

G. PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY: KURNOOL

DEPARTMENT OF MECHANICAL ENGINEERING

The following are the Course Outcomes of all the courses for the Academic Year 2019-2020 from I-B.Tech to Iv B.Tech

R19 REGULATION

I B.TECH I SEM

Course Name: MATHEMATICS-I

#	COURSE OUTCOMES
CO1	Develop the use of matrix algebra techniques that is needed by engineers for practical applications
CO2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem
CO3	Utilize mean value theorems to real life problems
CO4	familiarize with functions of several variables which is useful in optimization
CO5	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems

Course Name: ENGINEERING PHYSICS

#	COURSE OUTCOMES
CO1	apply mechanics for solving engineering problems
CO2	apply the principles of acoustics for noise cancellation and in designing buildings
CO3	analyze the applications of ultrasonics in various engineering fields
CO4	explain the relationship between elastic constants
CO5	interpret the concepts of lasers and optical fibers in various applications

Course Name: COMPUTER PROGRAMMING

#	COURSE OUTCOMES
CO1	Comprehend the fundamental concepts of computer hardware and problem solving Abilities
CO2	Knowledge on the basic concepts of algorithms, flow charts and python programming
CO3	Ability to analyze the procedure for providing input and acquire output from the program along with implementation of control statements
CO4	Interpret the importance of functions in programming

CO5	Analyze 3- dimensional coordinate systems and utilization of special functions.
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Course Name: **COMMUNICATIVE ENGLISH**

#	COURSE OUTCOMES
CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
CO2	Apply grammatical structures to formulate sentences and correct word forms
CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions
CO4	Evaluate reading/listening texts and to write summaries based on global comprehension of these texts.
CO5	Create a coherent paragraph interpreting a figure/graph/chart/table

Course Name: **ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB**

#	COURSE OUTCOMES
CO1	Become active participants in the learning process and acquire proficiency in spoken English.
CO2	Speak with clarity and confidence thereby enhance employability skills.
CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable Division for better listening and speaking comprehension.
CO4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
CO5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Course Name: **COMMUNICATIVE ENGLISH LAB**

#	COURSE OUTCOMES
CO1	Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
CO2	Apply communication skills through various language learning activities
CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4	Evaluate and exhibit acceptable etiquette essential in social and professional Settings
CO5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Course Name: **ENGINEERING PHYSICS LAB**

#	COURSE OUTCOMES
CO1	estimate the mechanical properties of materials

CO2	determine moment of inertia of a flywheel
CO3	measure the velocity of ultrasonics in liquid by applying the basic concepts of ultrasonics
CO4	determinethe wavelength of laser, particle size, numerical aperture and acceptance angle by applying the principles of lasers and optical fibres
CO5	Measure the elastic constants, Poisson's ratio of the material and verifiesHooke'slaw

Course Name: **COMPUTER PROGRAMMING LAB**

#	COURSE OUTCOMES
CO1	Design solutions to mathematical problems & Organize the data for solving the problem
CO2	Understand and implement modular approach using python
CO3	Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc
CO4	Understands about files and its applications.
CO5	Develop real-world applications, files and exception handling provided by python

I B.TECH II SEM

Course Name: **MATHEMATICS-II**

#	COURSE OUTCOMES
CO1	Apply the mathematical principles to solve second and higher order differential equations
CO2	Analyze the non- homogeneous linear differential equations along with method of variation of parameters
CO3	Apply the concept of higher order differential equations to the various streams like Mass spring system and L-C-R Circuit problems
CO4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs
CO5	Analyze the vector calculus involving divergence, curl and their properties along with vector identities

Course Name: **ENGINEERING CHEMISTRY**

#	COURSE OUTCOMES
CO1	Compare the quality of drinking water with BIS and WHO standards. Illustrate problems associated with hard water and demonstrate industrial water treatment process.
CO2	Demonstrate the corrosion prevention method and apply Nernst equation for calculating electrode and cell potentials.
CO3	Analyze the classification of fuels along with their characteristics and calorific value involving solid fuels, liquid and gaseous fuels.

CO4	Explain different types of polymers and their applications, demonstrate the mechanism of conduction and conducting polymers.
CO5	Summarize the underlying chemistry of engineering materials involving Cement, lubricants.

Course Name: **DATA STRUCTURES**

#	COURSE OUTCOMES
CO1	Learn to choose appropriate data structure as applied to specified problem definition.
CO2	Design and analyze linear and non-linear data structures.
CO3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs in python
CO4	Demonstrate advantages and disadvantages of specific algorithms and data structures
CO5	Develop a base for advanced computer science study.

Course Name: **ENGINEERING MECHANICS**

#	COURSE OUTCOMES
CO1	To analyze the basic concepts of rigid bodies subjected to different types of loads and supports.
CO2	To analyze the motion of the bodies considering friction and external loads.
CO3	To determine Centroids and area moment of inertia and centre of gravity and mass moment of inertia of simple and composite figures.
CO4	To analyse the motion of particle without considering forces and considering forces
CO5	To analyze the perfect frames using method of joints, method of sections & tension coefficient method for vertical , horizontal and inclined loads and concepts of Mechanical vibrations. (Simple, compound and torsional pendulums)

Course Name: **ENGINEERING GRAPHICS AND COMPUTER AIDED DRAFTING**

#	COURSE OUTCOMES
CO1	Learning conventions of Drawing, which is an Universal Language Of Engineers. Also Interpret and Sketch the various curves which Including ellipse, parabola, hyperbola
CO2	Analyze and draft the orthographic projections of points and lines
CO3	Analyze and sketch the orthographic projections of planes and solids
CO4	Revise and Improve their visualization skills in the development of new products
CO5	Construct the isometric projection of an object employing orthographic projections

Course Name: **ENGINEERING CHEMISTRY LAB**

#	COURSE OUTCOMES
CO1	Determine the cell constant and conductance of solutions
CO2	Prepare advanced polymer materials
CO3	Determine the physical properties like surface tension, adsorption and viscosity
CO4	Estimate the Iron and Calcium in cement
CO5	Calculate the hardness of water and calculation of dissolved oxygen percentages

Course Name: **DATA STRUCTURES LABORATORY**

#	COURSE OUTCOMES
CO1	Learn to choose appropriate data structure as applied to specified problem definition.
CO2	Design and analyze linear and non-linear data structures.
CO3	Design and implement algorithms for manipulating linked lists, stacks, queues, trees and graphs in python
CO4	Implement recursive algorithms as they apply to trees and graphs.
CO5	Formulate new solutions for programming problems or improve existing code using learned algorithms and data structures

Course Name: **APPLIED MECHANICS LABORATORY**

#	COURSE OUTCOMES
CO1	Acquire knowledge of static and dynamic behavior of the bodies.
CO2	Acquire the knowledge, so that they can understand physical phenomenon with the help of various theories.
CO3	Explain the physical phenomenon with help of diagrams.
CO4	with broad vision with the skills of visualizing and developing their own ideas, and to convert those ideas in to engineering problems and solving those problems with the acquired knowledge of the Engineering mechanics
CO5	Apply the principles of mechanics to analyze structural and machine elements.

Course Name: **CO-ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	To acquire the knowledge about the characteristics and working principles of semiconductor diodes, Bipolar Junction Transistor
CO2	Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
CO3	Able to Measure the amplitude and frequency utilizing oscilloscope and analyze the fabrication processes of printed circuit boards
CO4	Apply wood working skills in real world applications. Build different parts with metal sheets in real world applications
CO5	Apply fitting operations in various applications

II B. TECH I SEM

Course Name: **TRANSFORM TECHNIQUES AND NUMERICAL METHODS**

#	COURSE OUTCOMES
CO1	Apply Laplace transforms to solve ordinary differential equations.
CO2	Build Fourier series and Fourier transforms of a given function.
CO3	Apply numerical methods to solve algebraic and transcendental equations.
CO4	Derive interpolating polynomials using interpolation formulae.
CO5	Solve differential and integral equations numerically.

Course Name: **THERMODYNAMICS**

#	COURSE OUTCOMES
CO1	Apply the concepts of thermodynamics in the form of Work and Heat to various engines
CO2	Make use of energy equations for steady flow of fluids.
CO3	Make use of energy equations for steady flow of fluids.
CO4	Determine the efficiency of the cycles for various applications
CO5	Analyze basic laws of ideal gas, power cycles and refrigeration cycles for various applications

Course Name: **MECHANICS OF SOLIDS**

#	COURSE OUTCOMES
CO1	Analyze the types of stresses, strains and elastic constants of mechanical components
CO2	Construct shear force and bending moment diagrams for beams subjected to various loads.
CO3	Formulate the bending and shear stress equations and shear stress distribution for beams and shafts
CO4	Solve problems related to slope and deflection equations for beams subjected to various loads
CO5	Estimate hoop and longitudinal stresses in thin and thick cylinders

Course Name: **MATERIAL SCIENCE AND ENGINEERING**

#	COURSE OUTCOMES
CO1	Identify the properties of the crystallization of ferrous and nonferrous materials.
CO2	Construct the equilibrium diagrams by experimental methods.
CO3	Make use of advanced composite materials in manufacturing of components and sophisticated machine.
CO4	Improve the properties of ferrous and nonferrous materials using different heat treatment processes.
CO5	Select the suitable materials for various engineering applications.

Course Name: **ENGINEERING DRAWING FOR MECHANICAL ENGINEERS**

#	COURSE OUTCOMES
CO1	Apply orthographic projection concepts to draw projections of right regular solids.
CO2	Make use of sectional planes to draw sectional views of a solid.
CO3	Apply isometric projection concepts to draw isometric projections of right regular solids and sectioned solids
CO4	Construct Intersection curves when one right regular solid penetrates another right regular solid.
CO5	Make use of perspective projection concepts to draw simple planes and right regular solids.

Course Name: **MECHANICS OF SOLIDS LABORATORY**

#	COURSE OUTCOMES
CO1	Analyze the stress-strain diagram for different materials using universal testing machine
CO2	Compare the hardness values for various materials using hardness testing machine
CO3	Determine modulus of elasticity, bending stresses and deflection for different beams
CO4	Estimate the stiffness and shear modulus of springs using tension test
CO5	Asses the toughness and impact strength using impact testing machine.

Course Name: **MATERIAL SCIENCE AND ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	Make use of different material samples for investigating micro structures.
CO2	Interpret the microstructures of materials using metallurgical microscope

CO3	Measure the hardenability of mild steel samples.
CO4	Improve the properties of materials using various heat treatment processes.
CO5	Compare the properties of different materials with temperature variation.

Course Name: **COMPUTER AIDED DRAFTING LABORATORY**

#	COURSE OUTCOMES
CO1	Identify the commands in AutoCAD software to draw required objects
CO2	Create the mechanical components in 2 – Dimensional using AutoCAD commands
CO3	Draw the projections of solids using AutoCAD commands
CO4	Draw the sectional views of solids using AutoCAD commands
CO5	Draw the orthographic views of solids from isometric views using AutoCAD commands

Course Name: **QUANTITATIVE APTITUDE AND REASONING – I**

#	COURSE OUTCOMES
CO1	Identify the problems by applying mathematical fundamentals
CO2	Apply the suitable logical methods to solve the problems
CO3	Solve the various problems by using quantitative mathematical fundamentals
CO4	Analyse the comprehensive data with logical ability

Course Name: **ENVIRONMENTAL SCIENCE**

#	COURSE OUTCOMES
CO1	Solve environmental problems through higher level of personal involvement and interest.
CO2	Apply ecological morals to keep up amicable connection among nature and human beings.
CO3	Recognize the interconnectedness of human dependence on the earth's ecosystems.
CO4	Apply environmental laws for the protection of environment and wildlife.
CO5	Influence society in proper utilization of goods and services

II B. TECH II SEM

Course Name: **FLUID MECHANICS & HYDRAULIC MACHINES**

#	COURSE OUTCOMES
CO1	Analyze properties of fluids under different conditions
CO2	Identify the fluid flow patterns using different equations
CO3	Determine fluid flow using devices and principles of fluid mechanics
CO4	Apply boundary layer concepts to various types of flow and forces exerted by jet on vanes
CO5	Estimate the performance of hydraulic turbines and pumps for various design considerations

Course Name: **KINEMATICS OF MACHINERY**

#	COURSE OUTCOMES
CO1	Differentiate mechanism, machine and structure with respect to kinematic motions.
CO2	Analyse the mechanism of straight-line motion, steering and Hooke's joint as suitable applications.
CO3	Draw velocity and acceleration diagrams by using relative velocity method and instantaneous center method.
CO4	Solve the problems related to gears and gear trains using suitable methods.
CO5	Analyze cam profile design with specified contour

Course Name: **I.C. ENGINES**

#	COURSE OUTCOMES
CO1	Identify constructional features and working principles of the S.I and C.I engines.
CO2	Analyze the stages of combustion in S.I and C.I engines for better performance.
CO3	Apply various performance methods to increase the engine efficiency.
CO4	Identify constructional features and working principles of air compressors.
CO5	select suitable automobile systems for internal combustion engine.

Course Name: **MANUFACTURING TECHNOLOGY**

#	COURSE OUTCOMES
CO1	Select suitable material for preparing the patterns
CO2	Make use of moulding systems to prepare a product

CO3	Recommend the melting and solidification processes for designing the gating system.
CO4	Identify the suitable special casting and welding processes used for the given application
CO5	Identify the process parameters and defects to get quality product

Course Name: **COMPUTER AIDED MACHINE DRAWING**

#	COURSE OUTCOMES
CO1	Construct different materials used in engineering practice through conventional representation.
CO2	Develop skills related to the dimensioning, sectioning and development of views.
CO3	Apply suitable techniques to draw various parts of assembly drawing.
CO4	Make use of the orthographic and isometric projections to draw machine elements
CO5	Plan the part or assembly drawings as per the conventions.

Course Name: **FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY**

#	COURSE OUTCOMES
CO1	Analyze procedure for performance of various experiments
CO2	Calibrate flow discharge measuring devices used in pipes, channels and tanks.
CO3	Analyze the fluid flow through pipes with different materials and sizes.
CO4	Determine coefficient of discharge of fluid flow through pipes
CO5	Evaluate the performance analysis of various pumps and turbines.

Course Name: **I.C ENGINES LABORATORY**

#	COURSE OUTCOMES
CO1	Construct valve and port timing diagram of SI engine and CI engine.
CO2	Analyze the influence of variations in TDC and BDC operations of I.C engine
CO3	Calculate the power and efficiencies of I.C engines.
CO4	Test the performance of IC engine at various loads and Air fuel ratio.
CO5	Calculate the efficiency of reciprocating air compressor

Course Name: **MANUFACTURING TECHNOLOGY LABORATORY**

#	COURSE OUTCOMES
CO1	Identify various casting and welding equipments used in manufacturing processes

CO2	Choose suitable Sand properties of green sand to get quality specimen.
CO3	Determine the sequence of process to complete a job
CO4	Make use of various welding, foundry and forming equipments to prepare the job
CO5	Apply pattern making procedure for casting process

Course Name: **HUMAN VALUES AND PROFESSIONAL ETHICS**

#	COURSE OUTCOMES
CO1	Apply human values and ethics in professional life.
CO2	Develop the moral ideals to maintain good relationships with people.
CO3	Solve environmental related problems by keeping health of human being into consideration.
CO4	Make use of the fundamental rights and human rights in life for individual dignity
CO5	Build the sound health system both physically and mentally by practicing yoga, karate, sports etc.

III B.TECH I SEM

Course Name: **THERMAL ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply power cycles and efficiency enhancement methods to generate power
CO2	Calculate the chimney height and draught for maximum discharge
CO3	Determine the characteristics of flow through nozzle
CO4	Construct the various velocity triangles of steam turbines
CO5	Analyze the working principle and performance of various thermal equipment

Course Name: **DYNAMICS OF MACHINERY**

#	COURSE OUTCOMES
CO1	Apply gyro-principles to stabilize the motion of vehicle.
CO2	Analyse the forces of the Flywheel in IC Engine
CO3	Estimate the range of speeds of various governors suitable for applications
CO4	Solve problems on balancing of rotating masses and reciprocating masses in V- engine and multi cylinder engines

CO5	Evaluate the critical speed of the shaft and simple vibration calculations of rotor system
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Course Name: **DESIGN OF MACHINE ELEMENTS**

#	COURSE OUTCOMES
CO1	Apply the design process and theories of failure for designing different machine elements.
CO2	Solve the problems related to simple and complex components under different loads using Goodman's and Soderberg's criteria.
CO3	Estimate the stress induced in riveted and bolted joints under different load conditions
CO4	Analyze the failures in shafts, cotter joint and knuckle joint subjected to various loads.
CO5	Design the keys, rigid and flexible couplings as per the standards suitable to applications.

Course Name: **MACHINE TOOLS LABORATORY**

#	COURSE OUTCOMES
CO1	Identify various machine tools used in machine shop
CO2	Distinguish the constructional features and operations of general purpose machines
CO3	Determine the sequence of operations to process a job
CO4	Make use of various machining operations to perform metal cutting
CO5	Prepare models using required machine tools

Course Name: **CAD / CAM LABORATORY**

#	COURSE OUTCOMES
CO1	Construct complex geometries of machine components in sketcher mode.
CO2	Create programs to generate analytical and synthetic curves used in engineering practice.
CO3	Plan 2D and 3D drawings based on design constraints
CO4	Applying CAD/CAM concept to product design and manufacturing.
CO5	Analyze G and M codes for turning and milling components.

Course Name: **PRODUCTION DRAWING PRACTICE**

#	COURSE OUTCOMES
CO1	Construct the conventional representation of different materials used in engineering practice.
CO2	Identify the machine elements and designation of material.
CO3	Apply the drawing techniques to draw various parts of assembly drawing, tolerances, roughness.
CO4	Improve visualization ability of surface roughness and its indications with respect to the material surface
CO5	Plan the production drawings based on design constraints.

Course Name: **GENDER SENSITIZATION**

#	COURSE OUTCOMES
CO1	Develop a better understanding of important issues related to gender in contemporary India
CO2	Sensitize to basic dimensions of the biological, sociological, psychological and legal aspects of gender
CO3	Acquire insight into the gendered division of labour and its relation to politics and economics
CO4	Equip to work and live together as equal
CO5	Develop a sense of appreciation of women in all walks of life

III B.TECH II SEM

Course Name: **MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

#	COURSE OUTCOMES
CO1	Analyze the concepts of managerial economics and financial accounting to make better decisions in the organization
CO2	Analyze the demand, production, cost and break even to know interrelationship among variables and their impact
CO3	Classify the market structure to decide the fixation of suitable price
CO4	Apply capital budgeting techniques to select best investment opportunity

CO5	Analyze and prepare financial statements to assess financial health of business.
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Course Name: **DESIGN OF TRANSMISSION SYSTEMS**

#	COURSE OUTCOMES
CO1	Assess the type of stresses induced in crane hooks, C-clamps and drives subjected to various loadings.
CO2	Design different types of bearings for suitable applications.
CO3	Design springs and power screws under different load conditions as per the practical situation.
CO4	Solve the problems related to spur and helical gears for power transmission.
CO5	Analyze the stresses induced in IC engine parts subjected to various loads.

Course Name: **HEAT TRANSFER**

#	COURSE OUTCOMES
CO1	Apply laws of heat transfer in thermal analyses of engineering systems.
CO2	Calculate the amount of heat transfer in conduction, convection and radiation modes.
CO3	Discuss the concept of conduction heat transfer and its applications.
CO4	Analyze the free and forced convective heat transfer for fluids.
CO5	Analyze the concept of radiative heat transfer between black bodies and grey bodies.

Course Name: **METAL FORMING PROCESS**

#	COURSE OUTCOMES
CO1	Apply hot working and cold working processes to workpiece for obtaining a final product
CO2	Apply the mechanism of deformation for different metals
CO3	Analyze the effect of process parameters influencing metal forming
CO4	Identify the metal forming process used for given application
CO5	Examine effects of friction, lubrication and causes of common defects in metal forming

Course Name: **NON CONVENTIONAL SOURCE OF ENERGY**

#	COURSE OUTCOMES
CO1	Identify various conventional and non-conventional sources of energy.
CO2	Estimate the energy collection using suitable equipment
CO3	Compare different energy conversion systems within the available resources for better utilization
CO4	Make use of the suitable energy storage methods for real-time requirements
CO5	Analyze the advanced power generation systems like Magneto Hydro Dynamics and other methods for future requirements.

Course Name: **HEAT TRANSFER LABORATORY**

#	COURSE OUTCOMES
CO1	Analyze thermal conductivity in various materials.
CO2	Calculate heat transfer coefficient in various materials.
CO3	Select appropriate materials for improving effectiveness of heat transfer.
CO4	Test the performance and there by improve effectiveness of heat exchanger.
CO5	Calculate emissivity and Stefan's Boltzmann constant for various bodies through radiation.

Course Name: **MATLAB PROGRAMMING**

#	COURSE OUTCOMES
CO1	Understand the use of software tools for modelling and analysis of mathematical concepts for engineering applications
CO2	calculate the inverse of any matrix using MATLAB
CO3	Model and analyze Monte-Carlo simulation for suitable applications
CO4	Assess the Standard Normal Distribution and its importance in engineering applications
CO5	Model and analyze simple engineering concepts and its importance in engineering applications

Course Name: **INDIAN CONSTITUTION AND MULTICULTURALISM**

#	COURSE OUTCOMES
CO1	Understand historical background of the constitution making and its importance for building a democratic India.

CO2	Explain the role of President and Prime Minister.
CO3	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
CO4	Understand the value of the fundamental rights and duties for becoming good citizen of India
CO5	Analyze the decentralization of power between central, state and local self-government.

IV B. TECH I SEM

Course Name: **OPERATION RESEARCH**

#	COURSE OUTCOMES
CO1	Apply various Operations Research models and methods to real world problems.
CO2	Solve Linear Programming, assignment, sequencing, game theory, queuing, transportation and project management problems for optimum solution.
CO3	Evaluate various alternatives available to find optimal solution for real world problems.
CO4	Choose the best strategies to maximize the profit or minimize loss in the presence of a competitor.
CO5	Decide the best operating policy for the efficient use of resources.

Course Name: **METROLOGY AND MEASUREMENTS**

#	COURSE OUTCOMES
CO1	Understand the Limits, Fits and Tolerance. Indian standard system.
CO2	study the different types of Comparators, optical measuring instruments, flatness measurement methods and measuring methods of surface roughness.
CO3	Understand Screw thread elements and measuring methods, Gear tooth profile measurement, CMM, Alignment tests on lathe, milling and drilling machine tools.
CO4	Understand working of various instruments used for measuring for displacement, temperature and pressure.
CO5	understand working of various instruments used for measuring for flow, speed, stress, strain and Vibration

Course Name: **AUTOMOBILE ENGINEERING**

#	COURSE OUTCOMES
CO1	Identify components of various automobile systems including turbo chargers and superchargers
CO2	Examine the environmental implications of automobile emissions

CO3	Analyze brakes, steering and suspension systems of engine for better performance.
CO4	Analyze the effect of electrical and transmission system on the performance of an automobile engine.
CO5	Discuss the purpose and methods of various automobile systems and their applications.

Course Name: **FINITE ELEMENT METHOD**

#	COURSE OUTCOMES
CO1	Understand the concepts behind formulation methods in FEM.
CO2	Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.
CO3	Develop element characteristic equation and generation of global equation.
CO4	Able to apply suitable boundary conditions to a global equation for bars, trusses, beams, circular shafts, heat transfer, fluid flow, axi symmetric and dynamic problems
CO5	Able to apply suitable boundary conditions to a global equation for solve them displacements, stress and strains induced

Course Name: **METROLOGYANDMEASUREMENTS**

#	COURSE OUTCOMES
CO1	Understand the Limits, Fits and Tolerance. Indian standard system.
CO2	study the different types of Comparators, optical measuring instruments, flatness measurement methods and measuring methods of surface roughness.
CO3	Understand Screw thread elements and measuring methods, Gear tooth profile measurement, CMM, Alignment tests on lathe, milling and drilling machine tools.
CO4	Understand working of various instruments used for measuring for displacement, temperature and pressure.
CO5	understand working of various instruments used for measuring for flow, speed, stress, strain and Vibration

Course Name: **COMPUTER AIDED ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	Apply mathematical skills in the design and analysis of model generations and analysis.
CO2	Exercise analytical skills in model verifications and interpretations of FEA results.
CO3	Apply knowledge from component design in projects

CO4	Detailing a conceptual design involves determining material specifications, Dimensions, tolerances, performance measures, etc
CO5	Understand the basic concepts of modelling for analysis and manufacturability

Course Name: **FUNDAMENTALS OF IOT**

#	COURSE OUTCOMES
CO1	Analyze IoT applications using IoT enablers and connectivity layers, components.
CO2	Distinguish sensors and actuators in terms of their functions and applications
CO3	Interface I/O devices, Sensors using Arduino UNO
CO4	Develop Raspberry Pi Interfacing programs using python concepts
CO5	Apply Raspberry Pi and Arduino Uno programming for IoT based projects

IV B.Tech II Sem

Course Name: **INDUSTRIAL ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply the knowledge in management tools to apply in technical organizations.
CO2	Make use of plant layout design to facilitate material flow and processing of a product in the most efficient manner through the shortest possible time.
CO3	Apply various work study techniques towards productivity improvement in industrial and in real life environment.
CO4	Determine the inventory and to be able to apply selected techniques for its control and management under different circumstances.
CO5	Apply quality improvement techniques and methods for improvement of quality of product and process

Course Name: **BASIC CIVIL ENGINEERING**

#	COURSE OUTCOMES
CO1	Classify various materials and components used in building construction

CO2	List out different domains like Structural, Transportation and Geotechnical Engineering in Civil engineering stream
CO3	Identify types of soils and foundations for various structures
CO4	Measure the linear and angular parameters using concepts of surveying
CO5	Develop water supply system for domestic and irrigational needs