SANTHIRAM ENGINEERING COLLEGE:: NANDYAL

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NH-40, Nandyal – 518501 :: Kurnool Dist. A.P.

DEPARTMENT : MECHANICAL ENGINEERING

COURSE OUTCOMES **REGULATION : R15**

Year/Sem	S.No.	Subject Name	SUB CODE	COURSE OUTCOMES	
	1	**MATHEMATICS –III**	15A54301	CO1	To learn evaluation policy of Elementary row transformations-Rank – Echelon form, normal form – Consistency of System of Linear equations. Linear transformations. Hermitian, Skew-Hermitian and Unitary matrices and their properties. Eigen Values, Eigen vectors for both real and complex matrices. Cayley – Hamilton Theorem and its applications – Diagonolization of matrix. Calculation of powers of matrix and inverse of a matrix. Quadratic forms – Reduction of quadratic form to canonical form and their nature.
				CO2	To determined and calucated by Solution of Algebraic and Transcendental Equations: The Bisection Method – The Method of False Position– Newton-Raphson Method, Solution of linear simultaneous equation: Crout's triangularisation method, Gauss - Seidal iteration method.
				CO3	To determined and calucated by Newton's forward and backward interpolation formulae – Lagrange's formulae. Gauss forward and backward formula, Stirling's formula, Bessel's formula.
				CO4	To determined and calucated by Curve fitting: Fitting of a straight line – Second degree curve – Exponentional curve-Power curve by method of least squares. Numerical Differentiation for Newton's interpolation formula. Numerical Integration: Trapezoidal rule – Simpson's 1/3 Rule – Simpson's 3/8 Rule
				CO5	To calculated by Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods. Numerical solutions of Laplace equation using finite difference approximation.
	2	**MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**	15A52301	CO1	The aim of the unit to understand the Importance of managerial economics and analyzing of demand.
				CO2	To understand the Production function & Analyzing the cost concepts with the evaluating the BEP.
				CO3	To applying the market structure and creating the new economic environment.
				CO4	To understand the financial accounting and evaluate the ratio analysis.
				CO5	The student understand and Evaluating the capital and capital budgeting.
				CO1	Students will able to understand basic concepts of stress and strain in solids and learn concept stress strain curve for different materials. Students to Analyze the temperature stress in varying of bars and composite bars.

	3	**MECHANICS OF SOLIDS**	15A01308	CO2	solving complex problems.
				CO3	Students can learn concept of simple bending and determination of stresses in different Sections.
				CO4	Estimate the torsional load over shaft and solve deflection of beams under various loading Conditions.
				CO5	To analyze the cylindrical shells under circumferential and radial loading.
	4	**ENGINEERING DRAWING FOR MECHANICAL ENGINEERS**	15A03301	CO1	To Analyze the problem to sections and develop the surfaces.
				CO2	To Developing the pictorial views of a given sectional solids.
				CO3	To Developing the orthographic views from pictorial views of a given engineering component.
II YEAR I SEM				CO4	To Identify the views for interpenetration of right regular solids
				CO5	To Draw perspective views of an object/solid using different methods.
	5	**ENGINEERING MECAHNICS**	15A03302	CO1	To understand the basic Concepts of Forces ,and Newton Laws basics of mechanics.
				CO2	Describe basics of Friction and its types and problems on friction and screw jack problems.
				CO3	Describe basic Concepts of Center of Gravity and Movements of Inertia .
				CO4	Formulate and analyze a Kinetics and Kinematics of Mechanics.
				CO5	To understand the basic Concepts of Trusses and problems on Trusses.
	6	**THERMODYNAMICS**	15A03303	CO1	transfer in the form of Work and Heat with various applications.
				CO2	Understand the Energy transformation occurs from one form into another form in open and closed systems and applying steady flow energy equation and mass balance equation to various applications.
				CO3	Understand the Major difference in working of a heat engine, refrigerator and heat pump. Calculate the maximum efficiency of a cycle. Calculating entropy change for a process, maximum available energy.
				CO4	Understand the method drawing phase equilibrium diagrams like P-v, h-s, T-s and P-T of a pure substance. Usage of steam tables and mollier diagrams in solving problems. The cooling / heating effect of throttling process. Thermodynamic relations.
				CO5	To understand the basic Concepts the concept of ideal cycles for different engines and their working principle. Drawing P-V and T-S diagrams for various air standard cycles and calculating work output, efficiency, mean effective pressure of each cycle.
				CO1	To understand the introduction to Computer Aided Drafting soft ware packages
				CO2	To understand the practice on basic elements of a Computer Aided Drafting packages
				CO3	To understand the practice on features of a Computer Aided Drafting packages

	7	**COMPUTER AIDED DRAFTING LAB**	15A03304	CO4	To understand the Computer Aided Drafting soft ware Commands Easy to drafting of solids and intersection of solids
				CO5	To understand the Computer Aided Drafting soft ware Commands Easy to drafting of perfective views
				CO6	To understand the Computer Aided Drafting soft ware Commands Easy to drafting of orthographic views of simple parts
	8	**MECHANICS OF SOLIDS**	15A01309	CO1	Determine Young's Modulus of solids under tensile & compressive loads.
				CO2	Calculate the Young's Modulus of beams under bending loads.
				CO3	Determine the shear modulus of solids under torsional loads.
				CO4	Calculate the strength of solids under impact loads.
				CO5	Evaluate the behavior of helical springs under static loads.
				CO6	Estimate the hardness of solids under gradual loads.
	1	**FLUID MECHANICS & HYDRAULIC MACHINES**	15A01510	CO1	To understand the Basic concepts of fluid mechanics and, fluid statics, fluid kinematics, fluid dynamics.
				CO2	To understand and apply on major losses and minor losses to find the pressure, velocity from the flow measuring devices measuring devices.
				CO3	To understand and apply the concepts to find the impact in different positions of jets.
				CO4	To understand and create the velocity triangles accordingly the performance in turbines.
				CO5	To understand the basics of centrifugal pump and work done by it.
	2	**THERMAL ENGNERRING-II**	15A03501	CO1	To acquire knowledge of power cycles and improvement performance of power cycles.
				CO2	Students can able to understand the working of various steam boilers and distinguish mountings and accessories.
				CO3	To understand the working of steam nozzles and apply the principles for finding solutions to engineering problems.
				CO4	To understand the working of impulse and reaction turbines and apply the principles for finding solutions to engineering problems.
				CO5	To understand the working of gas turbines and jet propulsions and apply the principles for finding solutions to engineering problems.
	3	**DYNAMICS OF MACHINERY**	15A03502	CO1	Understand and explain the basic concepts of friction in pivots and collars with uniform pressure and uniform wear, and also to solve the numerical problems on brakes, clutches and dynamometers
				CO2	Apply gyroscopic principles on Aeroplane, ship, four wheel and two wheel vehicles. Students are able to design a flywheel for IC engine.
				CO3	Explain the basics and definitions related to governors and forces acting on various governors. After completion of this unit students are able to solve numerical problems on different governors.

				CO4	Solve numerical problems on balancing of rotating masses and reciprocating masses in V-engine and multi cylinder engines.
				CO5	Derive the response of one degree of freedom systems with free and forced vibrations, evaluate the critical speed of the shaft and simple vibration calculations of rotor systems.
	4	**MACHINE TOOLS**	15A03503	CO1	Explain the concepts of metal cutting and the mechanism of chip formation. Examine the interface in the machining zone between the tool and the work piece with cutting performance.
				CO2	Explain the concepts of turning. Distinguish various tooling accessories used in turning and understand different constructions of lathe depending on the nature of operation.
				CO3	Demonstrate the principle of drilling, shaping and planning operation, parts and tool holding devices, Compare operations performed on drilling, shaping and planning and machining calculations
				CO4	Demonstrate the principle of milling, grinding, Lapping, Honing and Broaching operation, Distinguish parts and types of milling and grinding machines.
				CO5	Design of Jigs and fixtures and uses, Classification of Jigs & Fixtures – Principles of location and clamping.
`III YEAR I SEM	5	**DESIGN OF MACHINE MEMBERS-I**	15A03504	CO1	To Remember the types of stresses and Apply the design procedure by using theories of failure for different elements.
				CO2	To Understand the types of Fluctuating stresses Design the simple components under cyclic loading by using Goodman's and Soderberg's criterions.
				CO3	To Understand the functions of Rivets and bolts. Design the Riveted joints with different configuration, boiler shell riveted joint and under eccentric loading design of riveted joints. To Design bolted joints with direct loading and eccentric loading condition.
				CO4	To Discuss the types of cotters and Design and Differentiate cotters and Knuckle joint. Understand the classifications of shafts and Design the shafts under different loading conditions.
				CO5	To Explain the function, classifications of keys & couplings and Design the various rigid and flexible shaft couplings.
	6	**ENTREPRENEURSHIP**	15A02503	CO1	To understand the fundamentals of entrepreneurship-marketing, accounting and operations.
				CO2	To understand how to ideate for tangible product or service to think about how your business meets a human need.
				CO3	To analyse financing and managing new venture, venture capital, sources of capital
				CO4	To evaluate joint ventures, mergers,acquisitions, franchising and understand public issues
				CO5	To understand production and marketing management concepts and global aspects of entrepreneurship
	7	**SOCIAL VALUES & ETHICS**	15A09501	CO1	Explain the Environmental issues and Justify the objectives of civil defense.
				CO2	Demonstrate Gender inequality, Domestic violence and Appraise the government schemes ,laws.
				CO3	Explain the Environmental issues and Justify the objectives of civil defense.
				CO4	Demonstrate Gender inequality, Domestic violence and Appraise the government schemes ,laws.

				CO5	Importance the games ,sports,and benefits of exercise, Recommend the yoga asanas ,mudras and pranayama
	8	**FLUID MECHANICS AND HYDRAULIC MACHINES LAB**	15A01511	CO1	To understand apply analyze Evaluate and Create the Calibration of Venturimeter.
				CO2	To understand apply analyze Evaluate and Create the Calibration of Orifice meter.
				CO3	
				CO4	To understand apply analyze Evaluate and Create the Coefficient of discharge for a small orifice by a constant head method.
				CO5	To understand apply analyze Evaluate and Create the Coefficient of discharge for an external mouth piece by variable head method.
				CO6	To understand apply analyze Evaluate and Create the Calibration of contracted Rectangular Notch and /or Triangular Notch.
				CO7	To understand apply analyze Evaluate and Create the Determination of Coefficient of loss of head in a sudden contraction and friction factor.
				CO8	To understand apply analyze Evaluate and Create the Impact of jet on vanes.
				CO9	To understand apply analyze Evaluate and Create the Study of Hydraulic jump.
				CO10	To understand apply analyze Evaluate and Create the Performance test on Pelton wheel turbine.
				CO11	To understand apply analyze Evaluate and Create the Performance test on Francis turbine.
				CO12	To understand apply analyze Evaluate and Create the Efficiency test on centrifugal pump.
	9	**MACHINE TOOLS LABORATORY**	15A03508	CO1	Demonstrate the construction & operations of general purpose machines
				CO2	Demonstrate Step turning and taper turning, Thread cutting and knurling on lathe machine
				CO3	Demonstrate Drilling and Tapping operations
				CO4	Demonstrate Shaping and Planning operations
				CO5	Demonstrate Slotting Operations
				CO6	Demonstrate Milling for groove cutting/ gear cutting
				CO7	Demonstrate Cylindrical and Surface Grinding operations
				CO8	Demonstrate Grinding of Tool angles
	1	**MANAGEMENT SCIENCE**	15A52601	CO1	Graduates will be able to understand the basics concepts of management and it will be practially applicable in all spheres through theories
				CO2	Graduates can learn the plant location process and different marketing the techniques to sell the product through advertising.
				CO3	To tell about HR concepts like HRP, Appraisal, recruitment, grievances and T &D
				CO4	To know about corporate planning process , environmental scanning, SWOT analysis, PERT and CPM
				CO5	To elucidate contemporary management practices like JIT, BPO, BSE, CMM TQM Etc,
	2	**AUTOMOBILE ENGINEERING**	15A03702	CO1	To understand the Basic process of Automotive components and usage of type of wheel drives, supercharger & turbocharger.
				CO2	To understand the transmission systems like clutch and its types, gear box and its types, propeller shaft, and types of drives.

		ENGINEERING		CO3	To understand the Basic process of Steering system & steering mechanism.
				CO4	To understand the Basic process of suspension system & brake system.
				CO5	To understand the Basic process of emission from automobiles & electrical system.
	3	**CAD/CAM**	15A03702	CO1	To understand and the basic Concepts of CAD/CAM with industrial applications.
				CO2	Students able to learn how use Geometric modeling and solid modeling.
				CO3	Student able to learn to create CNC part programming and APT part programme
				CO4	Student able to get knowledge on Group Technology ,Part family, and coding techniques in Manufacturing
				CO5	Student able to get knowledge on CAQC ,CAPP, Integration of Design and Manufacturing
IV YEAR I SEM	4	**METROLOGY & MEASUREMENTS**	15A03703	CO1	To understand the Limits, Fits and Tolerance. Indian standard system – International Standard organization system and know the principles of working of the most commonly Applying instruments for measuring linear and angular distances.
				CO2	Define the Linear, angle, Taper and Flatness Measurement and study the working principles of different types of Linear measuring devices, Angle measuring devices are Sine bar , Bevel protractor and Analyze the flatness measurement methods.
				CO3	To understand the measuring methods of surface roughness. Comparing the Screw thread elements and measuring methods, Gear tooth profile measurement, CMM, Alignment tests on lathe, milling and drilling machine tools.
				CO4	Define the Displacement, Stress, Strain ,Acceleration & Vibration and to understand working of various instruments utilizing for measuring for displacement, Stress-strain and Acceleration and Vibration.
				CO5	To understand working of various instruments Used for measuring for Temperature, Pressure, Force, Torque and Power.
	5	**MODERN MANUFACTURING METHODS**	15A03706	CO1	Explain the need for Non-traditional machining methods and rapid prototyping methods, classification & their relevance for precision and lean manufacturing .
				CO2	Explain the fundamentals of Ultrasonic machining, Abrasive jet and Water jet processes, develop mechanics of material removal.
				CO3	Explain the fundamentals of ECM and Chemical machining processes, Demonstrate their applications and defects.
				CO4	Explain the EDM and Plasma machining working processes, Demonstrate their advantages and disadvantages.
				CO5	Explain the concept of EBM and LBM processes and Demonstrate their applications.
	6	**PRODUCTION & OPERATIONS MANAGEMENT**	15A03709	CO1	To understand Production Planning and Control, generating of new products and strategies of Aggregate Planning.
				CO2	To understand forecasting techniques and able to Analyze accuracy of Forecasting methods.
				CO3	To select the plant location and plant layout and design plant layout using Computerized techniques.
				CO4	To Develop scheduling and material operation using lean enterprise and other concepts.
				CO5	To understand inventory management and scheduling techniques/Policies

	7	**CAD/CAM LAB**	15A03710	CO1	To develop 2D drafting using Auto CAD or any drafting package
				CO2	To develop the modeling of components in 3D- V block, open bearing, angular block, Dovetail Guide, Dovetail bracket , Tool post by using Auto CAD or PRO -E or CATIA or Solid works
				CO3	To develop the Assembly modeling of screw jack parts, knuckle joint , Oldham" s coupling, foot step bearing, stuffing box, square tool post by using Auto CAD or PRO -E or CATIA or Solid works
				CO4	To develop the machining of simple components on CNC lathe and CNC milling machine
	8	**METROLOGY & MEASUREMENTS LABORATORY**	15A03711	CO1	Demonstrate and measure the linear, angular and gear profiles.
				CO2	Conduct the alignment test on machine tools.
				CO3	Measure the flatness of the surface by using leveling tools.
				CO4	Measure the temperature& displacement by using transducers.
				CO5	Measure the speed, pressure, and strain by using transducers.
				CO6	Measure the angular measurement &flow measurement by using transducers.
	1	**PROBABILITY & STATISTICS**	15A54401	CO1	To help the students in getting a thorough understanding of the fundamentals of Basic concepts of Probability – Random variables – Expectation – Discrete and continuous Distributions – Distribution
				CO2	To help the students in getting a thorough understanding of the fundamentals of Test of Hypothesis: Population and Sample - Confidence interval of mean from Normal distribution - Statistical hypothesis - Null and Alternative hypothesis - Level of significance. Test of significance - Test based on normal distribution - Z test for means and proportions.
				CO3	To help the students in getting a thorough understanding of the Small samples - t- test for one sample and two sample problem and paired t-test, F-test and Chi-square test (testing of goodness of fit and independence).
				CO4	To help the students in getting a thorough understanding and calculating of Statistical Quality Control: Concept of quality of a manufactured product -Defects and Defectives - Causes of variations - Random and assignable - The principle of Shewhart Control Chart-Charts for attribute and variable quality
				CO5	To help the students in getting a thorough understanding and calculating of Queuing Theory: Pure Birth and Death process, M/M/1 & M/M/S & their related simple problems
	2	**BASIC ELECTRICAL & ELECTRONICS ENGINEERING**	15A99301	CO1	Understand & Apply The basic concepts of the currents and voltage by using theorems and two-port networks.
				CO2	Understand& Analyze the performance of DC Machines.
				CO3	Understand &Analyze the performance of AC Machines.
				CO4	Analyze the operating principles of major electronic devices, its characteristics and Explain different rectifiers and filters used in power supply section.
				CO5	Explain and analyze basic transistor amplifier circuits using BJT and FET.
	3	**MACHINE DRAWING**	15A03401	CO1	To understand the basic Concepts Drawing tools and Dimensioning.
				CO2	To understand and sketch the screws joints ,nut ,bolts,keys and threads.
				CO3	To Understand the functions of engine parts ,machine parts and valves and assembly of these parts

II YEAR II SEM	4	**KINEMATICS OF MACHINES**	15A03402	CO1	To Understand and identify the different mechanisms, inversions of different kinematic chains and also find the Mobility of Mechanisms.
				CO2	To Understand the mechanism of Hooke's joint, steering mechanisms and belt friction. And are also able to solve numerical problems on Hooke's joint, belt and rope drives.
				CO3	To Understand and Design draw the velocity and acceleration diagrams of simple plane mechanisms by using relative velocity method and instantaneous center method.
				CO4	To Explain gears terminology, types of gears, length of path of contact, contact ratio and interference in gears. Further students are also able to design the gears to avoid interference and to calculate train value for gear Trains.
				CO5	To Design and draw displacement diagram and cam profile for different types of motions of the follower. And also to find the displacement, velocity and acceleration of the follower at different positions of cam with specified contours.
	5	**THERMAL ENGINEERING - I**	15A03403	CO1	Gain the knowledge about Working principle of two stroke and four stroke SI and CI Engines.
				CO2	Gain the knowledge about engine associated systems such as lubricating system, cooling system, fuel feed system, ignition system , their necessity, requirements, construction details, different types and their working.
				CO3	The concept of combustion in Spark ignition engine; Pressure Vs crank angle diagrams, and pre-ignition. the concept of combustion in Compression ignition engine, Pressure Vs crank angle diagrams, Knocking, Detonation.
				CO4	The knowledge about performance calculations in I.C.Engine. The knowledge about engine pollution and working of catalytic converter.
				CO5	About working principle of reciprocating compressors and its efficiencies. Mechanical details of axial flow compressors and its efficiencies
	6	**MANUFACTURING TECHNOLOGY**	15A03404	CO1	To understand the general casting process for making product and elements used in casting.
				CO2	To understand the various special casting processes with its merits and demerits and associated defects with possible cause and cure.
				CO3	To understand the different types of Welding Processes, weld joints and cutting of Ferrous and Non Ferrous metals.
				CO4	To understand Advanced welding Process, Heat Affected Zone, Defects and various testing method of welds.
				CO5	To understand various surface treatment processes, characteristics and their Applications.
	7	**THERMAL ENGINEERING LABORATORY**	15A03405	CO1	Sketch the valve and port timing diagrams for single cylinder Petrol and diesel engines.
				CO2	Asses the fuels characterization through experimentation
				CO3	Predict the performance characteristics of 2-stroke and 4-stroke internalcombustion engines.

		LABORATORY		CO4	Predict the 2-stage air compressor performance characteristics.
				CO5	Evaluate the energy distribution in IC engines by conducting heat balance test.
				CO6	Differentiate the water tube and fire tube boilers.
	8	**MANUFACTURING TECHNOLOGYLABORATORY**		CO1	Develop a wooden pattern for a given casting
				CO2	Determine the sand properties used in foundry.
			15A03406	CO3	Demonstrate the Injection moulding process to produce bottle caps.
				CO4	Demonstrate the Blow moulding process to produce a bottle.
				CO5	Demonstrate Bending operations using hydraulic press.
				CO6	Prepare simple joints using arc, spot and gas welding.
	1	**OPERATIONS RESEARCH**	15A03601	CO1	Understand and apply simplex method
				CO2	Understand any apply assignment and transportation concepts to real life situations.
				CO3	Get the knowledge of choosing the best strategy out of the available strategies.
				CO4	Represent any project in the form of a network and estimate the parameters like project time ,project cost.
				CO5	Apply the dynamic programming technique to solve the complex problems by breaking them into a series of sub problems.
	2	**DESIGN OF MACHINE MEMBERS-II**	15A03602	CO1	To understand and able to design crane hooks, C-clamps and various belt, rope and chain drives.
				CO2	Design and Analyze the helical sprigs for two wheeler vehicle and laminated springs for trucks and Also design & Analyze power screws subjected to loading.
				CO3	Describe basic operation and Design of various types of Bearings.
				CO4	Formulate and analyze a Mechanical Gears and compare the Performance of Spur and Helical Gears.
				CO5	To understand the basic Concepts of IC Engine parts and apply the design parameter for energy storage element and engine components, piston, connecting and crank shaft
	3	**HEAT TRANSFER**	15A03603	CO1	Understand the basic concept of conduction, convection and radiation heat transfer.
				CO2	Understand how to formulate and be able to solve simple conduction heat transfer problems. Solutions techniques will include both closed form and numerical methods.
				CO3	Will apply empirical correlations for both forced and natural convection to determine values for the convection heat transfer co-efficient.
				CO4	Understand black body and gray surface radiation and evaluate radiation exchange between surfaces.
				CO5	Some students will like to use the knowledge obtained in classes to understand the nature.
		FINITE		CO1	Explain basic principles and approaches for solving FEM problems in different fields.
				CO2	Solve bars, trusses, beams and heat transfer problems using FEM and also to apply boundary conditions in realistic problems.

III YEAR II SEM	4	**ELEMENT METHODS**	15A03604	CO3	Formulate the FEM model for simple problems.
				CO4	Explain the interpolation functions to higher order Iso-parametric elements.
				CO5	Explain and determine element matrices for applying the principles to find stresses in beams and trusses and temperature distribution in composite walls and fins
	5	**METAL FORMING PROCESSES**	15A03605	CO1	To Understand the basic concept on one, two and three dimensional stress Analysis, theory of plasticity, strain hardening, hot and cold working process.
				CO2	To Understand the principles of rolling and forging processes, their applications and defects.
				CO3	To Understand the fundamentals of extrusion process and wire drawing processes and their industrial applications.
				CO4	To Understand the various press working processes and compare their advantages and disadvantages.
				CO5	To Understand the concept of plastic manufacturing process, rapid manufacturing process and its applications.
	6	**NON-CONVENTIONAL SOURCES OF ENERGY**	15A03606	CO1	To create awareness about basic concepts of non-conventional source of energy-Solar energy
				CO2	Identify Solar energy as alternate form of energy and to know how it can be tapped.
				CO3	Identify Solar and Winds energy as alternate form of energy and to know how it can be tapped
				CO4	Identify bio gas generation and its impact on environment and Understand the Geothermal &Tidal energy, its mechanism of production and its applications.
				CO5	Understand energy storage and economy.
	7	**HEAT TRANSFER LAB**	15A03609	CO1	To understand apply analyze Evaluate and Create the Thermal conductivity of insulating powder material through Concentric Sphere apparatus.
				CO2	To understand apply analyze Evaluate and Create the Thermal conductivity of insulating material through lagged pipe apparatus
				CO3	To understand apply analyze Evaluate and Create the Overall heat transfer co-efficient through Composite Slab Apparatus
				CO4	To understand apply analyze Evaluate and Create the Thermal Conductivity of metal.
				CO5	To understand apply analyze Evaluate and Create the Heat transfer in pin-fin.
				CO6	To understand apply analyze Evaluate and Create the Heat transfer coefficient in forced convection.
				CO7	To understand apply analyze Evaluate and Create the Heat transfer coefficient in natural convection.
				CO8	To understand apply analyze Evaluate and Create the Experiment on Parallel and counter flow heat exchanger.
				CO9	To understand apply analyze Evaluate and Create the Emissivity of a gray body through Emissivity apparatus.

				CO10	To understand apply analyze Evaluate and Create the Experiment on Stefan Boltzman Apparatus.
	8	**COMPUTER AIDED ENGINEERING LABORATORY**	15A03610	CO1	Demonstrate the knowledge on various simulation software's
				CO2	Analysis the structural components of various bars and beams
				CO3	Illustrate the thermal analysis of 2D components and composite wall
				CO4	Solve the fluid flow problems by using computational fluid dynamics
				CO5	Evaluate the various research problems in all the fields of engineering by using FEA.
IV YEAR II SEM	1	**INDUSTRIAL ENGINEERING**	15A03801	CO1	To understand the basic Concepts of management, organization structure and Apply the principles of management.
				CO2	Define the plant location, Classify the plant layouts and material handling equipment objectives learned and remembered.
				CO3	To understand the work study and work measurement objectives learned implement operation management functions, and work sampling Applications.
				CO4	To understand the Inventory control systems and Discuss the different types Inventory models.
				CO5	To understand and explain the applied quality control techniques and Total quality management
	2	**POWER PLANT ENGINEERING**	15A03804	CO1	Discuss environmental and safety aspects of power plant operation. Classify Different types of Power Plants, site selection criteria of each one of them.
				CO2	Summarise Thermal Power Plant operation, Examine different types of high pressure boilers including supercritical and supercharged boilers, Fluidized bed combustion systems.
				CO3	Summarise Diesel Power Plant operation, - Classify the Construction and Layout With Auxiliaries.
				CO4	Demonstration of Hydro-electric Power Plant Economics, Energy Storage pumped hydro etc., Classify the Construction and Layout With Auxiliaries.
				CO5	Summarise Different types of Non-Conventional power plants. Classify Nuclear power plants including Pressurized water reactor, Boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor
	3	**TECHNICAL SEMINAR**	15A03808	CO1	Define the various existing technological developments currently in use
				CO2	Select the specialized topic of the existing or proposed technology
				CO3	Summarize the information gathered from various resources
				CO4	Prepare a technical report on the selected specialized topic
				CO5	Explain the topic using appropriate presentation tools
				CO6	Show the inert personal, Professional and work with team skills
				CO1	Prepare the abstract represents the outline of the project
				CO2	Understand the literature collected in relevant to the project

		PROJECT WORK	15A03809	CO3	Design the required components of the prototype as per the specifications
				CO4	Develop a prototype of the project with the distribution of tasks among the team
				CO5	Analyze the movements and functioning of the developed module
				CO6	Prepare the project report as per guidelines and the present before the panel of experts

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