ADITYA ENGINEERING COLLEGE

An Autonomous Institutuion

Approved by AICTE • Permanently Affiliated to JNTUK • Accredited by NAAC with 'A' Grade

Recognised by UGC under sections 2(f) and 12(B) of UGC Act, 1956

Aditya Nagar, ADB Road, Surampalem - 533437, Near Kakinada, E.G.Dt., Ph:99498 76662

DEPARTMENT OF MECHANICAL ENGINEERING

B.Tech - AR20 - Course Articulation Matrix

Note: Enter Correlation Levels 1 or 2 or 3. Where: 1- Slight(Low), 2 - Moderate(Medium), 3 - Substantial (High).

	CO Statements	POs												PSOs	
I SEM															
Course Code	**201HS1T01 COMMUNICATIVE ENGLISH**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Identify the ways to overcome fear and use of words paradoxically, interpret the developing conditions and the core competences of the state	-	-	-	-	-	-	1	-	-	3	-	-	-	-
CO2	Explain about world's most precious natural resources.	-	-	-	-	-	-	1	-	-	3	-	-	-	-
CO3	Explain about importance of unity to abolish war.	-	-	-	-	-	-	-	-	-	3	-	-	-	-
CO4	Respond well to the changing situations in life with independent knowledge for better decision making.	-	-	-	-	-	-	-	-	2	3	-	2	-	-
CO5	Demonstrate writing and concepts of effective writing skills.	-	-	-	-	-	-	-	-	1	3	-	-	-	-
Course Code	**201BS1T01 DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Apply the concepts of Mean Value theorem, Partial Differentiation and identify the maxima and minima of a given function.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Solve the linear differential equations and model various situations involving differential equations of first order.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Solve linear differential equations of higher order and model various situations involving second order differential equations.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Calculate Rank of a matrix and solve the system of Linear equations and find the Eigen values and Eigen vectors.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Compute various powers of a matrix and identify the nature of the quadratic form.	3	2	-	-	-	-	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
Course Code	**201BS1T02 ENGINEERING PHYSICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the basic concepts of crystal structure and X-ray diffraction Techniques.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Apply the knowledge of acoustics to improve acoustic quality of concert halls and understand the concepts of flaw detection techniques using ultrasonics.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Apply the structure- property relationship exhibited by solid materials within the elastic limit.	3	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain thebasic concepts of LASERs along with its Engineering applications andfamiliarize with types of sensors for various engineering applications	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain about magnetic and dielectric properties of different materials.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201ES1T03 ESSENTIAL ELECTRICAL AND ELECTRONICS ENGINEERING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Construct simple electrical circuits using basic laws.	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Explain the constructional features of DC Machines and working.	2	1	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Examine the performance of single-phase transformer.	3	2	1	-	-	-	-	-	-	-	-	-	-	-
CO4	Illustrate the principle of AC rotating machines.	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Analyze the device structure, operation and application of Diode and Transistor.	3	2	2	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201ES1I05 ENGINEEING GRAPHICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Sketch the polygons, conics and scales by using the principles of drawing	3	2	1	-	-	-	-	-	-	-	-	-	1	-
CO2	Draw Orthographic projections of points and lines..	3	2	1	-	-	-	-	-	-	-	-	-	1	-
CO3	Draw Orthographic projections of planes in various positions	3	2	1	-	-	-	-	-	-	-	-	-	1	-
CO4	Draw Orthographic projections of solids in various positions.	3	2	1	-	-	-	-	-	-	-	-	-	1	-

	CO Statements	POs												PSOs	
CO5	Construct isometric scale and isometric projections	3	2	1	-	-	-	-	-	-	-	-	-	1	-
Course Code	**201HS1L01 COMMUNICATIVE ENGLISH LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Make use of the concepts to communicate confidently and competently in English Language in all spheres.	-	-	-	-	1	-	-	-	-	3	-	1	-	-
CO2	Express Creative skills to construct Dialogues / Conversations in Spoken and Written forms.	-	-	-	-	1	-	-	-	-	3	-	2	-	-
CO3	Identify Accent for intelligibility.	-	-	-	-	1	-	-	-	-	3	-	2	-	-
CO4	Demonstrate communicative ability in everyday Conversation, JAM Sessions and Public Speaking.	-	-	-	-	1	-	-	-	-	3	-	1	-	-
CO5	Demonstrate nuances of Language through Audio – Visual Experience and group activities.	-	-	-	-	1	-	-	-	-	3	-	1	-	-
Course Code	**201BS1L01 ENGINEERING PHYSICS LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Determine the rigidity and young's modulus to understand material properties.	3	2	-	-	-	-	-	-	3	-	-	1	-	-
CO2	Determine Acceleration due to Gravity and Radius of Gyration and spring constant by oscillatory mechanics	2	2	-	-	-	-	-	-	3	-	-	1	-	-
CO3	Find the strength of the magnetic field.	3	1	-	-	-	-	-	-	3	-	-	1	-	-
CO4	Determine wavelength of unknown source, particle size using lasers.	3	2	-	-	-	-	-	-	3	-	-	1	-	-
CO5	Determination of velocity of sound, moment of inertia	3	2	-	-	-	-	-	-	3	-	-	1	-	-
Course Code	**201ES1L03 ESSENTIAL ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Analyze the electrical networks using network theorems.	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO2	Analyze the performance of AC and DC Machines.	3	2	2	-	-	-	-	-	-	-	-	-	-	-
CO3	Estimate the performance of 1-phase transformer.	3	2	1	1	-	-	-	-	-	-	-	-	-	-
CO4	Explain diode characteristics and its applications	3	1	-	-	-	-	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
CO5	Explain the simulation of diode and transistor.	3	1	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201MC1T01 ENVIRONMENTAL SCIENCE**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Outline the natural resources and their importance for the sustenance of the life	-	-	-	-	1	2	-	-	-	-	-	-	-	-
CO2	Explain about the biodiversity of India, threats and its conservation methods	-	-	-	-	1	2	-	-	-	-	-	-	-	-
CO3	Illustrate various attributes of the pollution, impacts and measures to control the pollution along with waste management practices	-	-	-	-	1	2	-	-	-	-	-	-	-	-
CO4	Describe social issues of both rural and urban environment to combat the challenges and the legislations of India in environmental protection	-	-	-	-	1	2	-	-	-	-	-	-	-	-
CO5	Explain the population growth and its implications	-	-	-	-	1	2	-	-	-	-	-	-	-	-
II SEM															
Course Code	**201BS2T05 PARTIAL DIFFERENTAIL EQUATIONS AND VECTOR CALCULAS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Solve improper integrals using beta and gamma functions	3	2											-	-
CO2	Solve partial differential equations of first order.	3	2											-	-
CO3	Compute the double integral over a region and triple integral over a volume.	3	2											-	-
CO4	Calculate the gradient of a scalar function, divergence and curl of a vectorfunction	3	2											-	-
CO5	Calculate line, surface and volume integrals.	3	2											-	-
Course Code	**201BS2T08 CHEMISTRY OF MATERIALS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Compare the quality of drinking water and problems associated with hard water.	3	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Explain the fundamentals and applications of Electrochemical energy systems.	2	-	-	-	-	-	-	-	-	-	-	-	1	-
CO3	Explain fundamentals and applications of polymers and building materials.	3	-	-	-	-	-	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
CO4	Explain the fundamentals and controlling methods of corrosion.	2	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Explain the properties and applications of nano materials, conductors, Semiconductors and Super conductors.	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Course Code	**201ES2T06 ENGINEERING MECHANICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Determine the resultant force and moment for a given force system.	3	3	3	-	-	-	-	-	-	-	-	-	3	-
CO2	Solve the member forces in trusses.	3	2	1	-	-	-	-	-	-	-	-	-	3	-
CO3	Apply concept of Virtual work to find the work done by force and couple.	3	2	1	-	-	-	-	-	-	-	-	-	3	-
CO4	Solve the centre of gravity and moment of inertia for various geometric shapes.	3	2	1	-	-	-	-	-	-	-	-	-	3	-
CO5	Determine the displacement, velocity and acceleration relations in dynamic systems.	3	3	1	-	-	-	-	-	-	-	-	-	3	-
CO6	Apply the concepts of kinematics, kinetics, work - energy and impulse –momentum methods to particle motion.	3	2	1	-	-	-	-	-	-	-	-	-	3	-
Course Code	**201ES2T08 PROGRAMMING FOR PROBLEM SOLVING USING C**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Develop the basic programs in C and draw the flowcharts using Raptor.	2	3	-	-	1	-	-	-	-	-	-	2	1	-
CO2	Make use of conditional and iterative statements to solve real time scenarios in C.	3	2	-	-	2	-	-	-	-	-	-	2	2	-
CO3	Apply the concept of arrays, modularity and strings to handle complex problems.	2	2	3	-	-	-	-	-	-	-	-	1	2	-
CO4	Apply the dynamic memory allocation functions using pointers.	2	3	-	-	2	-	-	-	-	-	-	2	2	-
CO5	Develop programs using structures, and Files.	3	2	2	-	-	-	-	-	-	-	-	2	3	-
Course Code	**201ES2L07 ENGINEERING WORKSHOP**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Prepare cross lap and dovetail joints using Carpentry tools	1	-	-	-	-	-	-	-	1	-	-	1	1	-
CO2	Prepare V-Fit and Square Fit using Fitting tools	1	-	-	-	-	-	-	-	1	-	-	1	1	-

	CO Statements	POs												PSOs	
CO3	Develop Tray and Funnel surfaces using Tin smithy tools	1	-	-	-	-	-	-	-	1	-	-	1	1	-
CO4	Convert Round rod to Square and S-hook using Black smithy tools	1	-	-	-	-	-	-	-	1	-	-	1	1	-
CO5	Check the circuit for Parallel and Series connection of bulbs using House wiring tools	1	-	-	-	-	-	-	-	1	-	-	1	1	-
Course Code	**201ES2L12 COMPUTER AIDED DRAFTING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the basic functions of drawing software.	1	-	-	-	-	-	-	-	-	2	-	-	1	-
CO2	Select the Construction and editing commands for specified drawings.	1	-	-	-	-	-	-	-	-	2	-	-	1	-
CO3	Apply the concepts of Blocks, Hatching and Layers.	1	-	-	-	-	-	-	-	-	2	-	-	1	-
CO4	Draw the isometric views & orthographic views with dimensions	1	-	-	-	-	-	-	-	-	2	-	2	1	-
CO5	Draw the 3D Model for mechanical components	1	-	-	-	-	-	-	-	-	2	-	2	1	-
Course Code	**201HS2L02 PROFESSIONAL COMMUNICATION SKILLS LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Make effective use of Body language in all situations and contexts to enhance effective communication in all aspects.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO2	Identify communicative competency to respond to others in different situations.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO3	Make use of effective delivery strategies to select,compile and synthesize information for oral presentation.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO4	Demonstrate in mock interviews, group discussion and public speaking.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
CO5	Illustrate interpersonal skills using English language confidently and effectively for personal and professional growth.	-	-	-	-	-	-	-	-	-	3	-	2	-	-
Course Code	**201BS2L05 ENGINEERING CHEMISTRY LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Demonstrate Complexometric titrations by volumetric analysis.	2	-	-	-	-	-	-	-	1	-	-	1	-	-
CO2	Demonstrate Acid – Base titrations by instrumental analysis.	2	-	-	-	-	-	-	-	1	-	-	1	-	-

	CO Statements	POs												PSOs	
CO3	Estimate Vitamin C using volumetric analysis	2	-	-	-	-	-	-	-	1	-	-	1	-	-
CO4	Prepare polymer like Bakelite.	2	-	-	-	-	-	-	-	1	-	-	1	-	-
CO5	Prepare alternative fuel like Bio-Diesel.	2	-	-	-	-	-	-	-	1	-	-	1	-	-
Course Code	**201ES2L10 PROGRAMMING FOR PROBLEM SOLVING USING C LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Develop the basic programs in C and draw the flowcharts using Raptor.	2	1	-	-	3	-	-	-	-	2	-	-	-	-
CO2	Make use of conditional and iterative statements to solve real time scenarios in C.	3	2	-	-	-	-	-	-	-	-	1	2	-	-
CO3	Apply the concept of arrays, modularity and strings to handle complex problems.	3	2	-	-	-	-	-	-	-	-	1	2	-	-
CO4	Apply the dynamic memory allocation functions using pointers.	2	3	-	-	-	-	-	-	-	2	-	1	-	-
CO5	Develop programs using structures, and Files.	3	2	-	-	-	-	-	-	-	-	2	2	-	-
Course Code	**201MC2T02 CONSTITUTION OF INDIA**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain historical background of the constitution making and its importance for building a democratic India.	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO2	Compare the functioning of three wings of the government i.e., executive, legislative and judiciary.	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO3	Interpret the value of the fundamental rights and duties for becoming good citizen of India.	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO4	Compare the decentralization of power between central, state and local self- government.	-	-	-	-	-	1	-	-	-	-	-	-	-	-
CO5	Extend the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.	-	-	-	-	-	1	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
III SEM															
Course Code	**201BS3T12 INTEGRAL TRANSFORMS AND APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Compute the Fourier series of a function	3	2	-	-	-	-	-	-	-	-	-	1	1	-
CO2	Compute the Fourier transform of a function.	3	2	-	-	-	-	-	-	-	-	-	1	1	-
CO3	Compute Laplace transform of a function.	3	2	-	-	-	-	-	-	-	-	-	1	1	-
CO4	Apply Laplace transform to solve initial value problems.	3	2	-	-	-	-	-	-	-	-	-	1	1	-
CO5	Solve one dimensional heat equation, wave equation and two dimensional Laplace equation.	3	2	-	-	-	-	-	-	-	-	-	1	1	-
Course Code	**201ME3T01 PRODUCTION TECHNOLOGY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the basics of casting and its applications.	1	-	-	-	-	1	1	-	-	-	-	-	1	-
CO2	Demonstrate various special casting processes.	2	-	-	-	-	1	1	-	-	-	-	-	3	-
CO3	Distinguish different joining techniques.	2	-	-	-	-	1	1	-	-	-	-	-	3	-
CO4	Explain the basics of sheet metal forming and plastics processing techniques.	1	-	-	-	-	1	1	-	-	-	-	-	1	-
CO5	Summarize the bulk metal deforming process.	1	-	-	-	-	1	1	-	-	-	-	-	1	-
Course Code	**201ME3T02 FLUID MECHANICS AND HYDRAULIC MACHINES**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the fluid properties and calculate the meta centric height of a submerged body.	3	2	1	1	-	-	-	-	-	-	-	-	-	1
CO2	Compare different types of fluid flow and apply the concept of momentum equation to various applications.	3	2	1	1	-	-	-	-	-	-	-	-	-	2
CO3	Calculate the flow of fluid in circular conduits and analyze the concept of boundary layer theory.	3	2	1	1	-	-	-	-	-	-	-	-	-	1
CO4	Solve the hydrodynamic forces of jet on various vanes.	3	2	1	1	-	-	-	-	-	-	-	-	-	2

	CO Statements	POs												PSOs	
CO5	Explore about the construction and working principle of Turbines and pumps.	3	2	1	1	-	-	-	-	-	-	-	-	-	1
Course Code	**201ES3T15 THERMODYNAMICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain basic concepts, properties of substances and Laws of thermodynamics.	2	1	-	-	-	-	-	-	-	-	-	-	-	2
CO2	Analyze thermodynamic processes using laws of thermodynamics.	3	3	-	-	-	-	-	-	-	-	-	1	-	2
CO3	Evaluate energy output, efficiency, and amount of heat energy required for various thermal systems.	3	2	1	1	-	-	-	-	-	-	-	1	-	2
CO4	Analyze and synthesize various gas mixtures.	3	3	1	1	-	-	-	-	-	-	-	1	-	2
CO5	Suggest solutions for thermodynamic cycles application.	2	-	-	-	-	-	-	-	-	-	-	1	-	2
Course Code	**201ES3T16 METALLURGY AND MATERIAL SCIENCE**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the concepts of structure of metals and mechanical behavior under different loading conditions.	2	1	-	-	-	1	-	-	-	-	-	1	1	-
CO2	Apply the concepts of equilibrium diagrams to make use of various alloys in various industrial applications.	2	1	-	-	-	1	-	-	-	-	-	1	1	-
CO3	Discuss the concept of solidification of alloys and the analyze phases of iron- iron carbide equilibrium diagram.	2	1	-	-	-	1	-	-	-	-	-	1	1	-
CO4	Apply the processes of heat treatment on different types of Cast irons and Steels.	2	-	-	-	-	2	-	-	-	-	-	1	1	-
CO5	Use the concepts of non-ferrous metals and alloys in industrial applications.	2	-	-	-	-	1	-	-	-	-	-	1	1	-
CO6	Summarize the properties and applications of ceramic and composite materials.	2	-	-	-	-	1	-	-	-	-	-	1	1	-
Course Code	**201ME3L01 COMPUTER AIDED MACHINE DRAWING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Discuss the conventional representation of materials and machine components.	1	-	-	-	2	-	-	-	-	1	-	1	1	-
CO2	Apply the principles of engineering drawing in machine drawing.	1	-	-	-	2	-	-	-	-	1	-	1	1	-
CO3	Construct various types of temporary and permanent fasteners.	1	-	-	-	2	-	-	-	-	1	-	1	1	-

	CO Statements	POs												PSOs	
CO4	Practice assembly drawings from the given part drawings for manufacturing.	1	-	-	-	2	-	-	-	-	1	-	1	1	-
CO5	Construct part drawings from the given assembly drawing.	1	-	-	-	2	-	-	-	-	1	-	1	1	-
Course Code	**201ME3L02 PRODUCTION TECHNOLOGY LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Demonstrate mold making process for casting process and sand preparation methods.	3	-	-	-	-	-	-	-	1	1	1	1	1	-
CO2	Identify basic knowledge of casting defects and their remedies.	3	-	-	-	-	-	-	-	1	1	1	1	1	-
CO3	Distinguish among various gas welding, arc welding and solid-state welding processes.	3	-	-	-	-	-	-	-	1	1	1	1	1	-
CO4	Apply the principles of sheet-metal forming process for making a component.	3	-	-	-	-	-	-	-	1	1	1	1	1	-
CO5	Produce the plastic object through different plastic processing techniques.	3	-	-	-	-	-	-	-	1	1	1	1	1	-
Course Code	**201ME3L03 FLUID MECHANICS AND HYDRAULIC MACHINES LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Calculate the head losses causing decrease in energy of flow experimentally and by the verification of Bernoulli s theorem.	-	1	2	-	-	-	-	-	2	1	-	-	-	2
CO2	Compare the flow meters for their better performing characteristics when used in pipes of turbines, etc.	-	1	2	-	-	-	-	-	2	1	-	-	-	2
CO3	Calculate the efficiencies of Centrifugal and Reciprocating pumps while maintaining similar conditions.	-	1	2	-	-	-	-	-	2	1	-	-	-	2
CO4	Evaluate performance characteristic curves and efficiencies of different hydraulic turbines.	-	1	2	-	-	-	-	-	2	1	-	-	-	2
CO5	Calculate the work done and efficiency of various vane shapes for turbine applications.	-	1	2	-	-	-	-	-	2	1	-	-	-	2
Course Code	**201SC3L03 JAVA PROGRAMMING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Make use of class, inheritance, interface and packages to develop solutions for complex problems	1	1	3	-	2	-	-	-	-	-	-	-	-	-
CO2	Develop error-handling techniques using exception handling.	2	3	1	-	2	-	-	-	-	-	-	-	-	-
CO3	Build java applications using Threads.	2	1	1	-	3	-	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
CO4	Apply event handling to create interactive applications.	2	1	3	-	2	-	-	-	-	-	-	-	-	-
CO5	Build applications using JDBC connectivity.	2	1	3	-	2	-	-	-	-	-	-	-	-	-
Course Code	**201MC3T03 BIOLOGY FOR ENGINEERS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Apply biological engineering principles, procedures needed to solve real-world problems.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Demonstrate the fundamentals of living things, their classification, cell structure and biochemical constituents.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Apply the concept of plant, animal and microbial systems and growth in real life Situations.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Explain genetics and the immune system to know the cause, symptoms, diagnosis and treatment of common diseases.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Demonstrate basic knowledge of the applications of biological systems in relevant industries.	1	-	-	-	-	-	-	-	-	-	-	-	-	-
IV SEM															
Course Code	**201BS4T15 NUMERICAL METHODS AND STATISTICAL TECHNIQUES**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Apply numerical methods to solve equations and interpolation of polynomials.	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO2	Apply numerical methods to solve initial value problems and problems involving integration.	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO3	Apply discrete and continuous probability distributions.	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO4	Compute the components of a classical hypothesis test.	3	2	-	-	-	-	-	-	-	-	-	-	1	-
CO5	Apply the statistical inferential methods based on small and large sampling tests.	3	2	-	-	-	-	-	-	-	-	-	-	1	-
Course Code	**201HS4T04 INDUSTRIAL ENGINEERING AND MANAGEMENT**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Identify the role of an industrial engineer and required managerial skill set.	-	-	-	-	-	1	-	2	1	-	-	2	1	-
CO2	Identify suitable plant layout design.	-	-	-	-	-	-	-	-	3	-	2	2	1	-

	CO Statements	POs												PSOs	
CO3	Develop the efficient work system & Prepare suitable quality control charts.	-	-	-	-	-	-	-	-	-	-	2	2	-	-
CO4	Summarize human resources against their job roles and wage incentives.	-	-	-	-	-	1	-	-	-	-	2	2	-	-
CO5	Analyze resources of projects through CPM and PERT techniques, update	-	-	-	-	-	1	-	2	-	3	-	2	-	-
Course Code	**201ME4T03 MECHANICS OF SOLIDS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Calculate stress, strain and principal stresses in bodies of varying cross-section, Composite bars.	3	2	2	2	-	-	-	-	-	-	-	-	3	-
CO2	Determine the shear force and bending moment diagrams for beams of various supports and loads.	3	2	1	1	-	-	-	-	-	-	-	-	3	-
CO3	Analyse the variation of bending and shear stresses across a beam cross-section.	3	2	2	2	-	-	-	-	-	-	-	-	3	-
CO4	Calculate the slope and deflection for beams of various load and support arrangements.	3	2	2	1	-	-	-	-	-	-	-	-	3	-
CO5	Compute the shear stresses due to application of twisting moment.	3	2	2	1	-	-	-	-	-	-	-	-	3	-
CO6	Evaluate the buckling loads for various columns.	3	2	1	-	-	-	-	-	-	-	-	-	3	-
Course Code	**201ME4T04 THEORY OF MACHINES -I**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the inversions of a kinematic chain and its applications	2	1	1	1	-	-	-	-	-	-	-	-	1	-
CO2	Construct the velocity and acceleration diagrams using Relative velocity method and Instantaneous centre method.	2	2	1	1	-	-	-	-	-	-	-	-	1	-
CO3	Construct displacement diagram and profile of Cam with different types of follower motions.	2	2	2	1	-	-	-	-	-	-	-	-	1	-
CO4	Calculate the velocities of different components of a Compound gear train and Epicyclic gear train	3	2	2	1	-	-	-	-	-	-	-	-	1	-
CO5	Construct the turning moment diagram of a flywheel	3	2	-	-	3	-	-	-	-	-	-	-	1	-
Course Code	**201ME4T05 THERMAL ENGINEERING - I**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Differentiate the ideal, air standard cycles and actual thermodynamic cycles.	2	1	-	-	-	-	-	-	-	-	-	1	-	2

	CO Statements	POs												PSOs	
CO2	Evaluate the Engine performance based on the experimental data.	3	3	-	-	-	-	-	-	-	-	1	1	-	2
CO3	Analyze the fueling system and combustion behavior of SI engine.	3	2	-	-	-	-	-	-	-	-	-	1	-	2
CO4	Analyze the fueling system and combustion behaviour of CI engine.	2	3	-	-	-	-	-	-	-	-	-	1	-	2
CO5	Explain the formation of emissions and its control strategies of bot SI & CI Engines.	2	1	-	-	-	-	-	-	-	-	-	2	-	2
Course Code	**201ME4L04 THEORY OF MACHINES LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Determine the critical speed of whirling of shaft and the position of sleeve against the controlling force and speed in governors.	3	2	1	-	-	-	-	-	-	-	-	1	1	-
CO2	Analyze the motion of motorized gyroscopic couple and cam profiles for various cam follower systems.	2	3	1	-	-	-	-	-	-	-	-	1	1	-
CO3	Calculate the frequency of damped as well as un-damped vibrations of a spring mass system and the moment of inertia of flywheel.	3	2	2	-	-	-	-	-	-	-	-	1	1	-
CO4	Apply the principles of balancing of masses to various links, mechanisms and engines.	2	3	1	-	-	-	-	-	-	-	-	1	1	-
CO5	Analyze the displacement, velocity and acceleration against cranck rotation in slider crank mechnigam.	3	2	1	-	-	-	-	-	-	-	-	1	1	-
Course Code	**201ME4L05 MECHANICS OF SOLIDS AND METALLURGY LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Demonstrate the material mechanical behaviour under various direct loads.	2	-	-	-	-	1	-	-	-	2	-	1	1	-
CO2	Calculate the mechanical strength of spring and cube.	3	-	-	-	-	1	-	-	-	2	-	1	1	-
CO3	Demonstrate the materials mechanical behaviour under various indirect loads.	2	-	-	-	-	1	-	-	-	2	-	1	1	-
CO4	Analyze the Structure of pure metals and alloys.	3	-	-	-	-	1	-	-	-	2	-	1	1	-
CO5	Caluclate the hardness of various treated and untreated steels.	2	-	-	-	-	1	-	-	-	2	-	1	1	-

	CO Statements	POs												PSOs	
Course Code	**201ME4L06 THERMAL ENGINEERING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Sketch the Valve Timing Diagram and Port Timing Diagram for IC Engines.	2	1	-	-	-	-	-	-	-	1	-	-	-	2
CO2	Determine the performance of various types of IC Engines.	3	2	-	-	-	-	-	-	-	1	-	-	-	2
CO3	Prepare the heat balance sheet for various types of IC Engines.	3	2	-	1	-	-	1	-	-	-	-	3	-	2
CO4	Calculate the frictional power in various types of IC Engines.	3	2	-	-	-	-	-	-	-	1	-	-	-	2
CO5	Analyze the performance of reciprocating air compressor.	3	2	-	1	-	-	1	-	-	-	-	3	-	2
Course Code	**201SC4L15 -PYTHON PROGRAMMING LAB**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Develop programs using conditional and iterative statements.	-	2	3	-	2	-	-	-	-	-	-	2	-	-
CO2	Make use of different data structures in solving complex problems.	-	2	3	-	2	-	-	-	-	-	-	2	-	-
CO3	Apply the concepts of functions and files in solving real time applications.	-	2	2	-	3	-	-	-	-	-	-	2	-	-
CO4	Build applications for handling exceptions.	-	1	2	-	3	-	-	-	-	-	-	2	-	-
CO5	Develop GUI applications.	-	1	2	-	3	-	-	-	-	-	-	2	-	-
Course Code	**201MC4T04 -ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Identify the concept of Traditional knowledge and its importance.	-	-	-	-	1	1	-	-	-	-	-	-	-	-
CO2	Explain the need and importance of protecting traditional knowledge.	-	-	-	-	1	1	-	-	-	-	-	-	-	-
CO3	Illustrate the various enactments related to the protection of traditional knowledge	-	-	-	-	1	1	-	-	-	-	-	-	-	-
CO4	Interpret the concepts of Intellectual property to protect the traditional knowledge.	-	-	-	-	1	1	-	-	-	-	-	-	-	-
CO5	Explain the importance of Traditional knowledge in Agriculture and Medicine.	-	-	-	-	1	1	-	-	-	-	-	-	-	-

	CO Statements	POs												PSOs	
Course Code	**201ME4H01 -AUTOMOTIVE AERODYNAMICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Demonstrate a knowledge and understanding ofaerodynamics in automotive field	1	2	1	-	-	-	-	-	-	-	-	-	-	1
CO2	Evaluate basic fluid theory	1	3	2	1	-	-	-	-	-	-	-	-	-	2
CO3	Analyse the Aerodynamic aspects of the Passenger Cars	3	2	2	2	-	-	-	-	-	-	-	-	-	2
CO4	Analyse the Aerodynamic aspects of the high performance cars	3	2	2	-	-	-	-	-	-	-	-	-	-	2
CO5	Analyse the Aerodynamic aspects of the Commercial vehicles	3	2	1	2	-	-	-	-	-	-	-	-	-	2
Course Code	**201ME5H05-AUTOMOTIVE SAFETY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Identity different safety systems and vehicle structural crashworthiness.	1	1	-	-	-	2	-	-	-	1	-	-	1	-
CO2	Analyse and simulate vehicle in barrier impacts and its influence on Biomechanics.	3	1	-	-	-	2	-	-	-	1	-	-	3	-
CO3	Design vehicle safety systems as an Active Safety aspect.	3	1	-	-	-	2	-	-	-	1	-	-	3	-
CO4	Analyze the Occupant protection as a Passive Safety aspect.	3	1	-	-	-	2	-	-	-	1	-	-	3	-
CO5	Analyse pedestrian safety during crashing.	3	1	-	-	-	2	-	-	-	1	-	-	3	-
Course Code	**201ME6H09-VEHICLE BODY ENGINEERING**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Discuss the different types of car body design and its safety features.	1	2	-	-	1	-	-	-	-	1	-	-	-	1
CO2	Select a suitable body optimization technique to minimize drag andable to describe the wind tunnel testing procedure.	1	2	-	-	1	-	-	-	-	1	-	-	-	2
CO3	Classify the various types of bus body construction and able to identify the body layout.	1	2	-	-	1	-	-	-	-	1	-	-	--	1
CO4	Describe the different types of commercial vehicles and its design.	1	2	-	-	1	-	-	-	-	1	-	-	-	2
CO5	Explain the various types of materials and painting techniques used in automobiles	1	2	-	-	1	-	-	-	-	1	-	-	-	2

	CO Statements	POs												PSOs	
Course Code	**201ME7H13-VEHICLE DYNAMICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Design and Develop the Mathematical Models from Physical systems.	3	1	2	-	-	-	-	-	-	1	-	-	3	-
CO2	Analyze the different Road Loads on a given vehicle.	3	1	2	-	-	-	-	-	-	1	-	-	3	-
CO3	Analyze the different Tyre Mechanics under static and dynamic conditions.	3	1	2	-	-	-	-	-	-	1	-	-	3	-
CO4	Design and Analyze the Steering system of a vehicle for its steady state as well asdifferent driving conditions.	3	1	2	-	-	-	-	-	-	1	-	-	3	-
CO5	Analyze the Dynamic Axle loads transfer due to gradient, low speed acceleration.	3	1	2	-	-	-	-	-	-	1	-	-	3	-
Course Code	**201CE4M01-ENGINEERING MECHANICS**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Determine the resultant force and moment for a given force system	3	3	3	-	-	-	-	-	-	-	-	1	3	-
CO2	Solve the member forces in trusses and Apply concept of Virtual work to find the work done by force and couple	3	2	1	-	-	-	-	-	-	-	-	1	3	-
CO3	Solve the centre of gravity and moment of inertia for various geometric shapes	3	2	1	-	-	-	-	-	-	-	-	1	3	-
CO4	Determine the displacement, velocity and acceleration relations in dynamic systems.	3	2	1	-	-	-	-	-	-	-	-	1	3	-
CO5	Apply the concepts of kinematics, kinetics, work - energy and impulse – momentum methods to particle motion	3	3	3	-	-	-	-	-	-	-	-	1	3	-
Course Code	**201ME4M01-MATERIALS TECHNOLOGY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the concepts of structure of metals and mechanical behavior underdifferentloading conditions.	2	-	-	-	-	-	-	-	-	-	-	-	1	-
CO2	Apply the concepts of equilibrium diagrams to make use of various alloys in various industrial applications	2	-	-	-	-	1	1	-	-	-	-	-	1	-
CO3	Discuss the concept of solidification of alloys and the analyze phases of iron-iron carbide equilibrium diagram.	2	-	-	-	-	-	-	-	-	-	-	-	1	-
CO4	Apply the processes of heat treatment on different types of Cast irons and Steels.	2	-	-	-	-	2	2	-	-	-	-	-	1	-
CO5	Use the concepts of non-ferrous metals and alloys in industrial applications	2	-	-	-	-	1	1	-	-	-	-	-	1	-

	CO Statements	POs												PSOs	
Course Code	**201ME4M02-PRODUCTION TECHNOLOGY**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	Explain the basics of casting and its aplications.	3	-	-	-	-	-	-	-	-	-	2	1	2	-
CO2	Demonstrate various special casting processes.	3	-	-	-	-	-	-	-	-	-	2	1	2	-
CO3	Distinguish different joining techniques.	3	-	-	-	-	-	-	-	-	-	2	1	2	-
CO4	Explain the basics of sheet metal forming and plastics processing techniques.	3	-	-	-	-	-	-	-	-	-	2	1	2	-
CO5	Summarize the bulk metal deforming process	3	-	-	-	-	-	-	-	-	-	2	1	2	-