

COURSE OUTCOMES:

ME601	PEC-II	Industrial Fluid Power
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1. The student will be able to Demonstrate Hydraulic and pneumatic system
2. The student will be able to Investigate the performance of Hydraulic and pneumatic system
3. The student will be able to The student will be able to Explain the use of different types of valves and actuators.
4. The student will be able to Apply Hydraulic and pneumatic system fundamentals to industrial applications
5. The student will be able to Demonstrate about the fundamentals of Hydraulic and pneumatic circuits used in industrial applications
6. The student will be able to Select different types of motors and pumps for different applications.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	--	3	--	--	--	1	--	--	--	2	--	--	1	2	--
CO2	3	--	--	--	2	1	--	--	--	1	--	1	1	2	--
CO3	3	--	--	--	1	--	--	--	1	2	--	--	1	2	--
CO4	3	--	--	--	--	1	--	--	--	2	--	--	1	--	--
CO5	2	2	--	--	1	1	--	--	1	2	--	--	1	2	--
CO6	2	2	--	--	1	1	--	--	2	1	--	--	1	1	--

COURSE OUTCOMES:

ME601	PEC-II	Process Planning and Cost Estimation
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1. The student will be able to Select the process, equipment and tools for various industrial products.
2. The student will be able to Explain the concept of cost estimation.
3. The student will be able to Compute the job order cost for different type of shop floor.
4. The student will be able to Calculate the machining time for various machining operations.
5. The student will be able to Prepare process planning activity chart.
6. The student will be able to Estimate the process costing and accounting of industrial product.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	1	2	--	--	--	--	---	--	--	--	--	--	--	2
CO2	2	2	1	--	3	--	--	--	1	--	--	--	--	--	2
CO3	1	2	3	--	2	--	--	--	1	--	--	--	--	--	2
CO4	1	--	2	2	3	--	--	--	1	--	--	--	--	--	2
CO5	1	--	2	2	3	2	--	--	1	--	--	--	--	--	2
CO6	--	--	1	--	--	2	--	3	1	--	--	--	--	--	2

COURSE OUTCOMES:

ME603	PCC	Design of Machine Elements–II
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1. The student will be able to Evaluate the stresses in machine components due to various types of fluctuating loads and failure of components according to theories of failures.
2. The student will be able to Develop capability to analyze rolling contact bearing and its selection from manufacturer’s catalogue
3. The student will be able to Achieve an expertise in design of sliding contact bearing in industrial applications.
4. The student will be able to Apply principles of spur gear design during industrial gear boxes.
5. The student will be able to Design of Helical and Bevel Gears.
6. The student will be able to Design worm gear for various industrial applications.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	2	1	--	--	--	--	---	--	--	--	--	2	--	--
CO2	2	1	3	--	2	--	--	--	--	--	--	--	1	--	--
CO3	1	2	3	2	2	--	--	--	--	--	--	--	1	--	--
CO4	1	2	2	3	--	--	--	--	--	--	--	--	3	--	--
CO5	1	2	2	3	2	--	--	--	--	--	--	--	3	--	--
CO6	1	2	2	3	2	--	--	--	--	--	--	--	3	--	--

COURSE OUTCOMES:

ME604	PCC	Internal Combustion Engines
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1. The student will be able to Demonstrate engine construction, function of various parts of the engine and classify IC Engines.
2. The student will be able to Identify different parts and systems of the engine along with its function
3. The student will be able to Explain the process of air and fuel induction in IC Engines.
4. The student will be able to Understand combustion process in IC engines and study the types of combustion chambers.
5. The student will be able to Perform engine testing and evaluate engine performance parameters.
6. The student will be able to Predict impact of internal combustion engines on environment and ways to reduce them.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1	--	--	--	--	--	---	--	--	--	--	--	2	--
CO2	2	2	--	--	--	--	--	--	--	--	--	--	--	2	--
CO3	3	3	3	--	--	--	--	--	--	--	--	--	--	2	--
CO4	2	1	--	--	--	--	--	--	--	--	--	--	--	2	--
CO5	3	3	3	--	--	--	--	--	--	--	--	--	--	2	--
CO6	2	1	1	--	--	3	3	--	--	2	--	--	--	2	--

COURSE OUTCOMES:

ME605	OEC-II	Industrial Management and Operation Research
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1. The student will be able to Apply the concepts of Industrial management and operations research approaches. Know various functional areas of management.
2. The student will be able to Analyze issues in Managing operations and projects and various approaches to resolve those issues.
3. The student will be able to The student will be able to Understand MIS and Entrepreneurship Development
4. The student will be able to Formulate and solve a wide variety of problems using Linear Programming Problems (LPP).
5. The student will be able to Formulate and solve a wide variety of problems using Transportation and Assignment problems.
6. The student will be able to Implement the various techniques of Project Management such as Network Model and Sequencing Model to solve industrial problem .

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	1	--	--	--	--	--	---	--	--	2	--	--	--	--
CO2	2	1	--	--	--	--	--	--	--	--	2	--	--	--	--
CO3	2	1	--	--	--	--	--	--	--	--	2	--	--	--	--
CO4	2	1	--	--	1	--	--	--	--	--	1	--	--	--	1
CO5	2	2	1	--	2	--	--	--	--	--	2	--	--	--	1
CO6	2	1	--	--	1	--	--	--	--	--	1	--	--	--	1

COURSE OUTCOMES:

ME606T	PCC	CAD/CAM and 3D Printing Lab
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1. The student will be able to Understand and read engineering Drawings.
2. The student will be able to Prepare solid models from 2D drawings.
3. The student will be able to Prepare assemblies and BOM.
4. The student will be able to Understand the basics of Computer Aided Manufacturing and the concept of 3D Printing.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	--	3	--	--	--	1	--	--	--	2	--	--	1	2	--
CO2	3	--	--	--	2	1	--	--	--	1	--	1	1	2	--
CO3	3	--	--	--	1	-	--	--	1	2	--	--	1	2	--
CO4	3	--	--	--	--	1	--	--	--	2	--	--	1	--	--

COURSE OUTCOMES:

ME607T	II	Industrial Training – I
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1. The student will be able to Understand and interpret the knowledge gained in the course work
2. The student will be able to Create, select, learn and apply appropriate techniques, resources, and modern engineering tools.
3. The student will be able to Develop the capability to work in team.
4. The student will be able to Write technical report.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	3	3	2	2	2	2	1	1	2	3	2	1	3	--	3
CO2	1	2	2	1	2	1	1	2	2	2	2	1	2	1	2
CO3	1	2	2	2	1	2	1	2	3	2	3	1	1	--	1
CO4	1	3	1	3	2	1	3	--	1	3	--	--	1	1	1

COURSE OUTCOMES:

ME608T	PW	Mini-Project Phase - II
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1. The student will be able to Identify small real engineering and societal problems through different types of surveys (Literature survey, Industrial survey etc.)
2. The student will be able to Solve and Analyze these problems by using software/analytical/computational tools and techniques by applying engineering principles.
3. The student will be able to Develop model / technical reports with presenting skills to defend their work in front of technically qualified audience.
4. The student will be able to Develop problem solving capabilities by self-learning in a team as well as an individual, which leads to lifelong learning.

Mapping of POs & COs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	If applicable		
													PSO1	PSO2	PSO3
CO1	2	2	1	3	1	2	3	--	--	--	--	--	2	--	--
CO2	1	3	3	2	3	--	2	2	--	--	--	--	3	1	3
CO3	--	--	--	--	--	2	3	1	1	3	--	--	--	--	--
CO4	--	--	--	--	--	--	2	---	3	--	3	3	--	--	--

**COURSE
OUTCOMES
Final Year B. Tech**

Final Year B. Tech. (Mechanical Engineering) Semester-VII

List of Subject

Refrigeration & Air conditioning

Mechanical System Design

Finite Element Analysis

Automobile Engineering (ELE-I)

Total Quality Management (ELE-II)

Industrial Product Design (ELE-II)

Industrial Training

Project Phase-I

COURSE OUTCOMES:

REFRIGERATION & AIR CONDITIONING

1. Student will be able to know the different components and working of vapor compression & vapor absorption refrigeration system.
2. Student will be able to distinguish between different vapor refrigeration cycles and solve various problems for specified operating conditions.
3. Student will be able to compare Carnot, Theoretical and Practical CoP of a refrigeration system.
4. Student will be able to list different psychrometric properties and their importance in air conditioning process.
5. Student will be able to design an air conditioning system using cooling load calculation for summer and winter.
6. Student will be able to describe different applications of refrigeration and air conditioning in various fields like food and medicine storage, manufacturing processes and cryogenic applications.

COURSE OUTCOMES:

MECHANICAL SYSTEM DESIGN

1. Students will be able to apply the various concepts of aesthetics economics system approach and Optimization techniques in the design of various mechanical systems.
2. Students will be able to identify formulate and solve engineering design problems of pressure vessels clutch and braking systems.
3. Students will be able to design and develop multi speed gear boxes used in machine tool applications.
4. Students will be able to understand the variability in manufacturing, design and natural tolerances and applied the knowledge of statistical considerations to control the quality.
5. Students will be able to identify and quantify the specifications to use standards and codes to select the components commonly used in mechanical system design.
6. Students will be able to develop the understanding of various aspects of design for manufacture and assembly.

COURSE OUTCOMES:

FINITE ELEMENT ANALYSIS

1. Students will be able to understand the fundamental theory of the FEA method.
2. Students will be able to state various mathematical models solution of common engineering problems.
3. Students will be able to solve Structural, Thermal and Fluid flow problems using FEA.
4. Students will be able to evaluate and interpret finite element analysis results for design and development.
5. Students will be able to use a commercial finite element package like ANSYS to build finite element models and solve a selected range of engineering problems.
6. Students will be able to communicate effectively in writing a report the method used the implementation and the numerical results obtained.

COURSE OUTCOMES:

AUTOMOBILE ENGINEERING (ELECTIVE-I)

1. Students will be able to identify major components of automobiles types of vehicle layouts.
2. Students will be able to differentiate between different types of automobile power plants gearboxes steering systems braking systems and Suspension systems.
3. Students will be able to solve problems related to performance of automobiles and braking systems.
4. Students will be able to classify and compare automobiles, steering systems braking systems and Suspension systems.
5. Students will be able to describe the different components of electrical system of automobiles.
6. Students will be able to explain the distinguishing features of two wheelers and three wheelers.

COURSE OUTCOMES:

TOTAL QUALITY MANAGEMENT (ELECTIVE-II)

1. Students will be able to understand importance of assuring quality in the service or manufacturing sector and explain Quality assurance system.
2. Students will be able to identify and solve the quality related problems in manufacturing or service sector at various stages by using various TQM tools and techniques.
3. Students will be able to calculate reliability of system
4. Students will be able to understand vendor rating and select suitable vendor
5. Students will be able to interpret various quality attributes and discuss the various quality approaches.
6. Students will be able to comment on quality using Taguchi Philosophy.

COURSE OUTCOMES:

INDUSTRIAL PRODUCT DESIGN (ELECTIVE-II)

1. Students will be able to list and describe the characteristics of industrial design.
2. Students will be able to classify and distinguish between the characteristics product design and development process.
3. Students will be able to demonstrate aesthetic and economic considerations.
4. Students will be able to design and modify the existing product design.
5. Students will be able to decide Environmental effects on the development process.
6. Students will be able to evaluate and conclude the capability of industrial product design process.

COURSE OUTCOMES

INDUSRTIAL TRAINING

1. Students will be able to demonstrate the use, interpretation and application of an International engineering standard in a specific situation.
2. Students will be able to analyze a given engineering problem, identify an appropriate solving methodology and implement it to give meaningful solution.
3. Students will be able to identify sources of hazards and assess or identify appropriate health and safety measures.
4. Students will be able to understand the importance of sustainability and cost effectiveness in design and development process.
5. Students will be able to interact with multi-skilled engineer with sound technical knowledge and management, leadership and entrepreneurship skills.
6. Students will be able to get exposed to social, cultural, global and environmental responsibilities as an Engineer.

COURSE OUTCOMES

PROJECT PHASE-I

1. Students will be able to think creatively on real life engineering problem.
2. Students will be able to apply engineering knowledge to deduce proper solution to real life engineering problems.
3. Student will be able to work in a team and acquire collaborative skills to achieve common goals.
4. Student will be able to learn independently, reflect on their learning and take appropriate actions to improve it.
5. Students will be able to communicate effectively and present ideas clearly with specific audience in written and oral forms.
6. Students will be able to plan for activities in order to complete the task in predefined time.

Final Year B. Tech. (Mechanical Engineering) Semester-VIII

List of Subject

Mechatronics

Energy & Power Engineering

Noise & Vibrations

Industrial Engineering (ELE-III)

Cryogenics (ELE-IV)

Enterprise Resource Planning (ELE-IV)

Project Phase-II

COURSE OUTCOMES:

MECHATRONICS

1. Student will be able to identify mechatronics system and its basic components.
2. Students will be able to describe the importance of integration of mechanical electronics and control engineering and design of mechatronics system.
3. Students will be able to demonstrate PLC robotics and its programming.
4. Students will be able to analyze mechanical, electronics and control systems in selecting mechatronics system.
5. Students will be able to design a mechatronics system with elements of sensors and transducers and interfacing the same with problem under consideration.
6. Students will be able to handle multidisciplinary projects by applying mechatronics system design.

COURSE OUTCOMES:

ENERGY & POWER ENGINEERING

1. Students will be able to define and describe power plant collect information about the power plants available across India.
2. Students will be able to distinguish between types of power plants thermal hydroelectric at cetera and describe the main features.
3. Students will be able to draw the different types of load curves and show their performances.
4. Students will be able to solve the problems related to power plant performance analysis.
5. Students will be able to compile information related to safety and maintenance in power plants and energy audit.
6. Students will be able to compare different types of power plants measure the performance and recommend the best one.

COURSE OUTCOMES:

NOISE & VIBRATIONS

1. Students will be able to develop mathematical model to represent dynamic system.
2. Students will be able to estimate natural frequency of mechanical element or system.
3. Students will be able to analyze vibratory response of mechanical element or a system.
4. Students will be able to estimate the parameters of vibration isolation system.
5. Students will be able to carry out measurement of various vibration parameters.
6. Students will be able to understand relevance of noise in mechanical systems.

COURSE OUTCOMES:

INDUSTRIAL ENGINEERING (ELE-III)

1. Students will be able to describe Tools and techniques of industrial engineering.
2. Students will be able to describe and interpret various techniques in production planning and control and inventory control.
3. Students will be able to apply techniques Tools and techniques in facility planning.
4. Students will be able to analyze factors affecting productivity.
5. Students will be able to compose applications of Value Engineering and work study.
6. Students will be able to justify scope of human factors engineering.

COURSE OUTCOMES:

CRYOGENICS

1. Students will be able to describe different kinds of systems. Students will be able to understand and interpret the analysis report in the field of cryogenics.
2. Students will be able to apply knowledge of Mathematics, Science and Engineering for the needs in cryogenics.
3. Students will be able to design systems as per the desired needs based on economic, social and environmental issues associated with engineering practices.
4. Students will be able to communicate required information to develop various ideas related to design for research in different cryogenic systems.
5. Students will be able to contribute knowledge to solve step-by-step problems for lifelong learning.

COURSE OUTCOMES:

ENTERPRISE RESOURCE PLANNING

1. Students will be able to understand basics, evolution, advantages and importance of ERP.
2. Students will be able to correlate ERP and related Technologies, BPR, MIS, EIS, DSS, CRM, PLM etc.
3. Students will be able to understand manufacturing perspective of ERP.
4. Students will be able to know various business modules of ERP.
5. Students will be able to understand the key implementation issues and some popular products in ERP.
6. Students will be able to understand implementation of ERP package.

COURSE OUTCOMES

PROJECT PHASE-II

1. Students will be able to think creatively on real life engineering problem.
2. Students will be able to apply engineering knowledge to deduce proper solution to real life engineering problems.
3. Student will be able to work in a team and acquire collaborative skills to achieve common goals.
4. Student will be able to learn independently, reflect on their learning and take appropriate actions to improve it.
5. Students will be able to communicate effectively and present ideas clearly with specific audience in written and oral forms.
6. Students will be able to plan for activities in order to complete the task in predefined time.