

2.6.1. Approved Program Wise List of PO'S/PSO'S/CO'S

B.Tech-Civil Engineering

Program outcomes:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO1	Enhance employ ability skills by latest civil engineering tools and software.
PSO2	Develop Competency in professional and Industrial areas.

Course Outcomes:

Course Name	Course Outcomes:
Algebra and Calculus (20ABS9901)	CO1: Make use of matrix algebra techniques that is needed by engineers for practical Applications.
	CO2: Utilize mean value theorems to real life problems.
	CO3: Interpret with functions of several variables which is useful in optimization.
	CO4: Analyze 2- dimensional and 3- dimensional concepts in coordinate systems
	CO5: Utilize the concept of special functions
Engineering chemistry (20ABS9905)	CO1. Understand the disadvantages of using hard water in domestically and industrially and select suitable treatments
	CO2. Apply the electrochemical principles to the construction of battery and fuel cells, understand the corrosion prevention methods and factors affecting corrosion
	CO3. Outline the preparation, mechanism, properties and applications of polymer and conducting polymers and Interpret the different types of conventional and nonconventional fuels
	CO4. Understand the manufacturing of Portland cement and properties of concrete
	CO5. Utilize the applications of physicochemical methods in surface characterization of solids
Communicative English (20AHS9901)	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
Engineering Workshop Practice (20AES0304)	CO1: Apply wood working skills in real world applications.
	CO2: Build different parts with metal sheets in real world applications.
	CO3: Apply fitting operations in various applications.
	CO4: Apply different types of basic electric circuit connections.
	CO5: Demonstrate soldering and brazing.

Problem Solving And Programming (20AES0501)	CO1: Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2: Able to know problem solving aspects, design and analysis of algorithm
	CO3: Able to know flow control, input output and implementation functions
	CO4: Able to solve computational problems using functions, array and pointers
	CO5: Able to organise real world heterogeneous data and apply searching ,sorting techniques with exception handling
Communicative English Lab 20AHS9902	CO 1: Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
	CO 2: Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussions
	CO 3: Improve words knowledge and apply skills in various language learning activities.
	CO 4: Analyze speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
	CO 5: Evaluate and exhibit acceptable etiquette essentials in social and professional presentations.
Engineering Chemistry Lab (20ABS9910)	CO1: Demonstrate volumetric analysis involved with emphasis on solution preparation,
	CO2: Develop knowledge to prepare advanced materials
	CO3: Acquire knowledge to measure the strength of an acid present in secondary batteries
	CO4: Familiarize with digital and instrumental methods of analysis
	CO5: Apply important chemical concepts and principles to analyse mixture of components by chromatographic techniques.
Problem Solving and Programming lab (20AES0503)	CO1: Construct a Computer given its parts
	CO2: Select the right control structure for solving the problem
	CO3: Analyze different sorting algorithms
	CO4: Design solutions for computational problems
	CO5: Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Differential Equations and Vector Calculus (20ABS9906)	CO1. Apply the mathematical concepts of ordinary differential equations of higher order.
	CO2. Solve the differential equations related to various engineering fields.
	CO3. Identify solution methods for partial differential equations that model physical processes.
	CO4. Interpret the physical meaning of different operators such as gradient, curl and divergence.
	CO5. Evaluate the work done against a field, circulation and flux using vector calculus

Engineering Physics (20ABS9903)	CO1. Apply the fundamental laws of mechanics to solve engineering problems.
	CO2. Analyze and apply the concepts of architectural acoustics and ultrasonics.
	CO3. Analyze the properties of dielectric materials and magnetic materials for device applications.
	CO4. Examine the types of Lasers and propagation of electromagnetic waves in optical fibers for various applications.
	CO5. List the basic sensors for various applications
Basics of Electrical &Electronics Engineering (20AES0202)	CO1: Apply concepts of KVL/KCL in solving DC circuits
	CO2: Illustrate working principles of induction motor - DC Motor
	CO3: Identify type of electrical machine based on their operation
	CO4: Describe operation and characteristics of diodes and transistors.
	CO5: Make use of diodes and transistors in simple, typical circuit applications.
	CO6: Understand operation of basic op-amp circuits
Basics of Python Programming (20AES0509)	CO1: Understanding the syntax and semantics of Python programming.
	CO2: Apply modularity to programs.
	CO3: Select appropriate data structure of Python for solving a problem.
	CO4: Implement Mutable and Immutable data types
	CO5: Interpret the concepts of object oriented programming as used in Python
Engineering Graphics (20AES0301)	CO1: Draw various curves applied in engineering.
	CO2: Show projections of solids and sections graphically.
	CO3: Draw the development of surfaces of solids
	CO4: Use computers as a drafting tool
	CO5: Draw isometric and orthographic
Basics of Electrical & Electronics Engineering Lab (20AES0204)	CO1: Verify Kirchoff's Laws & Superposition theorem for dc supply
	CO2: Analyze the performance of AC and DC Machines by testing.
	CO3: Study I – V Characteristics of PV Cell & Perform speed control of dc shunt motor
	CO4: Ability to operate diodes for finding V-I Characteristics.
	CO5: Ability to construct and operate rectifiers without & with filters
	CO6: Ability to construct and operate BJT & FET Characteristics.
Engineering Physics Lab (20ABS9908)	CO1: Operate various optical instruments and estimate wavelength of laser and particles size using laser.
	CO2: Estimate the susceptibility and related magnetic parameters of magnetic materials and plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO3: Evaluate the acceptance angle of an optical fiber and numerical aperture and determine magnetic susceptibility of the material and its losses by B-H curve.
	CO4: Identify the type of semiconductor i.e., n-type or p-type using Hall effect.
	CO5: Apply the concepts of sensors for various applications.


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Basics of Python Programming Lab (20AES0510)	CO1: Design solutions to mathematical problems.
	CO2: Organize the data for solving the problem.
	CO3: Develop Python programs for numerical and text based problems.
	CO4: Select appropriate programming construct for solving the problem.
	CO5: Illustrate object oriented concepts
Probability & Statistics, Partial differential equations (20ABS9913)	CO1: Utilize the concepts of Central Tendency, Correlation, Regression concepts.
	CO2: Apply discrete and continuous probability distributions
	CO3: Infer the components of a classical hypothesis test for large samples.
	CO4: Inspect the statistical inferential methods based on small sampling tests.
	CO5: Solve the general solution of the PDEs bearing applications
Mechanics of Materials (20APC0101)	CO1: Understand the system of forces on bodies.
	CO2: Determine the centroid and moment of inertia for different cross-sections.
	CO3: Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli
	CO4: Evaluate shear force and bending moment diagrams for different load cases.
	CO5: Compute the slope and deflection of simple beams
Surveying (20APC0102)	CO1: Understand basic principles of surveying, Prismatic compass
	CO2: Apply basic concepts of leveling, contouring and Theodolite survey in field works
	CO3: Apply the concepts of computation of Areas and Volumes in earthworks
	CO4: Apply the concepts of the curves and setting out in field works
	CO5: Understand modern techniques in the survey systems.
Fluid Mechanics (20APC0103)	CO1: Understand basic characteristics and behavior of fluids
	CO2: Understand concepts of fluid statics, different equipment and their applications
	CO3: Understand fundamentals of fluid kinematics and differentiate types of fluid flows
	CO4: Apply Euler's and Bernoulli's equation to find the characteristics of fluid in motion
	CO5: Apply Energy losses in pipelines and flow characteristics through closed conduits
Managerial Economics and Financial Analysis (20AHSMB01)	CO1: Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2: Apply the Concept of Production constant revenues for effective Business decision
	CO3: Analyze how to invest their capital and maximize returns.
	CO4: Evaluate the capital budgeting techniques.
	CO5: Define the concepts related to financial accounting and management and able to develop the accounting statements and evaluate the financial performance of business entity

Strength of Materials Lab (20APC0104)	CO1: Determine the properties of engineering materials
	CO2: Solve the reactions at the supports of the simply supported beam
	CO3: Determine the bending and deflection of beams with different support conditions
Surveying Lab (20APC0105)	CO1: Determine area of closed boundary using chain surveying and plane table surveying.
	CO2: Determine angles using theodolite surveying and compass surveying.
	CO3: Determine height, area and level difference using total station and fly levelling.
Fluid Mechanics Lab (20APC0106)	CO1: Verify Bernoulli's theorem
	CO2: Calibrate flow measuring devices such as Venturimeter, orifice meter and notch
	CO3: Determine friction factor in pipes
	CO4: Determination of Coefficient of discharge for orifice and mouth piece
Environmental Studies (20AMC9903)	CO1: Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2: Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.
	CO3: Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4: Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5: To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Mathematical Modeling & Optimization Techniques (20ABS9922)	CO1: Know about the classifications and stages of mathematical modelling.
	CO2: Understand building of mathematical models.
	CO3: Study the behaviour of mathematical models.
	CO4: Formulate a linear programming problem and solve it by various methods.
	CO5: Give an optimal solution in assignment jobs, give transportation of items from sources to destinations.
Strength of Materials (20APC0108)	CO1: Apply concept of the simple bending in beams
	CO2: Apply concept of the shear stresses in beam and combined stresses in columns
	CO3: Apply concept of crippling load theory in axially loaded compression members
	CO4: Apply concept of pure torsion in circular shafts
	CO5: Apply concept of principal stresses and various failure theories in structural members

Hydraulic Engineering (20APC0109)	CO1: Understand Laminar Flow and Turbulent flow through pipes
	CO2: Compute the uniform flows in open-channel flow systems.
	CO3: Compute the Non-uniform flows in open-channel flow systems.
	CO4: Evaluate the performance of impact of jets on plates and its application in different turbines.
	CO5: Determine the performance of Centrifugal pumps
Structural Analysis-I (20APC0110)	CO1: Analyze fixed beam with yielding of supports
	CO2: Analyze beams using slope deflection method
	CO3: Analyze beams using moment distribution methods
	CO4: Apply energy theorems for analysis of indeterminate structures
	CO5: Analyze determinate and indeterminate trusses
Concrete Technology (20APC0111)	CO1: Understand various ingredients of concrete and their role.
	CO2: Determine the fresh, hardened and engineering properties of concrete.
	CO3: Understand non-destructive testing methods of testing concrete.
	CO4: Understand the durability problems and remedial measure in the concrete.
	CO5: Design of concrete mixes using Indian Standard method.
Universal Human Values (20AHS9905)	CO1: Students are expected to become more aware of themselves, and their surroundings (<i>family, society, nature</i>)
	CO2: They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3: They would have better critical ability.
	CO4: They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	CO5: It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction
Hydraulic Machinery Lab (20APC0112)	CO1: Determine minor losses in pipes
	CO2: Determine the hydraulic jump
	CO3: Determine the performance of hydraulic turbine and pumps under different working conditions
Concrete Technology Lab (20APC0113)	CO1. Determine the properties of cement and aggregate as per IS specifications.
	CO2: Determine the properties of fresh and hardened concrete as per IS specifications.
	CO3: Demonstrate the strength of concrete using Non-Destructive testing on concrete.
Computer-aided Civil Engineering Drawing Lab(20APC0114)	CO1: Understand the concepts and basics of CAD
	CO2: Draw and develop plan, elevation and section for single and multi storey buildings.
	CO3: Detailing of components for buildings.

Soil Mechanics (20APC0116)	CO1: Understand soil formation and determine the index properties of soil
	CO2: Determine the coefficient of permeability and effective stress
	CO3: Estimate stresses under various loading conditions and compaction characteristics.
	CO4: Analyze the compressibility of the soils
	CO5: Understand the strength of soils under various drainage conditions
Building Technology (20APC0117)	CO1: Classify and understand the applications of basic building materials.
	CO2: Understand the applications of advanced building materials
	CO3: Understand the principles and methods of building construction components
	CO4: Understand the building services and principles of building planning.
	CO5: Apply bye-laws and regulations in planning Residential buildings
Engineering Geology (20APC0118)	CO1: Understand principles of engineering geology.
	CO2: Understand properties of various rocks and minerals
	CO3: Understand the suitability of sites for various civil engineering structures.
	CO4: Understand geological strata in the analysis and design the civil engineering structures.
	CO5: Understand the concept of remote sensing and GIS.
Sensor Networks (20APE0417)	CO1: Understand the concepts of Converters and Sensor data acquisition systems
	CO2: Understand the concepts of Sensor Measurements in Structural Monitoring
	CO3: Understand the concepts of commonly used sensing technologies and algorithms
	CO4: Understand the concepts of Piezoelectric transducers for assessing and monitoring infrastructures
	CO5: Understand the concepts of Fiber optic sensors for assessing and monitoring infrastructures
Operations Research (20APC0323)	CO1 Able to create mathematical models of the real-life situations and capable of obtaining best solution using Graphical Method and Simplex Method
	CO2 To implement the theory of duality for simplifying the solution procedure for certain LPPs, and solve the special cases of LPP and Assignment problems
	CO3 Knowledge of choosing the best strategy out of the available strategies which is an essential skill for any business manager to successfully face the competition
	CO4 Able to represent any project in the form of a network and estimate the parameters like Project Completion Time
	CO5 Applying Dynamic Programming technique to solve the complex problems by breaking them into a series of sub-problems

Management Science (20AOE0301)	CO1 Understand the concepts & principles of management and designs of organization in a practical world.
	CO2 Apply the knowledge of Work-study principles & Quality Control techniques in industry.
	CO3 Analyze the concepts of HRM in Recruitment, Selection and Training &
	CO4 Development.
	CO5 Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time & cost of project & to analyze the business through SWOT.
	CO6 Create Modern technology in management science
Structural Analysis - II (20APE0101)	CO1: Analyse the three hinged arches for different loading
	CO2: Analyse the frames using slope deflection and moment distribution method
	CO3: Analyse the beams and frames using Kani's method
	CO4: Analyse the beams using flexibility & stiffness method
	CO5: Analyse the beams using plastic analysis
Water Harvesting and Conservation (20APE0102)	CO1: Appreciate the importance of movement of ground water
	CO2: Understand the methods of Water Harvesting
	CO3: Understand water recovery and reuse
	CO4: Understand the principles of Watershed Management and its importance in sustainability
	CO5: Understand soil and water conservation
Cost Effective Housing Techniques (20APE0103)	CO1: Apply the concept of housing techniques.
	CO2: Understand housing programmes and projects.
	CO3: Understand development and adoption of low cost housing technology
	CO4: Understand low cost housing in rural areas
	CO5: Understand housing in disaster prone areas
Soil Mechanics Lab (20APC0119)	CO1: Determine the index properties of soils
	CO2: Determine the coefficient of permeability of soils
	CO3: Determine the Engineering Properties and Swelling Characteristics of soils
Engineering Geology Lab (20APC0120)	CO1: Study of physical properties and identification of minerals referred under theory.
	CO2: Megascopic description and identification of rocks referred under theory.
	CO3: Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
	CO4: Simple Structural Geology problems

Professional Ethics And Human Values (20AMC9904)	CO1: It ensures students sustained happiness through identifying the essentials of human values and skills.
	CO2: The students will understand the importance of Values and Ethics in their personal lives and professional careers.
	CO3: The students will learn the rights and responsibilities as an employee, team member and a global citizen.
	CO4: Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5: Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life.
Environmental Engineering (20APC0122)	CO1: Identify the water demand and water characteristics.
	CO2: Apply the water treatment concept, methods, water distribution processes and operation.
	CO3: Carry out municipal water and wastewater treatment system operations and determine the sewage characteristics
	CO4: Prepare basic processes of designs of wastewater treatment plants.
	CO5: Design various sewage treatment plants and usage of solid wastes.
Highway Engineering (20APC0122)	CO1: Understand planning and alignment of highway.
	CO2: Apply concept of the geometric design for highway.
	CO3: Understand concept of traffic Engineering and its regulations.
	CO4: Apply concept of intersection design for traffic flow.
	CO5: Design of pavements as per IRC standards.
Foundation Engineering (20APC0124)	CO1: Understand the principles and methods of Soil Exploration
	CO2: Decide the suitability of soils and check the stability of slopes
	CO3: Calculate lateral earth pressures and check the stability of retaining walls
	CO4: Determine the bearing capacity of shallow foundations
	CO5: Estimate the bearing capacity of deep foundations
Design and Drawing of Reinforced Concrete Structures (20APE0104)	CO1: Understand the basic design concepts of reinforced concrete structures.
	CO2: Design of various types of beams.
	CO3: Design of slabs and staircase.
	CO4: Design of columns
	CO5: Design of footings
Intelligent Transportation Systems 20APE0105	CO1: Understand the sensor technologies
	CO2: Understand the communication techniques
	CO3: Apply the various ITS methodologies
	CO4: Understand the user needs
	CO5: Define the significance of ITS under Indian conditions
Remote Sensing and GIS (20APE0106)	CO1: Understand principles of aerial photography
	CO2: Understand the concept of remote sensing
	CO3: Understand the concept of geographic information system
	CO4: Analyze the GIS spatial data
	CO5: Apply the concepts of GIS in water resources

STAAD LAB (20APC0125)	CO1: Understand basic commands used in STAAD Pro and their applications
	CO2: Analyse and design of concrete structural elements for various loading conditions
	CO3: Analyse and design of steel structural elements for various loading conditions
Environmental Engineering Lab (20APC0126)	CO1: Determine physical, chemical and biological characteristics of water and wastewater
	CO2: Determine optimum dosage of coagulant
	CO3: Assess the quality of water and wastewater
Highway Engineering lab (20APC0127)	CO1: Determine the properties of coarse aggregate
	CO2: Determine the properties of bitumen
	CO3: Analysis of traffic volume data.


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B.Tech-Electrical and Electronics Engineering

Program outcomes:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
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PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO1	Modelling and Analysis: An ability to mathematically model and analyze the Performance of Electrical Machines, Control Systems, Power Systems and Power Electronic Systems.
PSO2	Design and Development: Ability to understand the recent technological development in Electrical and Electronics Engineering and Develop Products/Software to cater the Societal & Industrial needs.

Course Outcomes:

Course Name	Course Outcomes:
Algebra and Calculus (20ABS9901)	CO1: Make use of matrix algebra techniques that is needed by engineers for practical applications.
	CO2: Utilize mean value theorems to real life problems
	CO3: Interpret with functions of several variables which is useful in optimization.
	CO4: Analyze 2- Dimensional and 3- Dimensional concepts in coordinate systems
	CO5: Utilize the concept of special functions.
Applied Physics (20ABS9902)	CO1: Analyze the intensity variation of light due to interference and diffraction and illustrate the propagation of electromagnetic waves.
	CO2: Analyze and Apply the concepts of lasers and optical fibers.
	CO3: Infer the properties of dielectric and magnetic materials.
	CO4: Apply the fundamentals of semiconductors for device applications.
	CO5: Implement the behavior of super conductors in diverse fields and interpret the properties of Nano materials for multiple applications.
Communicative English (20AHS9901)	CO1: Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
	CO2: Apply grammatical structure to formulate sentences and correct word forms.
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	CO4: Able to solve computational problems using functions, array and pointers
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Communicative English Lab (20AHS9902)	CO1: Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
	CO2: Understanding the different aspects of the language with emphasis and LSRW skills and make use of different strategies in discussions.
	CO3: Improve words knowledge and apply skills in various language learning activities.
	CO4: Analyze speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO5: Evaluate and exhibit acceptable etiquette essentials in social and professional presentations.
Applied Physics Lab (20ABS9907)	CO1: Analyze the wave properties of light and the interaction of energy with the matter.
	CO2: Apply electromagnetic wave propagation in different guided media.
	CO3: Asses the electromagnetic wave propagation and its power in different media
	CO4: Analyze the conductivity of semiconductors.
	CO5: Interpret the dielectric and magnetic properties of materials and apply the nanomaterials for engineering applications.
Problem Solving and Programming Lab (20AES0503)	CO1: Construct a Computer given its parts
	CO2: Select the right control structure for solving the problem
	CO3: Analyze different sorting algorithms
	CO4: Design solutions for computational problems
	CO5: Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Engineering Workshop Practice (20AES0304)	CO1: Apply wood working skills in real world applications.
	CO2: Build different parts with metal sheets in real world applications.
	CO3: Apply fitting operations in various applications.
	CO4: Apply different types of basic electric circuit connections.
	CO5: Demonstrate soldering and brazing.
Differential Equations and Vector Calculus (20ABS9906)	CO1: Apply the mathematical concepts of ordinary differential equations of higher order.
	CO2: Solve the differential equations related to various engineering fields.
	CO3: Identify solution methods for partial differential equations that model physical processes.
	CO4: Interpret the physical meaning of different operators such as gradient, curl and divergence.
	CO5: Evaluate the work done against a field, circulation and flux using vector calculus.

Chemistry (20ABS9904)	CO1: Interpret the behavior of interactions between matter and energy at both the atomic and molecular levels
	CO2: Apply the electrochemical principles to the construction of batteries, fuel cells and electro chemical sensors.
	CO3: Outline the preparation, mechanism properties, and applications of polymer & conducting polymers.
	CO4: Analyze the separation of gaseous and liquid mixtures using instrumental methods and their applications.
	CO5: Understand the disadvantages of using hard water in domestically and industrially and select suitable treatments.
Basics of Civil & Mechanical Engineering (20AES0101)	CO1: Understand principles of Stress and Strain.
	CO2: Understand basic principles of Strain Measurement and apply the concepts of Strain Rosettes for strain measurement.
	CO3: Understand common building materials used in construction and analyze characteristics of common building materials
	CO4: Apply velocity ratio concepts in power transmission
	CO5: Understand the principles of CAD, CAM & CIM
Internet of Things (IoT) (20AES0505)	CO1: Interpret the vision of IoT from a global context.
	CO2: Determine the Market perspective of IoT.
	CO3: Compare and Contrast the use of Devices, Gateways and Data Management in IoT.
	CO4: Implement state of the art architecture in IoT.
	CO5: Illustrate the application of IoT in industrial Automation and Identify real world design constraints.
Engineering Graphics (20AES0301)	CO1: Draw various curves applied in engineering
	CO2: Show projections of solids and sections graphically.
	CO3: Draw the development of surfaces of solids
	CO4: Use computers as a drafting tool.
	CO5: Draw isometric and orthographic.
Basics of Civil & Mechanical Engineering Lab (20AES0102)	CO1: Impart basic principles of bending test on simply supported beam
	CO2: Understand principles of strain measurement using electrical strain gauges
	CO3: Impart concepts of compression and torsion
	CO4: Apply velocity ratio concepts in power transmission
	CO5: Understand the principles of CAD, CAM & CIM
Chemistry Lab (20ABS9909)	CO1: Demonstrate volumetric analysis involved with emphasis on solution preparation, dilution and chemical calculations.
	CO2: Develop knowledge to Prepare advanced materials.
	CO3: Acquire knowledge to Measure the strength of an acid present in secondary batteries
	CO4: familiarize with digital and instrumental methods of analysis
	CO5: Apply important chemical concepts and principles to analyze mixer of components by chromatographic techniques.

Internet of Things Lab (IoT Lab) (20AES0506)	CO1: Choose the sensors and actuators for an IoT application.
	CO2: Select protocols for a specific IoT application.
	CO3: Utilize the cloud platform and APIs for IoT application
	CO4: Experiment with embedded boards for creating IoT prototypes.
	CO5: Design a solution for a given IoT application
Constitution of India (20AMC9902)	CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics
	CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4: Discuss the Powers and functions of Governor, President, and Judiciary.
	CO5: Discuss the functions of local administration bodies.
Transform Techniques and Complex Variables (20ABS9912)	CO1: Interpret the Laplace transform for solving differential equations (continuous systems)
	CO2: Evaluate Fourier series of periodic signals
	CO3: Evaluate and be able to apply integral expressions for the Fourier and inverse transform.
	CO4: Make use of Z transform techniques for discrete time systems
	CO5: Analyze the differentiation and integration of complex functions used in engineering problems
Electrical Circuits – I (20APC0201)	CO1: Apply the mesh and nodal analysis to determine voltage, current and power involved through any electrical circuit and its elements.
	CO2: Analyze the magnetic circuits for their various properties.
	CO3: Analyze single phase AC circuits in steady state domain.
	CO4: Apply network theorems for analysis of electrical circuits.
	CO5: Analyze three phase balanced and unbalanced circuits.
Electronic Devices & Circuits (20APC0401)	CO1: Understand the operation of diodes and special electronic devices.
	CO2: Know operation of different rectifiers without and filters.
	CO3: Understand construction, operation of BJT, FET in different configurations
	CO4: Know the need of biasing and design of DC biasing circuits.
	CO5: Design of amplifiers with BJTs and FETs by using small signal model
Power Systems – I (20APC0202)	CO1: Acquire knowledge on thermal, gas and nuclear power plants operation.
	CO2: Understand the operation of AC and DC distribution systems.
	CO3: Understand the operation of Air Insulated & Gas Insulated (GIS) Substations.
	CO4: Familiarize with voltage control and power factor improvement techniques.
	CO5: Analyze economic aspects of power generation and different types of tariff methods.

Electrical Machines-I (20APC0203)	CO1: Apply the concepts of magnetic circuits to compute induced EMF and force in Electro-magnetic systems.
	CO2: Analyze the operation, conditions required of self-excitation of DC Generators and parallel operation of DC Generators.
	CO3: Distinguish the operation of various dc motors and determines the performance of DC machine using the results of tests.
	CO4: Explain the principle, constructional features and evaluate the performance characteristics of singlephase transformers by conducting various tests.
	CO5: Analyze the operations of Auto Transformer, Three Phase Transformer and parallel operation of Transformers.
Electrical Circuits-I Lab (20APC0204)	CO1: Remember, understand and apply various theorems and verify practically.
	CO2: Understand and analyze active, reactive power measurements in three phase balanced & un balanced circuits.
Electronic Devices & Circuitlab (20APC0404)	CO1: Test and operate diodes and special electronic devices.
	CO2: Construct and operate rectifiers without and with filters.
	CO3: Construct and operate BJT, FET in different configurations.
	CO4: Design DC biasing circuits for Transistors.
	CO5: Design amplifiers using BJTs and FETs.
Electrical Machines-I Lab (20APC0205)	CO1; Conduct and analyze load test on DC shunt generator.
	CO2: Understand and analyze magnetization characteristics of DC shunt generator.
	CO3: Understand and analyze speed control techniques and efficiency of DC machines.
	CO4: Understand to predetermine efficiency and regulation of single-phase Transformers.
Principles of Effective Public Speaking (20AHE9902)	CO1: Apply knowledge of principles, concepts and skills learned in speech preparation.
	CO2: Develop skills in speech composition.
	CO3: Develop skills in effective listening.
	CO4: Evaluate the delivery of speeches.
	CO5: Use supporting materials and presentation aids in speech preparation.
Environmental Studies (20AMC9903)	CO1: Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2: Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
	CO3: Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4: Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5: To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting

Basics Of Python Programming (20AES0509)	CO1: Understanding the syntax and semantics of python programming.
	CO2: Select appropriate data structure of Python for solving a problem.
	CO3: Design object oriented programs using Python for solving real-world problems.
	CO4: Apply modularity to programs.
	CO5: Interpret the concepts of object oriented programming as used in python.
Electrical Circuits-II (20APC0206)	CO1: Determine the transient response of R-L, R-C, R-L-C circuits for D.C and A.C excitations
	CO2: Analyze two port networks
	CO3: Apply Fourier transforms to electrical circuits excited by non-sinusoidal sources
	CO4: Design different types of filters
Electrical Machines-II (20APC0207)	CO1: Analyze the phasor diagrams of induction and synchronous machine, parallel operation of alternators, synchronization and load division of synchronous generators
	CO2: Apply the concepts to determine V and inverted V curves and power circles of synchronous motor.
	CO3: Understand construction, principle of working, equivalent circuit and analyze the testing of induction machine
	CO4: Analyze the various methods of starting and speed control of 3-phase induction motor.
	CO5: Analyze the principle operations of single phase induction motors and special motors
Engineering Electromagnetics (20APC0208)	CO1: Analyze the different aspects related to Static Electric Fields equations.
	CO2: Understand the concept of Conductors, Dipole, Dielectric & Capacitance.
	CO3: Learns the fundamental laws related to Magneto statics.
	CO4: Understand the concepts of Magnetic forces and Magnetic potential.
	CO5: Learns the fundamentals of Time Varying Fields.
Managerial Economics and Financial analysis (20AHSMB01)	CO1: Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2: Apply the Concept of Production cost and revenues for effective Business decision
	CO3: Analyze how to invest their capital and maximize returns.
	CO4; Evaluate the capital budgeting techniques.
	CO5: Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity.

Universal Human Values (20AHS9905)	CO1: Students are expected to become more aware of themselves, and their surroundings(family, society, nature)
	CO2: They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships in human nature in mind.
	CO3: They would have better critical ability.
	CO4: They would also become sensitive to their commitment towards what they have understood(human values, human relationship and human society)
	CO5: It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, atleast a beginning would be made in this direction.
Basics of Python Programming Lab (20AES0510)	CO1: Write, Test and Debug Python Programs
	CO2: Implement Conditionals and Loops for Python Programs
	CO3: Use functions and represent Compound data using Lists, Tuples and Dictionaries
	CO4: Read and write data from & to files in Python and develop Application using Pygame
ELECTRICAL CIRCUITSII LAB (20APC0209)	CO1: Able to understand simulation programs for DC circuit analysis using PSPICE.
	CO2: Understand and compare basic electric circuit theorems with actual working circuits
	CO3: Design and understand RLC series and parallel circuits and its resonance condition.
	CO4: Able to measure power in three phase circuits in day to day life.
	CO5: Characterize and model the network in terms of all network parameters.
Electrical Machines-II Lab (20APC0210)	CO1: Analyze and apply load test, no-load and blocked-rotor tests for construction of circle diagram and equivalent circuit determination in a single-phase induction motor.
	CO2: Predetermine regulation of a three-phase alternator by synchronous impedance & m.m.f methods.
	CO3: Predetermine the regulation of Alternator by Zero Power Factor method Xd and Xq determination of salient pole synchronous machine
	CO4: Evaluate and analyze V and inverted V curves of 3 phase synchronous motor
SIMULATION OF CIRCUITS USING PSPICE (20ASC0201)	CO1: Able to understand features and programming basics of PSPICE.
	CO2: Understand the procedures for simulation of AC and DC circuits using PSPICE.
	CO3: Design and understand nodal and frequency response analysis of circuits.


Electrical Machines – III (20APC0211)	CO1: Acquire knowledge on construction and operation of brushless D.C motor.
	CO2: Understand construction and operation of PMSM.
	CO3: Acquire Knowledge on Synchronous and switched reluctance motors.
	CO4: Acquire knowledge of other modern special machines.
Power Electronics (20APC0212)	CO1: Understand the basic operating principles of power semiconductor switching devices.
	CO2: Analyze the operation of AC-DC and DC to DC converters and their control.
	CO3: Analyze the operation of DC-AC and AC to AC converters and their control.
	CO4: Understand the operation of cycloconverters.
Control Systems (20APC0213)	CO1: Formulate mathematical model and transfer function of the physical systems.
	CO2: Determine the stability of linear systems in time domain.
	CO3; Perform frequency domain analysis using bode and polar plot.
	CO4: Formulate and design state-space analysis.
Analog And Digital IC Applications (20APC0425)	CO1: Understand the basic building blocks of linear integrated circuits and its characteristics.
	CO2: Design the Multivibrator circuits using IC555 and determines the frequency of oscillation and time delay, and understands the concept of A/D and D/A Converters.
	CO3: Understand the concept of active filters and oscillators.
	CO4: Design of CMOS logic circuits and analysis of performance characteristics.
	CO5: Implementation of digital logic circuits with the estimation of power and speed
POWER SYSTEMS – II (20APE0201)	CO1: Understand the classification and parameters of conductors, transmission lines.
	CO2: Understand the factors governing the performance of transmission lines.
	CO3: Analyze power system transients and the effect on power systems.
	CO4: Analyze the properties of overhead lines and their types.
	CO5: Understand the types and construction of underground cables.
Control Systems Lab (20APC0214)	CO1: Acquire knowledge of feedback control and transfer function of DC servo motor.
	CO2: Familiarize mathematical modelling of systems and design controllers and compensators.
	CO3: Get the knowledge on transient and steady state behaviour of second order systems.
	CO4: Determine the performance and time domain specifications of first and second order systems.
	CO5: Implement MATLAB analysis to real life systems

Power Electronics Lab (20APC0215)	CO1: Understand and analyze various characteristics of power electronic devices with gate firing circuits and forced commutation techniques.
	CO2: Analyze the operation of single-phase half & fully-controlled converters and inverters with different types of loads.
	CO3: Analyze the operation of DC-DC converters, single-phase AC Voltage controllers, cyclo- converters with different loads.
	CO4: Create and analyze various power electronic converters using MATLAB software
Introduction To Programming With Matlab (20ASC0202)	CO1: Learn fundamental computer programming concepts such as variables, control structures, functions and many others.
	CO2: Learn about various data types and how to handle them in MATLAB.
	CO3: Learn the powerful support MATLAB provides for working with matrices.
	CO4: Learn about file input/output.
Biology For Engineers (20AMC9901)	CO1: Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
	CO2: Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3: Brief about human physiology.
	CO4: Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
	CO5: Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.
Electrical Measurements And Instrumentation (20APC0216)	CO1: Understand different types of measuring instruments, their construction, operation and characteristics.
	CO2: Identify the instruments suitable for measurement of unknown resistance, capacitance, inductance, voltage and current.
	CO3: Understand different types of measuring instruments, their construction, operation for measurement of power and Energy.
	CO4: Apply the knowledge about transducers and instrument transformers to use them effectively.
Power System Analysis (20APC0217)	CO1: Remember and understand the concepts of per unit values, YBus and Zbus formation.
	CO2: Apply the concepts of good algorithm for the given power system network and obtain the converged load flow solution.
	CO3: Analyse the symmetrical faults and unsymmetrical faults and carry out the fault calculations.
	CO4: Design and select efficient Circuit Breakers to improve system stability.



Switchgear And Protection (20APC0218)	CO1: Acquire knowledge on various types of fuses, breakers and relays used for power system protection.
	CO2: Design protection system for generators and transformers.
	CO3: Identify various types of the relays in protecting feeders, lines and bus bars.
	CO4: Demonstrate the protection of a power system from over voltages.
Microprocessors And Microcontrollers (20APC0418)	CO1: Understand architecture details of 8085
	CO2: Review and analyze details of 8085 and 8086 architecture
	CO3: Illustrate brief details of 8086 operations
	CO4: Determine Importance of low power MSP 430 and its advancements
	CO5: Analyze Inbuilt peripherals of MSP 430 also Power management features.
Electrical Measurements Lab (20APC0219)	CO1: Understand calibration of various electrical measuring instruments.
	CO2: Accurately determine the values of inductance and capacitance using AC bridges.
	CO3: Analyze coefficient of coupling between two coupled coils.
	CO4: Accurately determine the values of very low resistances.
	CO5: Understand the working principles of displacement transducers.
Power System Analysis Lab (20APC0220)	CO1: Acquire practical knowledge on calculation of sequence impedance, fault currents, voltages and sub transient reactance's. Get the practical knowledge on how to draw the equivalent circuit of three winding transformer.
	CO2: Acquire knowledge on development of MATLAB program for formation of Y and Z buses.
	CO3: Acquire knowledge on development of MATLAB programs for Gauss-Seidel and Fast Decouple Load Flow studies.
	CO4: Acquire knowledge on development of SIMULINK model for single area load frequency problem
Switchgear And Protection Lab (20APC0221)	CO1: Understand the operation and characteristics of switch gear used in protection of power systems.
	CO2: Analyze the protection of parallel, radial feeders & over voltage induction relay.
	CO3: Analyze the functioning of various protection schemes using MATLAB.
Numerical Techniques Using MATLAB (20ASC0203)	CO1: Learn fundamental computer programming concepts used for numerical analysis.
	CO2: Solve linear equations, difference equations and differential equations in MATLAB.
	CO3: Determination of roots for polynomials.
	CO4: Determination of polynomials using Euler, Runge-Kutta and LSC fitting methods

Professional Ethics And Human Values (20AMC9904)	CO1: It ensures students sustained happiness through identifying the essentials of human values and skills.
	CO2: The students will understand the importance of Values and Ethics in their personal lives and professional careers.
	CO3: The students will learn the rights and responsibilities as an employee, team member and a global citizen.
	CO4: Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5: Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life


PRINCIPAL
ANNAMACHARYA INSTITUTE OF
TECHNOLOGY & SCIENCES
 Karakambadi Road, Venkatapuram (V)
TIRUPATI - 517 520

B.Tech-Mechanical Engineering

Program outcomes:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO1	Design, analyze and develop the mechanical components in the field of engineering practice for better functioning.
PSO2	Understand various concepts of Design, Production and thermal fluid sciences to solve engineering difficulties by utilizing advanced technology.
PSO3	Understanding the interdisciplinary skills and research knowledge to remain competitive.

Course Outcomes:

Course Name	Course Outcomes:
Algebra and Calculus (2OABS9901)	CO1: Make use of matrix algebra techniques that is needed by engineers for practical applications.
	CO2: Utilize mean value theorems to real life problems
	CO3: Interpret with functions of several variables which is useful in optimization
	CO4: Analyze 2- dimensional and 3- dimensional concepts in coordinate systems
	CO5: utilize the concept of special function.
Engineering Physics (2OABS9903)	CO1: Apply the fundamental laws of mechanics to solve engineering problems.
	CO2: Analyze and apply the concepts of architectural acoustics and ultrasonics.
	CO3: Analyze the properties of dielectric materials and magnetic materials for device applications.
	CO4: Examine the types of Lasers and propagation of electromagnetic waves in optical fibers for various applications.
	CO5: List the basic sensors for various applications.
Basics of Electrical & Electronics Engineering (2OAES0202)	CO1: Apply concepts of KVL/KCL in solving DC circuits
	CO2: Illustrate working principles of induction motor - DC Motor
	CO3: Identify type of electrical machine based on their operation
	CO4: Describe operation and characteristics of diodes and transistors
	CO5: Make use of diodes and transistors in simple, typical circuit applications.
	CO6: Understand operation of basic op-amp circuits
Engineering Graphics (2OAES0301)	CO1: Draw various curves applied in engineering.
	CO2: Show projections of solids and sections graphically.
	CO3: Draw the development of surfaces of solids.
	CO4: Use computers as a drafting tool.
	CO5: Draw isometric and orthographic drawings using CAD packages.
Problem Solving and Programming (2OAES0501)	CO1: Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2: Able to know problem solving aspects, design and analysis of algorithm
	CO3: Able to know flow control, input output and implementation functions
	CO4: Able to solve computational problems using functions, array and pointers
	CO5: Able to organise real world heterogeneous data and apply searching ,sorting techniques with exception handling

Engineering Physics Lab (2OABS9908)	CO1:	Operate various optical instruments and Estimate wavelength of laser and particles size using laser.
	CO2:	Estimate the susceptibility and related magnetic parameters of magnetic materials and plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO3:	Evaluate the acceptance angle of an optical fiber and numerical aperture and determine magnetic susceptibility of the material and its losses by B-H curve.
	CO4:	Identify the type of semiconductor i.e., n-type or p-type using Hall effect.
	CO5:	Apply the concepts of sensors for various applications.
Basics of Electrical & Electronics Engineering Lab (2OAES0204)	CO1:	Apply concepts of KVL/KCL in solving DC circuits
	CO2:	Illustrate working principles of induction motor - DC Motor
	CO3:	Identify type of electrical machine based on their operation
	CO4:	Describe operation and characteristics of diodes and transistors.
	CO5:	Make use of diodes and transistors in simple, typical circuit applications.
	CO6:	Understand operation of basic op-amp circuits.
Problem Solving and Programming Lab (2OAES0503)	CO1:	Construct a Computer given its parts
	CO2:	Select the right control structure for solving the problem
	CO3:	Analyze different sorting algorithms
	CO4:	Design solutions for computational problems
	CO5:	Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Differential Equations and Vector Calculus (2OABS9906)	CO1:	Apply the mathematical concepts of ordinary differential equations of higher order.
	CO2:	Solve the differential equations related to various engineering fields.
	CO3:	Identify solution methods for partial differential equations that model physical processes.
	CO4:	Interpret the physical meaning of different operators such as gradient, curl and divergence.
	CO5:	Estimate the work done against a field, circulation and flux using vector calculus.
Engineering Chemistry (2OABS9905)	CO1:	Understand the disadvantages of using hard water in domestically and industrially and select suitable treatments
	CO2:	Apply the electrochemical principles to the construction of battery and fuel cells, understand the corrosion prevention methods and factors affecting corrosion
	CO3:	Outline the preparation, mechanism, properties and applications of polymer and conducting polymers and Interpret the different types of conventional and nonconventional fuels
	CO4:	Understand the manufacturing of Portland cement and properties of concrete
	CO5:	Utilize the applications of physicochemical methods in surface characterization of solids

Communication English (20AHS9901)	CO1:	Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
	CO2:	Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
	CO3:	Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
	CO4:	Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
	CO5:	Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing
Basics of Python Programming (20AES0509)	CO1:	Understanding the syntax and semantics of Python programming.
	CO2:	Apply modularity to programs.
	CO3:	Select appropriate data structure of Python for solving a problem.
	CO4:	Implement Mutable and Immutable data types
	CO5:	Interpret the concepts of object oriented programming as used in Python
Engineering Workshop Practice (20AES0304)	CO1:	Make moulds for sand casting.
	CO2:	Develop different weld joints.
	CO3:	Assemble or disassemble of machine components.
	CO4:	Make plastic components.
	CO5:	Use power tools and find applications of hydraulic and pneumatic circuits.
Communication English Lab (20AHS9902)	CO1:	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
	CO2:	Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussions.
	CO3:	Improve words knowledge and apply skills in various language learning activities.
	CO4:	Analyze speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO5:	Evaluate and exhibit acceptable etiquette essentials in social and professional presentations
Engineering Chemistry Lab (20ABS9910)	CO1:	Demonstrate volumetric analysis involved with emphasis on solution preparation,
	CO2:	Develop knowledge to prepare advanced materials
	CO3:	Acquire knowledge to measure the strength of an acid present in secondary batteries
	CO4:	Familiarize with digital and instrumental methods of analysis
	CO5:	Apply important chemical concepts and principles to analyse mixture of components by chromatographic techniques.
Basics of Python Programming Lab (20AES0503)	CO1:	Design solutions to mathematical problems.
	CO2:	Organize the data for solving the problem.
	CO3:	Develop Python programs for numerical and text based problems.
	CO4:	Select appropriate programming construct for solving the problem.
	CO5:	Illustrate object oriented concepts

Constitution of India (20AMC9902)	CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4: Discuss the Powers and functions of Governor, President, Judiciary.
	CO5: Discuss the functions of local administration bodies.
Probability & Statistics, PDE (20ABS9913)	CO1: Understand the concepts of Central Tendency, Correlation, Regression concepts
	CO2: Apply discrete and continuous probability distributions
	CO3: Design the components of a classical hypothesis test for large samples.
	CO4: Infer the statistical inferential methods based on small sampling tests.
	CO5: Find the general solution of the PDEs bearing applications
Thermodynamics 20APC0308	CO1: Explain the importance of thermodynamic properties related to conversion of heat energy into work.
	CO2: Apply the laws of thermodynamics to boilers, heat pumps, refrigerators, heat engines, compressors and nozzles.
	CO3: To understand concept of Entropy and Availability of system
	CO4: Utilize steam properties to design steam based components.
	CO5: Compare thermodynamic relations and air standard cycles.
Engineering Mechanics 20APC0301	CO1: Resolve forces and moments in mechanical systems.
	CO2: Identify the frictional forces and its influence on equilibrium.
	CO3: Find the centre of gravity and moment of inertia for various geometric shapes
	CO4: Demonstrations of equilibrium of ideal systems and estimation of the work done by the force and the couple
	CO5: Determine the displacement, velocity and acceleration relations in dynamic systems
Material Science and Engineering 20APC0306	CO1: Explain the principles of binary phases
	CO2: Apply heat treatment to different applications and its defects
	CO3: Select steels and cast irons for a given application
	CO4: Utilize non ferrous metals and alloys in engineering
	CO5: Choose composites for various applications. Assess the properties of Nano-materials and their applications
Machine Drawing 20APC0303	CO1: Understand the Concepts of Conventional Representation of Materials & Machine Elements
	CO2: Draw the Machine Elements and simple parts
	CO3: Draw the assembled views for the part drawings of the Engine parts
	CO4: Draw the assembled views for the part drawings of the other machine parts – Screws jacks, Machine Vices Plummer block, Tailstock.
	CO5: Draw the assembled views for the part drawings of the Valves

Material Science and Engineering Lab 20APC0307	CO1: Identify various microstructures of steels and cast irons.
	CO2: Visualize grains and grain boundaries
	CO3: Evaluate hardness of treated and untreated steels
	CO4: Summarize the importance of hardening of steels
	CO5: Study the Micro structure of Heat treated steels.
Mechanical Engineering Workshop Practice 20APC0313	CO: 1 Make moulds for sand casting
	CO: 2 Develop different weld joints
	CO: 3 Assemble or disassemble of machine components
	CO: 4 Make plastic components
	CO: 5 Use power tools and find applications of hydraulic and pneumatic circuits
COMPUTER AIDED DRAFTING Lab 20APC0324	CO1: Understand the CAD software
	CO2: Understand the elements of CAD tools
	CO3: Design the draw, modify toolbar
	CO4: Design the solids, intersection in 3D
	CO5: Analyze the perceptive views and orthographic views
CATIA Lab 20ASC0301	CO1: Design of 2D models using software
	CO2: Design of 3D models and analysis
	CO3: Create simulation of any simple components
	CO4: Design and simulation of machine components
	CO5: Analysis of any components using software
Environmental Studies 20AMC9903	CO1: Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2: Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.
	CO3: Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4: Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5: To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Internet of Things (IoT) (20AES0505)	CO1: Interpret the vision of IoT from a global context.
	CO2: Determine the Market perspective of IoT.
	CO3: Compare and Contrast the use of Devices, Gateways and Data Management in IoT.
	CO4: Implement state of the art architecture in IoT.
	CO5: Illustrate the application of IoT in Industrial Automation and identify Real World Design Constraints.


Thermal Engineering 20AES0324	CO1:	To student can know working of both S.I and C.I engines with the help of indicator diagrams.
	CO2:	Student can understand the fuel supply systems, cooling, lubrication and ignition systems
	CO3:	Student can understand the flame propagation inside the cylinder, stages of combustion in S.I and C.I engines
	CO4:	To familiar with indicated power, brake power and friction power and their methods of measurement
	CO5:	the working of reciprocating and rotary air compressors. Student can calculate work done by single and multistage reciprocating air compressors
Manufacturing Technology 20APC0312	CO1:	Demonstrate different metal casting processes and gating systems
	CO2:	Classify working of various welding processes
	CO3:	Evaluate the forces and power requirements in rolling process
	CO4:	Apply the principles of various forging operations
	CO5:	Outline the manufacturing methods of plastics and ceramics.
Mechanics of Materials 20APC0302	CO1:	Apply the concepts of stress and strain to machine members
	CO2:	Determine, shear forces, and bending moments in beams
	CO3:	Estimate the stresses in machine members such as shafts and springs and design
	CO4:	Estimate the stresses in thin cylinders due to internal pressure
	CO5:	To find slope and deflection in beams, determine shear forces and bending moments in beams
Managerial Economics and Financial Analysis (20AHSMB01)	CO1:	Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2:	Apply the Concept of Production cost and revenues for effective Business decision
	CO3:	Analyze how to invest their capital and maximize returns.
	CO4:	Evaluate the capital budgeting techniques.
	CO5:	Define the concepts related to financial accounting and management and able to develop the accounting statements and evaluate the financial performance of business entity
Universal Human Values (20AHS9905)	CO1:	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
	CO2:	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3:	They would have better critical ability.
	CO4:	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	CO5:	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction

Thermal Engineering Lab (20APC0326)	CO1:	To student can know working of both S.I and C.I engines with the help of indicator diagrams.
	CO2:	Student can understand the fuel supply systems, cooling, lubrication and ignition systems
	CO3:	Student can understand the flame propagation inside the cylinder, stages of combustion in S.I and C.I engines
	CO4:	To familiar with indicated power, brake power and friction power and their methods of measurement
	CO5:	the working of reciprocating and rotary air compressors. Student can calculate work done by single and multistage reciprocating air compressors.
Mechanics of Materials Lab 20APC0304	CO1:	Analyze the strength of the beam, SSB
	CO2:	Design the various types of springs and their loads
	CO3:	Test the load and strength of bricks, cubes.
	CO4:	Define and analyze shear test, stress
	CO5:	Design the strain, stress and compression
Manufacturing Process Lab (20ASC0302)	CO1:	Fabricate different types of components using various manufacturing techniques.
	CO2:	Carry out Pattern preparation and Estimate the Sand properties
	CO3:	Carry out the Welding process to join the components
	CO4:	Carry out Blanking & Piercing operation
	CO5:	Adapt material forming methods.
Machine Tools 20APC0327	CO1:	To understand the basic concepts of the philosophy of metal cutting and the mechanism of chip formation
	CO2:	To understand the basic concepts of turning
	CO3:	To understand the basic principle of drilling, shaping and planning operation, parts of the drilling
	CO4:	To able to understand the principle of milling, grinding, Lapping, Honing and Broaching operation
	CO5:	To understand the design of Jigs and fixtures and uses, Classification of Jigs & Fixtures – Principles of location and clamping
Kinematics of Machines 20APC0309	CO1:	To enable the students in selection of appropriate mechanisms.
	CO2:	To impart the clear idea in constructing velocity & acceleration diagrams for the given mechanism
	CO3:	To provide an overview of straight line motion mechanisms, steering mechanisms and Hooke's joint.
	CO4:	To understand the kinematic analysis of gears & gear trains.
	CO5:	To develop the knowledge of kinematic analysis of cams.
Fluid Mechanics & Hydraulic Machinery 20APC0314	CO1:	Interpret the behavior under static and dynamic conditions.
	CO2:	analyze one dimensional viscous flows using conservation laws for compressible and incompressible flows
	CO3:	apply boundary layer flows for laminar and turbulent regimes.
	CO4:	explain Reynolds stresses and its application
	CO5:	explain different types of pumps and their application


Entrepreneurship Development 20AOEMB02	CO1:	Understand the concept of Entrepreneurship and challenges in the world of Competition
	CO2:	Apply the Knowledge in generating ideas for New Ventures and design business plan structure
	CO3:	Analyze various sources of finance and subsidies to entrepreneurs
	CO4:	Evaluate the role of central government and state government in promoting women Entrepreneurship.
	CO5:	Study the role of incubations in fostering startups
Artificial Intelligence (20APC0521)	CO1:	Understand the basic concepts of Artificial Intelligence
	CO2:	Apply searching techniques for solving a problem
	CO3:	Analyze the concepts of Reinforcement Learning
	CO4:	Develop Natural Language Interface for Machines
	CO5:	Understanding the concepts to design a robotics
Sensor Networks (20APE0416)	CO1:	Understand the concepts of Converters and Sensor data acquisition systems
	CO2:	Understand the concepts of Sensor Measurements in Structural Monitoring
	CO3:	Understand the concepts of commonly used sensing technologies and algorithms
	CO4:	Understand the concepts of piezoelectric transducers for assessing and monitoring infrastructures
	CO5:	Understand the concepts of Fiber optic sensors for assessing and monitoring infrastructures
Renewable Energy Technologies (20APE0306)	CO1:	Explain the current energy scenario and requirement of migration to renewable energy sources
	CO2:	To understand role significance of solar energy
	CO3:	To provide importance of Wind Energy
	CO4:	To understand the role of ocean energy in the Energy Generation
	CO5:	To understand role of hydrogen in non conventional energy
Introduction to CAD/CAM 20APE0302	CO1:	Understand the basic concepts components of CAD/CAM. Concepts of Graphics techniques
	CO2:	Understand the concepts of Geometric representation methods.
	CO3:	Understand and apply Numerical CNC Part Programming methods.
	CO4:	Understand the concepts of Group technology and techniques, production flow Analysis.
	CO5:	Understand the concepts of FMS and its elements.
Fluid Mechanics & Hydraulic Machinery Lab 20APC0315	CO1:	Interpret the behavior under static and dynamic conditions.
	CO2:	analyze one dimensional viscous flows using conservation laws for compressible and incompressible flows
	CO3:	apply boundary layer flows for laminar and turbulent regimes
	CO4:	explain Reynolds stresses and its application
	CO5:	explain different types of pumps and their application.

Machine Tools – 1 Lab 20APC0329	CO1:	To apply knowledge of tool materials and cutting fluids in the machine shop
	CO2:	To develop the hands-on experience on different machining processes that will enable them to work in a typical machine shop.
	CO3:	To apply knowledge of metal cutting parameters, tool wear mechanisms
	CO4:	To understand the basic calculations of machining parameters.
	CO5:	To develop the practical knowledge on groove cutting, gear cutting
SOFT SKILLS 20ASA0502	CO1:	Recognize the importance of verbal and non verbal skills
	CO2:	2. Develop the interpersonal and intrapersonal skills
	CO3:	3. Apply grammatical structures to formulate sentences and correct word forms.
	CO4:	4. Create trust among people and develop employability skills
	CO5:	5. Develop the skills needed for approaching different types of interviews.
Professional Ethics and Human Values 20AMC9904	CO1:	It ensures students sustained happiness through identifying the essentials of human values and skills.
	CO2:	The students will understand the importance of Values and Ethics in their personal lives and professional careers
	CO3:	The students will learn the rights and responsibilities as an employee, team member and a global citizen
	CO4:	Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5:	Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life
Heat Transfer 20APC0317	CO1:	To understand the concept of modes of heat transfer and to solve problems on conduction heat transfer.
	CO2:	To understand heat transfer through extended surfaces and solve the problems in 1-D transient conduction heat transfer
	CO3:	To understand concept of the convection heat transfer and to solve practical problems on forced and natural convection heat transfer.
	CO4:	Calculate heat transfer in boiling, condensation and understand principle behind heat exchangers and solve problems using LMTD and NTU methods.
	CO5:	Understand basic concepts of radiation heat transfer from black and gray bodies and solve problems involving radiation shields
Design of Machine Elements 20APC0316	CO1:	To apply design procedures using theories of failure for different elements
	CO2:	Able to design simple components under cyclic loading using Goodman's and Soderberg's criterions
	CO3:	Able to design riveted joints with different configuration, boiler shell joint design and eccentric loading design of riveted joints
	CO4:	To design cotter joint, knuckle joint and shafts
	CO5:	To design various rigid and flexible shaft couplings

Dynamics of Machines 20APC0318	CO1:	To understand the application of friction in pivots, collars, clutches, brakes, and dynamometers, and also to solve the numerical problems
	CO2:	To understand gyroscopic effect on Aeroplane, ship, four wheel and two-wheel vehicles. To design a flywheel for reciprocating engine and punching press.
	CO3:	To understand the working of various types of governors and to analyze the forces acting on them. To solve numerical problems on balancing of rotating masses
	CO4:	To understand that effect of primary and secondary balancing of reciprocating masses in locomotive engines, V-engine, inline engines and Radial engines
	CO5:	To understand the concept of different types of vibratory systems and to perform simple calculations of vibration systems
Composite materials 20APE0305	CO1:	To study matrix material, reinforcements of polymer matrix composites, MMC and ceramic matrix composites.
	CO2:	To develop knowledge on manufacturing methods of composites
	CO3:	To develop knowledge on processing techniques and applications of PMCs
	CO4:	To develop knowledge on processing techniques and applications of PMCs
	CO5:	To develop knowledge on processing techniques and applications of CMCs and Carbon- carbon composites
CAM Lab 20APC0328	CO1:	To introduce fundamentals of the analysis software, its features and applications
	CO2:	To learn the basic element types in Finite Element analysis
	CO3:	To understand the stress analysis on different load conditions.
	CO4:	To know the concept of discretization of continuum, Loading conditions.
	CO5:	To analyze the structure using pre-processor and postprocessor conditions.
Heat Transfer Lab 20APC0318	CO1:	Estimate heat transfer coefficients in forced and natural convection and determine the effectiveness of heat exchangers and heat pipe.
	CO2:	Perform the transient heat conduction experiment and obtain the variations of temperature along length of pin-fin
	CO3:	To determine overall heat transfer coefficient for composite walls
	CO4:	Perform experiment to determine thermal conductivity of metal rod.
	CO5:	Perform radiations experiments and determine the surface emissivity and Stefan boltzman's constant and compare the theoretical values
Machine Tools – 2 Lab 20APC0330	CO1:	Learn the Step turning and taper turning
	CO2:	Learn the thread cutting Drilling and Tapping on the lathe machine
	CO3:	The operations of Shaping and Planning and milling
	CO4:	Understand the basics of surface grinding operations
	CO5:	To analyze the surface finish on planar machine.
Crystal structure Analysis Lab 20ASC0303	CO1:	Determination of mechanical properties of different materials.
	CO2:	Establish the constitutive relations in metals using destructive methods.
	CO3:	Understand the behavior of micro structures in specimens.
	CO4:	Familiarize with standard test specimens.
	CO5:	Prepare samples for investigating micro structure of different materials


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 Karakambadi Road, Venkatapuram (Vt
 TELUPATI - 517 520

Biology for Engineers 20AMC9901	CO1:	Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms
	CO2:	Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3:	Brief about human physiology.
	CO4:	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
	CO5:	Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals


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B.Tech- Electronics and Communication Engineering

Program outcomes:

PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitation.
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice
PO9	Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply the set to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Program Specific Outcomes:

PSO1	Able to design, apply and demonstrate the principles of electronic, digital systems, in the field of consumer electronics, communications and in different applications.
PSO2	Able to solve complex problems using latest hardware and software tools along with analytical skills to arrive cost effective and appropriate solutions in different areas like Electronics & Communications

Course Outcomes:

Course Name	Course Outcomes(COs):
Algebra and Calculus (20ABS9901)	CO1: Make use of matrix algebra techniques that is needed by engineers for practical applications.
	CO2: Utilize mean value theorems to real life problems.
	CO3: Interpret with functions of several variables which is useful in optimization.
	CO4: Analyze 2-dimensional and 3-dimensional concepts in coordinate systems
	CO5: Utilize the concept of special functions
Applied Physics (20ABS9902)	CO1: Analyze the intensity variation of light due to interference and diffraction & illustrate the propagation of electromagnetic waves
	CO2: Analyze and apply the concepts of LASER and optical fibres
	CO3: Infer the properties of dielectric and magnetic materials.
	CO4: Apply the fundamentals of semiconductors for device applications.
	CO5: Implement the behaviour of superconductors in diverse fields & interpret the properties of nanomaterials for multiple applications
Communicative English (20AHS9901)	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
Engineering Workshop Practice (20AES0304)	CO1: Apply wood working skills in real world applications.
	CO2: Build different parts with metal sheets in real world applications.
	CO3: Apply fitting operations in various applications.
	CO4: Apply different types of basic electric circuit connections.
	CO5: Demonstrate soldering and brazing.

Problem Solving and Programming (20AES0501)	CO1: Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2: Able to know problem solving aspects, design and analysis of algorithm
	CO3: Able to know flow control, input output and implementation functions
	CO4: Able to solve computational problems using functions, array and pointers
	CO5: Able to organise real world heterogeneous data and apply searching ,sorting techniques with exception handling
Communicative English Lab (20AHS9902)	CO 1: Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
	CO 2: Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussions
	CO 3: Improve words knowledge and apply skills in various language learning activities.
	CO 4: Analyze speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
	CO 5: Evaluate and exhibit acceptable etiquette essentials in social and professional presentations.
Applied Physics Lab (20ABS9907)	CO1: Analyze the wave properties of light and the interaction of energy with the matter.
	CO2: Apply electromagnetic wave propagation in different guided media.
	CO3: Asses the electromagnetic wave propagation and its power in different media
	CO4: Analyze the conductivity of semiconductors.
	CO5: Interpret the dielectric and magnetic properties of materials and apply the nanomaterials foe engineering applications.
Problem Solving and Programming Lab (20AES0503)	CO1: Assemble and disassemble parts of computer
	CO2: Identify to control structure to solving the problem
	CO3: Analyze different sorting algorithms
	CO4: Design solutions for computational problems
	CO5: Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Differential Equations and Vector Calculus (20ABS9906)	CO1: Apply the mathematical concepts of ordinary differential equations of higher order.
	CO2: Solve the differential equations related to various engineering fields .
	CO3: Identify solution methods for partial differential equations that model physical processes .
	CO4: Interpret the physical meaning of different operators such as gradient, curl and divergence .
	CO5: Evaluate the work done against a field, circulation and flux using vector calculus .

Chemistry (20ABS9904)	CO1: Interpret the behaviour and interactions between matter and energy at both the atomic and molecules levels
	CO2: Apply the electrochemical principles to the construction of batteries, fuel cells and electrochemical sensors
	CO3: Outline the preparation, mechanism properties and applications of polymer and conducting polymers.
	CO4: Analyze the separation of gaseous and liquid mixtures using instrumental methods and their applications.
	CO5: Understand the disadvantages of using hard water in domestically and industrially and select suitable treatments.
Network Theory (20AES0201)	CO1: Solve network problems using mesh and nodal analysis techniques
	CO2: Analyze networks using Thevenin, Norton, Maximum power transfer, Superposition, Miller and Millman theorems
	CO3: Compute responses of first order and second order networks using time & frequency domain analysis
	CO4: Design resonant circuits for given bandwidth
	CO5: Utilize z, y, ABCD and h parameters for analyzing two port circuit behaviour
Data Structures (20AES0502)	CO1: Understand the concept of cloud computing
	CO2: Ability to understand various service delivery models of a cloud computing architecture
	CO3: understanding cloud service providers
	CO4: Configure various virtualization tools such as virtual box, vm ware work station
	CO5: Analyze authentication, confidentiality and privacy issues in computing
Engineering Graphics (20AES0301)	CO1: Draw various curves applied in engineering.
	CO2: Show projections of solids and sections graphically.
	CO3: Draw the development of surfaces of solids.
	CO4: Use computers as a drafting tool.
	CO5: Draw isometric and orthographic.
Network Theory Lab (20AES0203)	CO1: Verify Kirchhoff's laws and network theorems
	CO2: Measure time constants of RL & RC circuits
	CO3: Analyze behavior of RLC circuit for different cases
	CO4: Design resonant circuit for given specifications
	CO5: Characterize and model the network in terms of all network parameters
Chemistry Lab (20ABS9909)	CO1: Demonstrate volumetric analysis involved with emphasis on solution preparation, dilution and chemical calculations.
	CO2: Develop knowledge to prepare advanced materials.
	CO3: Acquire knowledge to measure the strength of an acid present in secondary batteries.
	CO4: familiarize with digital and instrumental methods of analysis
	CO5: Apply important chemical concepts and principles to analyze mixture of components by chromatographic techniques.

Data Structures Lab (20AES0504)	CO1: Select the data structure appropriate for solving the problem
	CO2: Implement searching and sorting algorithm
	CO3: derive new data types
	CO4: Illustrate the working of linear and non linear data structure .
	CO5: Organize the data using files structure
Constitution of India (20AMC9902)	CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4: Discuss the Powers and functions of Governor, President, Judiciary.
	CO5: Discuss the functions of local administration bodies.
Electronic Devices & Circuits (20APC0401)	CO1: Understand the operation of diodes and special electronic devices.
	CO2: Know operation of different rectifiers without and filters.
	CO3: Understand construction, operation of BJT, FET in different configurations
	CO4: Know the need of biasing and design of DC biasing circuits.
	CO5: Design of amplifiers with BJTs and FETs by using small signal model
Switching Theory And Logic Design (20APC0402)	CO1: To introduce basic postulates of Boolean algebra.
	CO2: To introduce basic methods for simplifying Boolean expressions
	CO3: To illustrate the concepts and study the procedures for the analysis and design of combinational circuits.
	CO4: To illustrate the concepts and study the procedures for the analysis and design of sequential circuits.
	CO5: To introduce the concepts of programmable logic devices.
Signals & Systems (20APC0403)	CO1: Understand mathematical description and representation of continuous time and discrete time signals.
	CO2: Resolve signals in frequency domain using Fourier Series and Fourier Transforms
	CO3: Apply sampling theorem to convert continuous-time signals to discrete-time signal
	CO4: Understand the properties of systems, response of LTI systems and filters.
	CO5: Able to analyze CT LTI systems and DTLTI systems using Laplace and Z-Transforms
Transform Techniques And Complex Variables (20ABS9912)	CO1: Interpret the Laplace transform for solving differential equations(continuous system)
	CO2: Evaluate Fourier series of periodic signal.
	CO3: Evaluate and be able to apply integral expressions for Fourier and inverse transforms.
	CO4: Make use of Z-transform techniques for discrete time system..
	CO5: Analyze the differentiation and integration of complex functions used in engineering problems.

Managerial Economics and Financial Analysis (20AHSMB01)	CO1: Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2: Apply the Concept of Production cost and revenues for effective Business decision
	CO3: Analyze how to invest their capital and maximize returns
	CO4: Evaluate the capital budgeting techniques
	CO5: Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity
Electronic Devices & Circuits Lab (20APC0404)	CO1: Test and operate diodes and special electronic devices.
	CO2: Construct and operate rectifiers without and with filters.
	CO3: Construct and operate BJT, FET in different configurations.
	CO4: Design DC biasing circuits for Transistors.
	CO5: Design amplifiers using BJTs and FETs.
Signals & Systems Lab (20APC0405)	CO1: Understand basics of MATLAB syntax, functions and programming.
	CO2: Generate and characterize various signals and perform the basic operations
	CO3: Design and analyze linear time-invariant (LTI) systems and compute its response
	CO4: Analyze the spectral characteristics of signals using Fourier analysis
	CO5: Analyze the systems using Laplace transforms and Z-transforms.
Switching Theory And Logic Design Lab (20APC0406)	CO1: Ability to verify all logic gates.
	CO2: Ability to Design combinational circuits.
	CO3: Ability to design flip flops.
	CO4: Ability to design counters.
	CO5: Ability to design sequence generator.
Electronic Circuit Design (20ASC0401)	CO1: Identify basic Electronic Components
	CO2: Understand Fundamentals of Circuit Design.
	CO3: Construct different Power Supply circuits.
	CO4: Analyze Printed Circuit Boards.
	CO5: Design a Electronic circuit as a mini project.
Biology For Engineers (20AMC9901)	CO1: Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
	CO2: Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3: Brief about human physiology
	CO4: Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
	CO5: Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.
Basics Of Python Programming (20AES0509)	CO1: Understanding the syntax and semantics of Python programming.
	CO2: Apply modularity to programs
	CO3: Select appropriate data structure of Python for solving a problem.
	CO4: Implement Mutable and Immutable data types
	CO5: Interpret the concepts of object oriented programming as used in Python

Probability Theory And Stochastic Processes (20APC0407)	CO1: Understand the concepts of probability and random variables.
	CO2: Understand the concepts of Multiple Random Variables and operations that may be performed on Multiple Random variables.
	CO3: Understand the concepts of Random Process and its Temporal Characteristics.
	CO4: Understand the concepts of Random Process and its Spectral Characteristics.
	CO5: Understand the Spectral characteristics of response of an LTI system
Electromagnetic Theory & Transmission Lines (20APC0408)	CO1: Understand basic laws of electric fields and Solve problems related to electric fields equations for static and time varying fields.
	CO2: Apply laws of magnetic fields and Solve problems related to magnetic fields.
	CO3: Analyze electric and magnetic fields at the interface of different media and derive Maxwell's
	CO4: Proficient with analytical skills for understanding propagation of electromagnetic waves in different media.
	CO5: Understand the concept of transmission lines & their applications.
Analog Communication Systems (20APC0409)	CO1: Acquire knowledge on the basic concepts of Analog Communication Systems.
	CO2: Analyze the analog modulated and demodulated systems.
	CO3: Analyze the performance of the communication system in presence of noise
	CO4: Know the working of various transmitters and receivers
	CO5: Know the fundamental concepts of information and capacity.
Electronic Circuit Analysis (20APC0410)	CO1: Understand multi stage amplifiers using BJT and FET.
	CO2: Understand high frequency model and analyze its frequency responses.
	CO3: Understand feedback amplifiers and oscillators along with design.
	CO4: Understand power amplifiers.
	CO5: Understand tuned amplifiers and their effect on bandwidth and stability.
Basics Of Python Programming Lab (20AES0510)	CO1: Write, test and debug python programs
	CO2: Implement conditionals and loops for python programs
	CO3: Use functions and represent compound data using lists, tuples and dictionaries
	CO4: Read and write data from & to files in python and develop application using python
	CO5: Implement the problem in terms of real world object using OOPs concepts.
Analog Communication Systems Lab (20APC0411)	CO1: Design modulation and demodulation circuits such as AM, PM, FM.
	CO2: Design the PAM, PWM&PPM circuits
	CO3: Identify and understand different types of antennas, radiation pattern
	CO4: Identify and measure Radio receiver measurements the parameters
	CO5: Construct pre-emphasis and de-emphasis at the transmitter and receiver respectively
Electronic Circuit Analysis Lab (20APC0412)	CO1: The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
	CO2: Designing and analyzing the transistor at high frequencies.
	CO3: Determine the efficiencies of power amplifiers.
	CO4: Determine Frequency response and design of tuned amplifiers.
	CO5: Able to Analyze all the circuits using simulation software and Hardware.

Internet Of Things (20ASC0402)	CO1: Describe characteristics and functionality of IoT
	CO2: Understand the types of Sensors
	CO3: Compute the different enabling technologies for Arduino IDE
	CO4: Assemble different electronic components in Development Boards
	CO5: Design an IOT application as a mini project.
Universal Human Values (20AHS9905)	CO1: Students are expected to become more aware of themselves, and their surroundings(family, society, nature)
	CO2: They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships in human nature in mind.
	CO3: They would have better critical ability.
	CO4: They would also become sensitive to their commitment towards what they have understood(human values, human relationship and human society)
	CO5: It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, atleast a beginning would be made in this direction.
Antennas And Wave Propagation (20APC0413)	CO1: Apply parametric equations for the calculation of antenna parameters in far field region.
	CO2: Identify Loop antenna, helical antenna, horn antenna and its parameters
	CO3: Compute Micro-strip antenna, Reflector and Lens antennas and its parameters.
	CO4: Analyze principle of pattern multiplication for antenna arrays.
	CO5: Illustrate different modes of Wave propagation in atmospheric layers
Digital Communication Systems (20APC0414)	CO1: Understand the various pulse code modulation techniques..
	CO2: Analyze and compute performance parameters in baseband pulse transmission.
	CO3: Apply the knowledge of signal representations and describe their error probabilities in Digital Communication Systems.
	CO4: Understand and analyze systems based on digital modulation techniques
	CO5: Analyze various Error detection and Error correction codes in Digital Communication Systems.
Integrated Circuits And Applications (20APC0415)	CO1: Understand the basic building blocks of linear integrated circuits and its characteristics.
	CO2: Analyze different feedback amplifiers and its frequency response.
	CO3: Compare linear and non-linear applications of operational amplifiers.
	CO4: Illustrate the importance of specialized applications of Operational Amplifier by using specialized ICs.
	CO5: Describe the different types of A/D and D/A converters.
OPERATING SYSTEMS (20APC0515)	CO1: Distinguish between the different types of operating system environments
	CO2: Apply the concepts of process synchronization & CPU scheduling.
	CO3: Develop solutions to deadlock and memory management.
	CO4: Analyze various disk scheduling algorithms and file system interfaces.
	CO5: Analyze the various security issues and goals of protection.


PRINCIPAL
ANNAMACHARYA INSTITUTE OF
TECHNOLOGY & SCIENCES
 Karakambadi Road, Venkatapuram (V)
TIRUPATI - 517 520

Programmable Logic Controllers (20AOE0202)	CO1: Understand the purpose, functions, and operations of a PLC and Identify the basic components of the PLC and how they function.
	CO2: View a directory of processor files using PLC software and Ability to gain knowledge on Programmable Logic Controllers.
	CO3: Will understand different types of Devices to which PLC input and output modules are Connected and To provide the knowledge about understand various types of PLC registers.
	CO4: Able to create ladder diagrams from process control descriptions.
	CO5: Ability to apply PLC timers and counters for the control of industrial processes. Able to use different types PLC functions, Data Handling Function.
Control Systems (20APC0213)	CO1: Formulate mathematical model and transfer function of the physical systems.
	CO2: Determine the stability of linear systems in time domain.
	CO3: Perform frequency domain analysis using bode and polar plot.
	CO4: Formulate and design state-space analysis
VLSI DESIGN (20APE0401)	CO1: Understand the IC fabrication process of MOS Transistors and Their Electrical Properties
	CO2: Understand and analyze the basic Integrated circuits.
	CO3: Design VLSI circuits at Gate-level using stick diagrams and layouts.
	CO4: Implement VLSI circuits at Physical-level through various design styles
	CO5: Testing of integrated circuits using VHDL synthesis and VLSI circuits.
Computer Organization (20APE0402)	CO1: Remember basic operations about computer
	CO2: Illustrate various configurations available in processor operations
	CO3: Compute different arithmetic operations done by a computer
	CO4: Analyze peripheral devices and its internal interfacing with computer
	CO5: Implement parallel processing techniques in computer operations.
Digital System Design (20APE0403)	CO1: Understand and analyze different Logic families and its interfacing
	CO2: Design different applications by understanding VHDL
	CO3: Analyze different combinational circuits and its logic
	CO4: Design logical analysis of different sequential circuits.
	CO5: Apply logical synthesis on designing applications.
Digital Communication Systems Laboratory (20APC0416)	CO1: Capable of Applying Digital communication Concepts using modulation schemes.
	CO2: Analyze real time behavior of modulation schemes using line codes.
	CO3: Visualize spectra of different digital modulation schemes.
	CO4: Simulate Digital communication concepts using digital modulation schemes
	CO5: Simulate Digital Modulation Techniques
Integrated Circuits And Applications Laboratory (20APC0417)	CO1: Understand and perform various linear application of op-amp.
	CO2: Understand and perform various non-linear application of op-amp
	CO3: Design and analyze oscillators and multivibrator circuits using op-amp
	CO4: Design and test filter circuits using op-amp
	CO5: Design and study various application of TL082IC.

Principles of Effective Public Speaking (20AHE9902)	CO 1: Apply knowledge of principles, concepts and skills learned in speech preparation.
	CO 2: Develop skills in speech composition.
	CO 3: Develop skills in effective listening.
	CO 4: Evaluate the delivery of speeches.
	CO 5: Use supporting materials and presentation aids in speech preparation.
Professional Ethics And Human Values (20AMC9904)	CO1: It ensures students sustained happiness through identifying the essentials of human values and skills
	CO2: The students will understand the importance of Values and Ethics in their personal lives and professional careers
	CO3: The students will learn the rights and responsibilities as an employee, team member and a global citizen.
	CO4: Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5: Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life.
Microprocessors And Microcontrollers (20APC0418)	CO1: Understand architecture details of 8085
	CO2: Review and analyze details of 8085 and 8086 architecture
	CO3: Illustrate brief details of 8086 operations
	CO4: Determine Importance of low power MSP 430 and its advancements
	CO5: Analyze Inbuilt peripherals of MSP 430 also Power management features.
Digital Signal Processing (20APC0419)	CO1: Analyze discrete signals and systems in time and frequency domains.
	CO2: Apply FFT algorithms to efficient computation of DFT.
	CO3: Implement and realize various structures of IIR and FIR systems.
	CO4: Design & analyze various Analog Filters and Digital Filters.
	CO5: Understand and apply the basics of multi rate digital signal processing.
Microwave And Optical Communications (20APC0420)	CO1: Review different fields in rectangular waveguides and performance of Gunn diode.
	CO2: Understand working of different waveguide components and analyze S parameters of waveguide junctions.
	CO3: Analyze the operation of O type tubes and measure different parameters of microwave test bench setup.
	CO4: Compare different optical fiber modes.
	CO5: Exemplify Optical sources, detectors and their working principles.
Low Power VLSI Circuits And Systems (20APE0404)	CO1: Remember concepts of MOS transistor logic and various sources of power dissipation.
	CO2: Analyze different sources of power dissipation and supply voltage scaling for low power.
	CO3: Estimate Low power design approaches for various circuit level measures.
	CO4: Verify various switched capacitance minimization methods.
	CO5: Illustrate various Leakage power minimization techniques.

MEMS And Microsystems (20APE0405)	CO1: Understand the Micro sensors and different material properties
	CO2: Illustrate micro machine process for different techniques
	CO3: Compare various characteristics in different types of Micro sensors
	CO4: Analyze MEMS accelerometers functionality and know its applications.
	CO5: Determine the use of MEMS devices in various applications.
Industrial Electronics (20APE0406)	CO1: Review of semi-conductors and understand the operation of Diodes
	CO2: Analyze the operation of Semiconductor Devices.
	CO3: Illustrate the characteristics of AC to DC converters.
	CO4: Identify the techniques of Heating and Welding methods.
	CO5: Implement various applications in Ultrasonics.
Microprocessors And Microcontrollers Laboratory (20APC0421)	CO1: Apply Assembly language instructions of 8086 microprocessor to describe the concept of programming and its applications to real world.
	CO2: Demonstrate the steps in executing an assembly language program using an assembler.
	CO3: Implement some specific real time applications Using MSP 430 low power microcontroller.
	CO4: Program MSP 430 for designing any basic Embedded System
	CO5: Examine concepts of Power management in MSP 430 Controllers
Digital Signal Processing Laboratory (20APC0422)	CO1: Analyze Power or Energy of a discrete time sequence.
	CO2: Compute convolution & Correlation of discrete time sequences
	CO3: Compute Fourier Transform of discrete time sequence
	CO4: Design and analyze various Analog Filters
	CO5: Design and analyze various Digital Filters
Microwave And Optical Communications Laboratory (20APC0423)	CO1: Apply and test Microwave Concepts/ Microwave components.
	CO2: Analyze Microwave Active Devices by conducting experiments and measuring various parameters.
	CO3: Perform and measure various parameters of an Antenna.
	CO4: Design and analyze an optical fiber communication link.
	CO5: Analyze the characteristics of Optical Sources and Optical fiber by conducting experiments and measuring various parameters.
Basics Of Cloud Computing (20ASA0501)	CO1: Ability to understand various service delivery models of a cloud computing architecture..
	CO2: Understanding cloud service providers.
	CO3: Configure various virtualization tools such as Virtual Box, VMware workstation
	CO4: Analyze authentication, confidentiality and privacy issues in cloud computing.

Environmental Studies (20AMC9903)	CO1: Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc
	CO2: Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.
	CO3: Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4: Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5: To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting


PRINCIPAL
ANNAMACHARYA INSTITUTE OF
TECHNOLOGY & SCIENCES
 Karakambadi Road, Venkatapuram (V)
TIRUPATI - 517 520

B.Tech-Computer Science & Engineering

Program outcomes:

PO NO.	Programme Outcome
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO No.	Programme Specific Outcomes
PSO1	(System Analysis and Design) Demonstrate the working principles of the hardware and software aspects of computer systems.
PSO2	(Product Development) Implementation and maintenance of software products based on the professional engineering practices with effective strategies.

Course Outcomes:

COURSE NAME	COURSE OUTCOMES	
Algebra and Calculus (20ABS9901)	CO1	Make use of matrix algebra techniques that is needed by engineers for practical Applications.
	CO2	Utilize mean value theorems to real life problems.
	CO3	Interpret with functions of several variables which is useful in optimization.
	CO4	Analyze 2- dimensional and 3- dimensional concepts in coordinate systems
	CO5	Utilize the concept of special functions
Chemistry (20ABS9904)	CO1	Interpret the behaviour and interactions between matter and energy at both the atomic and molecular levels
	CO2	Apply the electrochemical principles to the construction of batteries, fuel cells and electrochemical sensors
	CO3	Outline the preparation, mechanism properties and applications of polymer and conducting polymers.
	CO4	Analyze the separation of gaseous and liquid mixtures using instrumental methods and their applications.
	CO5	Understand the disadvantages of using hard water in domestically and industrially and select suitable treatments.
Problem Solving and Programming (20AES0501)	CO1	Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2	Able to know problem solving aspects, design and analysis of algorithm
	CO3	Able to know flow control, input output and implementation functions
	CO4	Able to solve computational problems using functions, array and pointers
	CO5	Able to organise real world heterogeneous data and apply searching ,sorting techniques with exception handling


PRINCIPAL
ANNAMACHARYA INSTITUTE OF
TECHNOLOGY & SCIENCES
 Karakambadi Road, Venkatapuram (V)
TIRUPATI - 517 520

Engineering Graphics (20AES0301)	CO1	Ability to discuss the conventions and methods of Engineering Drawing
	CO2	Ability to demonstrate drafting practices, visualization and projection skills
	CO3	Ability to perform basic sketching techniques of Engineering components
	CO4	Ability to draft the orthographic and pictorial views of a given Engineering components
	CO5	Ability to increasingly use architectural and engineering scales
Information Technology And Numerical Methods (20AES0505)	CO1	Usage of Digital World and Exploring Cyber space
	CO2	Explain the needs of hardware and software required for a computation task.
	CO3	Peripheral devices, networking and internet concepts
	CO4	Analyze the concepts of Errors, Algebraic & Transcendental Equations to solve different Engineering problems
	CO5	Analyze Interpolation using the concepts of the numerical methods and apply the Integration in numerical methods
	CO6	Apply the concepts of O.D.E on numerical method
Computer Science And Engineering Workshop (20AES0506)	CO1	Assemble and disassembling parts of a computer
	CO2	Develop Documents using Word processors
	CO3	Develop presentations using the presentation tool
	CO4	Perform computations using spreadsheet tool
	CO5	Design Graphics, Videos and Web pages
Chemistry Lab (20ABS9909)	CO1	Demonstrate volumetric analysis involved with emphasis on solution preparation, dilution and chemical calculations.
	CO2	Develop knowledge to prepare advanced materials.
	CO3	Acquire knowledge to measure the strength of an acid present in secondary batteries.
	CO4	familiarize with digital and instrumental methods of analysis
	CO5	Apply important chemical concepts and principles to analyze mixture of components by chromatographic techniques.
Problem Solving and Programming Lab (20AES0503)	CO1	Assemble and disassembling parts of a Computer
	CO2	Identify to control structure to solving the problem
	CO3	Analyze different sorting algorithms
	CO4	Design solutions for computational problems
	CO5	Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Applied Physics (20ABS9902)	CO1	Analyze the intensity variation of light due to interference and diffraction & illustrate the propagation of electromagnetic waves.
	CO2	Analyze and apply the concepts of LASER S and optical fibers.
	CO3	Infer the properties of dielectric magnetic material
	CO4	Apply the fundamentals of semi conductors for device applications
	CO5	Implement the behavior of superconductors in diverse fields & interpret the properties of nanomaterials for multiple applications.

Probability And Statistics (20ABS9911)	CO1	Interpret the characteristics through correlation and regression tools.
	CO2	Make use of the concepts of probability and their applications.
	CO3	Apply discrete and continuous probability distributions.
	CO4	Inference the components of a classical hypothesis test for large sample
	CO5	Inspect the components of a classical hypothesis test for small samples.
Communicative English (20AHS9901)	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
Data Structures (20AES0502)	CO1	Analyze and evaluate the efficiency of an algorithm
	CO2	Implement linear data structures
	CO3	implement non -linear data structures
	CO4	Solve the problem of efficiently using graphs and Hashing techniques
	CO5	Implement advanced sorting and organizing the file
Web Design (20AES0507)	CO1	Add elements to web pages, including colors, text, images, and more
	CO2	Add advanced features to your website including special effects
	CO3	Apply the CSS Knowledge to add colors and text formatting
	CO4	Apply advanced CSS style presentation and techniques
	CO5	Develop HTML and CSS Programs.
Communicative English Lab (20AHS9902)	CO1	Create Awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English
	CO2	Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussion
	CO3	Improve word knowledge and apply skills in various languages learning activities
	CO4	Analyze speech sounds, stress ,rhythm, intonation and syllable division for better listening and speaking comprehension
	CO5	Evaluate and exhibit acceptable etiquette essential in social and professional presentations.

Applied Physics Lab (20ABS9907)	CO1	Analyze the wave properties of light and the interaction of energy with the matter.
	CO2	Apply electromagnetic wave propagation in different guided media.
	CO3	Asses the electromagnetic wave propagation and its power in different media
	CO4	Analyze the conductivity of semiconductors.
	CO5	Interpret the dielectric and magnetic properties of materials and apply the nanomaterials for engineering applications.
Data Structures Lab (20AES0504)	CO1	Select the data structure appropriate for solving the problem
	CO2	Implement searching and sorting algorithms
	CO3	Derive new data types
	CO4	Illustrate the working of linear and non linear data structure
	CO5	Organize the data using Files structure
Environmental Studies (20AMC9903)	CO1	Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2	Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5	To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Discrete Mathematical Structures (20ABS9914)	CO1	Make use of mathematical logic to solve problems.
	CO2	Analyze the concepts and perform the operations related to sets, relations and functions.
	CO3	Identify basic counting techniques to solve combinatorial problems.
	CO4	Evaluate problems to solve recurrence relations
	CO5	Utilize Graph Theory in solving computer science problems
Digital Electronics & Microprocessors (20APC0503)	CO1	Design Logic circuit using basic concepts of Boolean algebra.
	CO2	Design Logic circuit using basic concepts of PLDs.
	CO3	Design sequential logic circuits.
	CO4	Design application using 8086 Microprocessor.
	CO5	Design application using 8051 Microcontroller.

Database Management Systems (20APC0502)	CO1	know the fundamentals of Databases
	CO2	Understand SQL and PL/SQL Concepts
	CO3	Design a database for a real-world information system
	CO4	Process and Optimize the query
	CO5	Working of transaction and concurrency techniques in real time applications
Basics of Python Programming (20AES0509)	CO1	Understanding the syntax and semantics of Python programming.
	CO2	Apply modularity to programs.
	CO3	Select appropriate data structure of Python for solving a problem.
	CO4	Implement Mutable and Immutable data types
	CO5	Interpret the concepts of object oriented programming as used in Python
Basics of Electrical & Electronics Engineering (20AES0202)	CO1	Apply concepts of KVL/KCL in solving DC circuits
	CO2	Illustrate working principles of induction motor - DC Motor
	CO3	Identify type of electrical machine based on their operation
	CO4	Describe operation and characteristics of diodes and transistors.
	CO5	Make use of diodes and transistors in simple, typical circuit applications.
	CO6	Understand operation of basic op-amp circuits.
Database Management Systems Lab (20APC0505)	CO1	Write SQL Queries
	CO2	Implement PL/SQL programs
	CO3	Design database for any real world problem
Basics of Python Programming Lab (20AES0510)	CO1	Write, Test and Debug Python Programs
	CO2	Implement Conditionals and Loops for Python Programs
	CO3	Use functions and represent Compound data using Lists, Tuples and Dictionaries
	CO4	Read and write data from & to files in Python and develop Application using Python
	CO5	Implement the problem in terms of real world object using OOPs concepts
Basics of Electrical & Electronics Engineering Lab (20AES0204)	CO1	Verify Kirchoff's Laws & Superposition theorem for dc supply
	CO2	Analyze the performance of AC and DC Machines by testing.
	CO3	Study I – V Characteristics of PV Cell & Perform speed control of dc shunt motor
	CO4	Ability to operate diodes for finding V-I Characteristics.
	CO5	Ability to construct and operate rectifiers without & with filters
	CO6	Ability to construct and operate BJT & FET Characteristics.
Client Side Scripting (20ASC0501)	CO1	Analyze and understand the basic concepts of web programming.
	CO2	Implement Arrays, Functions and Strings
	CO3	Apply techniques of form validation using Java Script.
	CO4	Describe important concepts related to client side Web Security.
	CO5	Save client information in cookie by server

Constitution Of India (20AMC9902)	CO1	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4	Discuss the Powers and functions of Governor, President, Judiciary.
	CO5	Discuss the functions of local administration bodies
Computer Organization (20APC0506)	CO1	Understand computer architecture concepts related to the design of modern processors, memories and I/Os
	CO2	Design Arithmetic and control unit
	CO3	Identify the hardware requirements of Primary and Secondary memory
	CO4	Understand the importance of I/O devices and its interface circuits.
	CO5	Identify pipeline hazards and possible solutions to those hazards
Design And Analysis Of Algorithms (20APC0511)	CO1	Analyze the complexity of the algorithms
	CO2	Use techniques of greedy and dynamic programming to solve the problems.
	CO3	Implement traversal, backtracking and searching techniques.
	CO4	choose the appropriate algorithm for solving minimization problem.
	CO5	Able to prove that a certain problem is NP-Complete
Operating Systems (20APC0515)	CO1	Distinguish between the different types of operating system environments.
	CO2	Apply the concepts of process synchronization & CPU scheduling
	CO3	solutions to deadlock and Develop memory management
	CO4	Analyze various disk scheduling algorithms and file system interfaces
	CO5	Analyze the various security issues and goals of protection

Managerial Economics And Financial Analysis (20AHSMB01)	CO1	Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2	Apply the Concept of Production cost and revenues for effective Business decision
	CO3	Analyze how to invest their capital and maximize returns.
	CO4	Evaluate the capital budgeting techniques.
	CO5	Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity
Universal Human Values (20AHS9905)	CO1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
	CO2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3	They would have better critical ability.
	CO4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	CO5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction
Object Oriented Programming through Java (20APC0512)	CO1	Understanding the Syntax, Semantics and features of Java Programming Language.
	CO2	To gain knowledge on Object Oriented Programming concepts.
	CO3	Design the method of creating Multi-threading programs and handle exceptions.
	CO4	Understanding the concepts of java Collection Framework and Applets.
	CO5	Ability to create GUI applications & perform event handling.
Computer Organization Lab (20APC0504)	CO1	Represent numbers and perform arithmetic operations.
	CO2	Minimize the Boolean expression using Boolean algebra and design it using logic gates
	CO3	Analyze and design combinational circuit.
	CO4	Design and develop sequential circuits
	CO5	Understand and apply the working of different operations on binary numbers

Object Oriented Programming through Java (20APC0512)	CO1	Demonstrate java compiler and eclipse platform and learn how to use net beans IDE to create java application
	CO2	Ability to create user friendly interfaces
	CO3	Ability to solve the problem using object-oriented approach and design solutions which are robust
	CO4	Implement exception handling and Templates
Operating Systems Lab (20APC0513)	CO1	Ensure the development of applied skills in operating systems related areas.
	CO2	Able to write software routines modules or implementing various concepts of operating system
Computer Networks (20APC0518)	CO1	understand the basics of data communications and networking
	CO2	classify the functionalities of two sub layers of Data link Layer
	CO3	know briefly about Network Layer through algorithms and protocols
	CO4	distinguish the services provided by Transport Layer
	CO5	recognize the services offered by Application Layer to the user
Formal Languages and Automata Theory (20APC0518)	CO1	Design finite state machines to recognize formal languages.
	CO2	Identify different types of grammars in formal languages
	CO3	Construct context free grammars for context free languages
	CO4	Find solutions to the problems using PDA.
	CO5	Develop Turing machine for different computational problems.
Software Engineering (20APC0519)	CO1	Characterize software engineering models
	CO2	Focus on analysis in software project management
	CO3	Design important features of software project management
	CO4	Test the software specifications
	CO5	Measure the software quality
Sensors and IoT	CO1	Understand the characteristics of sensors and Transducers.
	CO2	Identify different types of sensors and its technologies based on recent trends.
	CO3	Determine the Market perspective of IoT
	CO4	Compare and contrast the use of Devices, Gateways and Data Management in IoT
	CO5	Analyze IOT design methodologies and can understand basic concepts about Arduino
Optimization Techniques (20AOE0303)	CO1	Explain the need of optimization of engineering systems
	CO2	Understand optimization of electrical and electronics engineering problems
	CO3	Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
	CO4	Apply unconstrained optimization and constrained non-linear programming and dynamic programming
	CO5	Formulate optimization problems.

Deterministic & Stochastic Statistical Methods (20AOE9925)	CO1	Identify logical thinking to problem-solving in context.
	CO2	Make use of methods related to these concepts in a variety of data science applications.
	CO3	Solve problems by using appropriate technology to aid problem-solving and data analysis.
	CO4	: Analyze Distribution Theory and Bayesian process of inference in probabilistic reasoning system.
	CO5	Develop skills in solving unconstrained optimization problems
Computer Networks (20APC0518)	CO1	Understand the basic concepts of Data Warehouse and data Mining
	CO2	Apply OLAP technology for Data Warehouse.
	CO3	Analyze and evaluate performance of Association Rules and classification algorithms
	CO4	Evaluate various Clustering algorithms
	CO5	Analyze advanced Data Mining techniques
Design Patterns (20APE0502)	CO1	Know the underlying object-oriented principles of design patterns.
	CO2	Understand the context in which the pattern can be applied.
	CO3	Understand how the application of a pattern affects the system quality and its tradeoffs.
	CO4	Importance in behavioral pattern in terms of different types
	CO5	Understanding about the importance of design patterns
Computer Graphics (20APE0503)	CO1	Explain the basic concepts used in computer graphics
	CO2	Design algorithms based on output primitives.
	CO3	Construct 2D graphics transformations
	CO4	Construct 3D graphics transformations
	CO5	Remove hidden surfaces from graphs and anime
SOFTWARE ENGINEERING LABORATORY (20APC0520)	CO1	Understand precisely about functional and non-functional requirements
	CO2	Gain knowledge in project managements and its principles
	CO3	Identify the relationship between requirements and use case
	CO4	Know the interface of modules such as cohesion and coupling
	CO5	Able to deduct the bugs during testing
COMPUTER NETWORKS SIMULATION LAB (20APC0517)	CO1	Deal with Error detection/ correction techniques
	CO2	Simulate Data link layer protocols
	CO3	Simulate network layer protocols
	CO4	Able to get knowledge about NS2 simulator
	CO5	Able to develop network applications

Mobile Application Development(20ASA0503)	CO1	Demonstrate knowledge on mobile platforms, mobile user interface and user interface design requirements.
	CO2	Design user interfaces by analyzing user requirements
	CO3	Develop mobile applications for messaging, location-based services and networking
	CO4	Develop mobile applications and publish in different mobile platforms
	CO5	Use android studio and iOS tools to develop mobile applications
Biology For Engineers (20AMC9901)	CO1	Explain about cells and their structure and function. Different types of cells and basics for classification of living organisms.
	CO2	Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3	Brief about human physiology.
	CO4	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
	CO5	Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.
Artificial Intelligence 20APC0521	CO1	Understand the basic concepts of Artificial Intelligence
	CO2	Apply searching techniques for solving a problem
	CO3	Analyze the concepts of Reinforcement Learning
	CO4	Develop Natural Language Interface for Machines
	CO5	Understanding the concepts to design a robotics
Compiler Design (20APC0523)	CO1	Understand the basic structure of a compiler
	CO2	Use the tools related to compiler design effectively and efficiently
	CO3	Generate intermediate code
	CO4	Able to explain various data structures used in symbol tables
	CO5	Construct optimized code
Cloud Computing (20apc0528)	CO1	Understand the concept of cloud computing
	CO2	Ability to understand various service delivery models and Cloud Computing Architecture
	CO3	Analyze the need for virtualization in a cloud environment.
	CO4	Able to explain various data structures used in symbol tabl Demonstrate the map reducing programming model to process the Big Data along with Hadoop tools s
	CO5	Analyze authentication, confidentiality, privacy issues and disaster management

Machine Learning (20ape0504)	CO1	Ability to understand what is learning and why it is essential to the design of intelligent machines.
	CO2	Ability to understand various service delivery models and Cloud Computing Architectu Ability to design and implement various machine learning algorithms in a wide range of real-world applications e
	CO3	Acquire knowledge deep learning and be able to implement deep learning models for language, vision, speech, decision making, and more
	CO4	Ability to demonstrate feature selection and dimensionality reduction
	CO5	Ability to solve decision making problems using SVM (Support Vector Machines) and graphical models
Real Time Operating Systems (20ape0505)	CO1	Characterize real-time systems and describe their functions.
	CO2	Design and implement a real-time system
	CO3	Apply formal methods to the analysis and design of real-time systems
	CO4	Apply formal methods for scheduling real-time systems
	CO5	Characterize and describe reliability and fault tolerance issues and approaches
Block chain Technology (20ape0506)	CO1	Understand the basic concepts of blockchain and its applications.
	CO2	Make use of the specific mechanics of Ethereum
	CO3	Experiment with Smart contracts
	CO4	Develop Enterprise applications using Blockchain
	CO5	Create customized Blockchain solutions
Artificial Intelligence Laboratory (20apc0522)	CO1	Implement search algorithms.
	CO2	Solve Artificial Intelligence Problems
	CO3	Develop the solutions using Backtracking
	CO4	Design Chatbot
	CO5	Implement basic problems by using NLTK (Natural Language Tool Kit)
Compiler Design Lab (20apc0524)	CO1	Develop compiler tools
	CO2	Design simple compiler
	CO3	Develop program for solving parser problems
	CO4	Design lexical analyzer
	CO5	Able to use Lex and YACC tools for developing a scanner and a parser
Cloud Computing Laboratory (20apc0529)	CO1	Ability to understand various service delivery models of a cloud computing architecture.
	CO2	Summarize the Services and Platform of cloud.
	CO3	Configure various virtualization tools.
	CO4	Explore the future trends of cloud computing
	CO5	Develop Hadoop Applications

Soft Skills (20ASA0502)	CO1	Recognize the importance of verbal and non-verbal skills.
	CO2	Develop the interpersonal and intrapersonal skills.
	CO3	Apply grammatical structures to formulate sentences and correct word forms.
	CO4	Create trust among people and develop employability skills
	CO5	Identify and apply communication skills effectively for professional
Professional Ethics and Human Values (20AMC9904)	CO1	It ensures students sustained happiness through identifying the essentials of human values and skills.
	CO2	The students will understand the importance of Values and Ethics in their personal lives and professional careers
	CO3	The students will learn the rights and responsibilities as an employee, team member and a global citizen.
	CO4	Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5	Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life.


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B.Tech- CSE (Artificial Intelligence and Data Science)

Program outcomes:

PO No	Programme Outcome
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO	Programme Specific Outcomes
PSO1	Demonstrate to understand the working principles of computer system and implementation of software products based on its professional engineering practices with effective strategies.
PSO2	Apply adaptive algorithms and techniques to solve problems in areas related to artificial intelligence, machine learning, data science and deep learning.

Course Outcomes:

COURSE NAME	COURSE OUTCOMES	
Algebra and Calculus (20ABS9901)	CO1:	Make use of matrix algebra techniques that is needed by engineers for practical application
	CO2:	Utilize mean value theorems to real life problems.
	CO3:	Interpret with functions of several variables which is useful in optimization. Variables which is useful in optimization.
	CO4:	Analyze 2-dimensional and 3- dimensional concepts in coordinate systems.
	CO5:	Utilize the concept of special functions.
Applied Physics (20ABS9902)	CO1:	Analyze the intensity variation of light due to interference and diffraction & illustrate the propagation of electromagnetic waves.
	CO2:	Analyze and apply the concepts of LASER S and optical fibers.
	CO3:	Infer the properties of dielectric magnetic material
	CO4:	Apply the fundamentals of semi conductors for device applications
	CO5:	Implement the behavior of superconductors in diverse fields & interpret the properties of nanomaterials for multiple applications.
Communicative English (20AHS9901)	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

Engineering Graphics (20AES0301)	CO1:	Ability to discuss the conventions and methods of Engineering Drawing
	CO2:	Ability to demonstrate drafting practices, visualization and projection skills
	CO3:	Ability to perform basic sketching techniques of Engineering components
	CO4:	Ability to draft the orthographic and pictorial views of a given Engineering components
	CO5:	Ability to increasingly use architectural and engineering scales
Problem Solving and Programming (20AES0501)	CO1:	Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2:	Able to know problem solving aspects, design and analysis of algorithm
	CO3:	Able to know flow control, input output and implementation functions
	CO4:	Able to solve computational problems using functions, array and pointers
	CO5:	Able to organise real world heterogeneous data and apply searching, sorting techniques with exception handling
Communicative English Lab (20AHS9902)	CO1:	Create Awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English
	CO2:	Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussion
	CO3:	Improve word knowledge and apply skills in various languages learning activities
	CO4:	Analyze speech sounds, stress ,rhythm, intonation and syllable division for better listening and speaking comprehension
	CO5:	Evaluate and exhibit acceptable etiquette essential in social and professional presentations.
Applied Physics Lab (20ABS9907)	CO1:	Analyze the wave properties of light and the interaction of energy with the matter.
	CO2:	Apply electromagnetic wave propagation in different guided media.
	CO3:	Asses the electromagnetic wave propagation and its power in different media
	CO4:	Analyze the conductivity of semiconductors
	CO5:	Interpret the dielectric and magnetic properties of materials and apply the nanomaterials for engineering applications.
Problem Solving And Programming Lab (20AES0503)	CO1:	Assemble and disassembling parts of a Computer
	CO2:	Identify to control structure to solving the problem
	CO3:	Analyze different sorting algorithms
	CO4:	Design solutions for computational problems
	CO5:	Develop C programs which utilize the memory efficiently using programming constructs

Probability And Statistics (20ABS9911)	CO1:	Interpret the characteristics through correlation and regression tools.
	CO2:	Make use of the concepts of probability and their applications
	CO3:	Apply discrete and continuous probability distributions.
	CO4:	Inference the components of a classical hypothesis test for large sample
	CO5:	Inspect the components of a classical hypothesis test for small samples.
Numerical Methods (20ABS9921)	CO1:	Make use of concepts of Errors, Relative and Percentage Errors
	CO2:	Solve the concepts of Algebraic & Transcendental Equations to solve different Engineering problems
	CO3:	Examine Interpolation using the concepts of the Numerical Methods
	CO4:	Infer the concepts of Integration in Numerical Methods
	CO5:	Analyze the concepts of O.D.E on Numerical Methods
Basics of Python Programming (20AES0509)	CO1:	Understanding the syntax and semantics of Python programming.
	CO2:	Apply modularity to programs.
	CO3:	Select appropriate data structure of Python for solving a problem.
	CO4:	Implement Mutable and Immutable data types
	CO5:	Interpret the concepts of object oriented programming as used in Python
Data Structures (20AES0502)	CO1:	Analyze and evaluate the efficiency of an algorithm
	CO2:	Implement linear data structures
	CO3:	implement non -linear data structures
	CO4:	Solve the problem of efficiently using graphs and Hashing techniques
	CO5:	Implement advanced sorting and organizing the file
Web Design (20AES0507)	CO1:	Add elements to web pages, including colors, text, images, and more
	CO2:	Add advanced features to your website including special effects
	CO3:	Apply the CSS Knowledge to add colors and text formatting
	CO4 :	Apply advanced CSS style presentation and techniques
	CO5:	Develop HTML and CSS Programs.
Basics of Python Programming Lab (20AES0510)	CO1:	Write, Test and Debug Python Programs
	CO2:	Implement Conditionals and Loops for Python Programs
	CO3:	Use functions and represent Compound data using Lists, Tuples and Dictionaries.
	CO4:	Read and write data from & to files in Python and develop Application using Python
	CO5:	Implement the problem in terms of real world object using OOPs concepts

Computational Lab (20ABS9918)	CO1:	Determine problems in linear algebra using MS-Excel's Tools.
	CO2:	Apply Central Tendency, Dispersion, Correlation and Regression analysis as basics of Statistics using Ms- Excel's Tools.
	CO3:	Utilize properties of probability distributions and to perform using Ms- Excel's Tools
	CO4:	Solving problems in Definite integrals numerically using Trapezoidal and Simpson's methods in Ms- Excel's Tools
	CO5:	Analyse Statistics to solve large samples and Small samples problems using Statistical Tools practicing in Ms- Excel's Tools.
Data Structures Lab (20AES0504)	CO1:	Select the data structure appropriate for solving the problem
	CO2:	Implement searching and sorting algorithms
	CO3:	Design new data types
	CO4 :	Illustrate the working of stack and queue
	CO5:	Organize the data in the form of files
Environmental Studies (20AMC9903)	CO1	Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2	Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5	To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Discrete Mathematical Structures (20ABS9914)	CO1:	Make use of mathematical logic to solve problems.
	CO2:	Analyze the concepts and perform the operations related to sets, relations and functions.
	CO3:	Identify basic counting techniques to solve combinatorial problems
	CO4:	Evaluate solutions by using recurrence relations.
	CO5:	Utilize Graph Theory in solving computer science problems

Digital Electronics & Microprocessors (20APC3001)	CO1	Design Logic circuit using basic concepts of Boolean algebra.
	CO2	Design Logic circuit using basic concepts of PLDs.
	CO3	Design sequential logic circuits.
	CO4	Design application using 8086 Microprocessor.
	CO5	Design application using 8051 Microcontroller.
Data base Management Systems (20APC3002)	CO1:	know the fundamentals of Databases
	CO2:	Understand SQL and PL/SQL Concepts
	CO3:	Design a database for a real-world information system
	CO4:	Process and Optimize the query
	CO5:	Working of transaction and concurrency techniques in real time applications
Object Oriented Programming through JAVA (20APC3004)	CO1:	Understanding the Syntax, Semantics and features of Java Programming Language
	CO2:	To gain knowledge on Object Oriented Programming concepts
	CO3:	Raise Exceptions and handle exceptions
	CO4:	Analyze the method of creating Multi-threading programs.
	CO5:	Ability to create GUI applications & perform event handling
Computer Organization (20APC3006)	CO1:	Understand computer architecture concepts related to the design of modern processors,
	CO2:	memories and I/Os
	CO3:	Design Arithmetic and control unit
	CO4:	Identify the hardware requirements of Primary and Secondary memory and Understand the importance of I/O devices and its interface circuits
	CO5:	Identify pipeline hazards and possible solutions to those hazards
Database Management Systems Laboratory (20APC3003)	CO1:	Write SQL Queries
	CO2:	Implement PL/SQL programs
	CO3:	Design database for any real world problem
Object Oriented Programming through JAVA Lab (20APC3004)	CO1:	Demonstrate java compiler and eclipse platform and learn how to use net beans IDE to create java application
	CO2:	Ability to create user friendly interfaces
	CO3:	Ability to solve the problem using object oriented approach and design solutions which are robust
	CO4:	Implement exception handling and Templates
	CO5:	Ability to create GUI components and implementations
Computer Organization Lab (20APC3007)	CO1:	Represent numbers and perform arithmetic operations.
	CO2:	Minimize the Boolean expression using Boolean algebra and design it using logic gates
	CO3:	Analyze and design combinational circuit
	CO4:	Design and develop sequential circuits
	CO5:	Understand and apply the working of different operations on binary numbers

Client Side Scripting (20ASC3001)	CO1:	Analyze and understand the basic concepts of web programming
	CO2:	Implement Arrays, Functions and Strings
	CO3:	Apply techniques of form validation using Java Script.
	CO4:	Describe important concepts related to client side Web Security.
	CO5:	Save client information in cookie by server
Constitution Of India (20AMC9902)	CO1:	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics
	CO2:	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India
	CO3:	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4:	Discuss the Powers and functions of Governor, President, Judiciary
	CO5:	Discuss the functions of local administration bodies.
Formal Languages and Automata Theory (20APC3008)	CO1:	Design finite state machines to recognize formal languages.
	CO2:	Identify different types of grammars in formal languages
	CO3:	Construct context free grammars for context free languages
	CO4:	Find solutions to the problems using PDA.
	CO5:	Develop Turing machine for different computational problems
Computer Networks (20APC3009)	CO1:	Understand the basics of data communications and networking
	CO2:	Classify the functionalities of two sub layers of Data link Layer
	CO3:	Know briefly about Network Layer through algorithms and protocols
	CO4:	Distinguish the services provided by Transport Layer
	CO5:	Recognize the services offered by Application Layer to the user
Data warehousing and Mining (20APC3011)	CO1:	Understand the basic concepts of data warehouse and data mining
	CO2:	Apply OLAP technology for Data Warehouse
	CO3:	Analyze and evaluate performance of Association Rules and classification algorithms
	CO4:	Evaluate various Clustering algorithms.
	CO5:	Analyze advanced Data Mining techniques

Operating Systems (20APC3013)	CO1:	Distinguish between the different types of operating system environments.
	CO2:	Apply the concepts of process synchronization & CPU scheduling
	CO3:	Develop solutions to deadlock and memory management
	CO4:	Analyze various disk scheduling algorithms and file system interfaces
	CO5:	Analyze the various security issues and goals of protection
Managerial Economics And Financial Analysis (20AHSMB01)	CO1:	Understand the fundamentals of Economics and Managerial economics viz., Demand,
	CO2:	Production, cost, revenue and markets.
	CO3:	Apply the Concept of Production cost and revenues for effective Business decision
	CO4:	Evaluate the capital budgeting techniques.
	CO5:	Define the concepts related to financial accounting and management and able to develop
Universal Human Values (20AHS9905)	CO1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
	CO2	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3	They would have better critical ability.
	CO4	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	CO5	It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction
Computer Networks Lab (20APC3010)	CO1:	Deal with Error detection/ correction techniques
	CO2:	Learn about Data link layer protocols
	CO3:	Learn about network layer protocols
	CO4:	Able to get knowledge about simulator
Data warehousing and Mining Lab (20APC3012)	CO1:	Learn how to use different data mining tools.
	CO2:	Learn to execute data mining tasks using a data mining toolkit (Orange data mining tool kit) and visualize the results.
	CO3:	Understanding linear regression model in the orange environment.
	CO4:	Demonstrate the working of algorithms for data mining tasks such as association rule mining,
	CO5:	classification and clustering.

Operating Systems Lab (20APC3014)	CO1:	Ensure the development of applied skills in operating systems related areas.
	CO2:	Able to write software routines modules or implementing various concepts of operating system
Server Side Scripting (20ASC3002)	CO1:	Learn the installation guide of MYSQL,XAMPP5,APACHE and PHP
	CO2:	Able to design code for simple dynamic web pages
	CO3:	Design PHP and SQL/MySQL Integration.
	CO4:	Design Basic Projects
	CO5:	Able to provide protection to web server
Principles of Data Science (20APC3015)	CO1:	Recognize the different levels of Data Science concepts.
	CO2:	Analyse the basics of probability models for data exploration.
	CO3:	Analyse the basics of statistics models for data exploration.
	CO4:	Demonstrate the data using visualization techniques.
	CO5:	Design the suitable model for real time applications.
Artificial Intelligence (20APC3017)	CO1:	Understand the basic concepts of Artificial Intelligence
	CO2:	Apply searching techniques for solving a problem
	CO3:	Analyze the concepts of Reinforcement Learning
	CO4:	Develop Natural Language Interface for Machines
	CO5:	Understanding the concepts to design a robotics
BIG DATA TECHNOLOGIES (20APC3019)	CO1:	Understand the elements of Big data
	CO2:	Use different technologies to tame Big Data
	CO3:	Process Given data using Map Reduce
	CO4:	Test & Debug map reduce applications
	CO5:	Develop applications using Hive, NoSQL.
Deterministic and Stochastic Statistical Methods (20AOE9925)	CO1:	Identify logical thinking to problem-solving in context.
	CO2:	Employ methods related to these concepts in a variety of data science applications.
	CO3:	Solve problems by using appropriate technology to aid problem-solving and data analysis.
	CO4:	Analyze Distribution Theory and Bayesian process of inference in probabilistic reasoning system.
	CO5:	Develop skills in solving unconstrained optimization problems.
Optimization Techniques (20AOE0303)	CO1:	Explain the need of optimization of engineering systems
	CO2:	Understand optimization of electrical and electronics engineering problems
	CO3:	Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
	CO4:	Apply unconstrained optimization and constrained non-linear programming and dynamic programming
	CO5:	Formulate optimization problems.


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Internet of Things (20AOE0552)	CO1:	Able to understand the applications of IOT
	CO2:	Able to understand build blocks of IOT
	CO3:	Apply IOT design methodologies
	CO4:	Able to understand the HADOOP and IEEE standard protocol
	CO5:	Able to understand the Zigbee devices
Design And Analysis of Algorithms (20APE3001)	CO1:	Analyze the complexity of the algorithms
	CO2:	Use techniques of greedy and dynamic programming to solve the problems.
	CO3:	Implement traversal, backtracking and searching techniques.
	CO4:	Choose the appropriate algorithm for solving minimization problem.
	CO5:	Able to prove that a certain problem is NP-Complete
Computer Graphics (20APE3002)	CO1:	Explain the basic concepts in computer Graphics
	CO2:	Design algorithms based on output primitives
	CO3:	Construct 2D graphics transformations
	CO4:	Construct 3D graphics transformations
	CO5:	Remove hidden surfaces from graphs
ADHOC & SENSOR NETWORKS (20APE3003)	CO1:	List the design issues for Adhoc and sensor networks
	CO2:	Analyze the use of TCP in Wireless networks.
	CO3:	Justify the need for new MAC Protocols for Adhoc networks.
	CO4:	Extend the existing protocols to make them suitable for Adhoc Networks.
	CO5:	Evaluate the performance of Protocols in Adhoc and sensor networks. Design new Protocols for Adhoc and Sensor networks.
Artificial Intelligence Lab (20APC3018)	CO1:	Implement search algorithms
	CO2:	Solve Artificial Intelligence Problems
	CO3:	Develop the solutions using Backtracking
	CO4:	Design Chatbot
	CO5:	Implement basic problems by using NLTK(Natural Language Tool Kit)
Principles of Data Science Lab (20APC3016)	CO1:	Implement basic concepts of R Programming.
	CO2:	Implement the concepts of R script to extract the data from data frames and file operations.
	CO3:	Implement the various statistical techniques using R.
	CO4:	Extend the functionality of R by using Add-on packages.
	CO5:	Use R graphics and tables to visualize the results of various statistical operations on data.
Conversational AI / AI Chatbot (20ASC3003)	CO1:	Develop a fair understanding of AI applications and to know where and how to apply these tools to improve productivity.
	CO2:	Understand AI as a tool pretty much like they treat calculator as a tool for simple calculation
	CO3:	Apply methods for different training and testing assistance
	CO4:	Design classifier for voice assistants
	CO5:	Deploying Chatbot into the application

Biology for Engineers (20AMC9901)	CO1:	Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
	CO2:	Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3:	Brief about human physiology.
	CO4:	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
	CO5:	Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.
Big Data Analytics (20APC3020)	CO1:	Understand the concepts and challenges of big data
	CO2:	Outline the operations viz. Collect, manage, store, query, and analyze various forms of big data.
	CO3:	Apply large-scale analytic tools to solve some of the open big data problems.
	CO4:	Analyze the impact of big data for business decisions and strategies.
	CO5:	Design different big data applications.
Machine Learning (20APC3022)	CO1:	Ability to understand what is learning and why it is essential to the design of intelligent machines.
	CO2:	Ability to design and implement various machine learning algorithms in a wide range of real-world applications.
	CO3:	Acquire knowledge deep learning and be able to implement deep learning models for language, vision, speech, decision making, and more
	CO4:	Ability to demonstrate feature selection and dimensionality reduction
	CO5:	Ability to solve decision making problems using SVM(Support Vector Machines) and graphical models
Cloud Computing (20APC3024)	CO1:	Understand the concept of cloud computing
	CO2:	Ability to understand various service delivery models and Cloud Computing Architecture.
	CO3:	Analyze the need for virtualization in a cloud environment.
	CO4:	Demonstrate the map reducing programming model to process the Big Data along with Hadoop tools
	CO5:	Analyze authentication, confidentiality, privacy issues and disaster management
Software Engineering for AI (20APE3004)	CO1:	Understand the methods and issues in software engineering
	CO2:	Apply the principles of Artificial Intelligence for Software engineering
	CO3:	Design AI based software
	CO4:	Apply the algorithms of Machine learning in solving problems
	CO5:	Design Expert systems

Game Programming (20APE3005)	CO1:	Discuss the concepts of Game design and development.
	CO2:	Design the processes, and use mechanics for game development.
	CO3:	Explain the Core architectures of Game Programming.
	CO4:	Use Game programming platforms, frame works and engines.
	CO5:	Create interactive Games.
Introduction To NoSQL Database (20APE3006)	CO1:	Explain and compare different types of NoSQL Databases
	CO2:	Compare and contrast RDBMS with different NoSQL databases.
	CO3:	Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases.
	CO4:	Explain performance tune of Key-Value Pair NoSQL databases.
	CO5:	Apply NoSQL development tools on different types of NoSQL Databases
Machine Learning Lab (20APC3023)	CO1:	Implement procedures for the machine learning algorithms
	CO2:	Design Python programs for various Learning algorithms
	CO3:	Apply appropriate data sets to the Machine Learning algorithms
	CO4:	Identify and apply Machine Learning algorithms to solve real world problems
Cloud Computing Lab (20APC3025)	CO1:	Ability to understand various service delivery models of a cloud computing architecture.
	CO2:	Summarize the Services and Platform of cloud.
	CO3:	Configure various virtualization tools.
	CO4:	Explore the future trends of cloud computing.
	CO5:	Develop Hadoop Applications.
Mobile Application Development (20ASC3004)	CO1:	Create data sharing with different applications and sending and intercepting SMS.
	CO2:	Develop applications using services and publishing android applications.
	CO3:	To demonstrate their skills of using Android software development tools
	CO4:	Develop mobile applications and publish in different mobile platforms
	CO5:	Use Android studio and iOS tools to develop mobile applications.
SOFT SKILLS (20ASA0502)	CO1:	Recognize the importance of verbal and non verbal skills
	CO2:	Develop the interpersonal and intrapersonal skills
	CO3:	Apply grammatical structures to formulate sentences and correct word forms.
	CO4:	Create trust among people and develop employability skills
	CO5:	Identify and apply communication skills effectively for professional

B.Tech-CSE-(IOT & CYBER SECURITY INCLUDING BLOCKCHAIN TECHNOLOGY)

Program outcomes:

PO No.	Programme Outcome
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO No.	Programme Specific Outcomes
PSO1	Demonstrate to understand the working principles of computer system and implementation of software products based on its professional engineering practices with effective strategies.
PSO2	Apply adaptive algorithms and techniques to solve problems in areas related to cyber security, IOT and Blockchain Technology

Course Outcomes:

COURSE NAME	COURSE OUTCOMES	
Algebra and Calculus (20ABS9901)	CO1:	Make use of matrix algebra techniques that is needed by engineers for practical application
	CO2:	Utilize mean value theorems to real life problems.
	CO3:	Interpret with functions of several variables which is useful in optimization. Variables which is useful in optimization.
	CO4:	Analyze 2-dimensional and 3- dimensional concepts in coordinate systems
	CO5:	Utilize the concept of special functions.
CHEMISTRY (20ABS9904)	CO1:	Interpret the behaviour and interactions between matter and energy at both the atomic and molecular levels between mater and energy at both the atomic and molecular levels
	CO2:	Apply the electrochemical principles to the construction of betteries, fuel cells and electrochemical sensors
	CO3:	Outline the preparation, mechanism properties and applications of polymer and conducting polymers
	CO4:	Analyze the separation of gaseous and liquid mixtures using instrumental methods and their applications.
	CO5:	Understand the disadvantages of using hardwater in domestically and industrially and select suitable treatments.
Problem Solving and Programming (20AES0501)	CO1:	Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2:	Able to know problem solving aspects, design and analysis of algorithm
	CO3:	Able to know flow control, input output and implementation functions
	CO4:	Able to solve computational problems using functions, array and pointers
	CO5:	Able to organise real world heterogeneous data and apply searching ,sorting techniques with exception handling

Engineering Graphics (20AES0301)	CO1:	Ability to discuss the conventions and methods of Engineering Drawing
	CO2:	Ability to demonstrate drafting practices, visualization and projection skills
	CO3:	Ability to perform basic sketching techniques of Engineering components
	CO4:	Ability to draft the orthographic and pictorial views of a given Engineering components
	CO5:	Ability to increasingly use architectural and engineering scales
Information Technology And Numerical Methods (20AES0505)	CO1:	Usage of Digital World and Exploring Cyber space
	CO2:	Explain the needs of hardware and software required for a computation task.
	CO3:	Peripheral devices, networking and internet concepts
	CO4:	Analyze the concepts of Errors, Algebraic & Transcendental Equations to solve different Engineering problems
	CO5:	Analyze Interpolation using the concepts of the numerical methods and apply the Integration in numerical methods
	CO6:	Apply the concepts of O.D.E on numerical method
Computer Science And Engineering Workshop (20AES0506)	CO1:	Assemble and disassembling parts of a computer
	CO2:	Develop Documents using Word processors
	CO3:	Develop presentations using the presentation tool
	CO4:	Perform computations using spreadsheet tool
	CO5:	Design Graphics, Videos and Web pages
Chemistry Lab (20ABS9909)	CO1:	Demonstrate volumetric analysis involved with emphasis on solution preparation, dilution and chemical calculations.
	CO2:	Develop knowledge to prepare advanced materials.
	CO3:	Acquire knowledge to measure the strength of an acid present in secondary batteries.
	CO4:	familiarize with digital and instrumental methods of analysis
	CO5:	Apply important chemical concepts and principles to analyze mixture of components by chromatographic techniques.
Problem Solving And Programming Lab (20AES0503)	CO1:	Assemble and disassembling parts of a Computer
	CO2:	Identify to control structure to solving the problem
	CO3:	Analyze different sorting algorithms
	CO4:	Design solutions for computational problems
	CO5:	Develop C programs which utilize the memory efficiently using programming constructs like pointers

Applied Physics (20ABS9902)	CO1:	Analyze the intensity variation of light due to interference and diffraction & illustrate the propagation of electromagnetic waves.
	CO2:	Analyze and apply the concepts of LASER S and optical fibers.
	CO3:	Infer the properties of dielectric magnetic material
	CO4:	Apply the fundamentals of semi conductors for device applications
	CO5:	Implement the behavior of superconductors in diverse fields & interpret the properties of nanomaterials for multiple applications.
Probability And Statistics (20ABS9911)	CO1:	Interpret the characteristics through correlation and regression tools.
	CO2:	Make use of the concepts of probability and their applications.
	CO3:	Apply discrete and continuous probability distributions.
	CO4:	Inference the components of a classical hypothesis test for large sample
	CO5:	Inspect the components of a classical hypothesis test for small samples.
Communicative English (20AHS9901)	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
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	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
Data Structures (20AES0502)	CO1:	Analyze and evaluate the efficiency of an algorithm
	CO2:	Implement linear data structures
	CO3:	implement non -linear data structures
	CO4:	Solve the problem of efficiently using graphs and Hashing techniques
	CO5:	Implement advanced sorting and organizing the file
Web Design (20AES0507)	CO1:	Add elements to web pages, including colors, text, images, and more
	CO2:	Add advanced features to your website including special effects
	CO3:	Apply the CSS Knowledge to add colors and text formatting
	CO4:	Apply advanced CSS style presentation and techniques
	CO5:	Develop HTML and CSS Programs.
Communicative English Lab (20AHS9902)	CO1:	Create Awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English
	CO2:	Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussion
	CO3:	Improve word knowledge and apply skills in various languages learning activities
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	CO2:	Apply electromagnetic wave propagation in different guided media.
	CO3:	Asses the electromagnetic wave propagation and its power in different media
	CO4:	Analyze the conductivity of semiconductors.
	CO5:	Interpret the dielectric and magnetic properties of materials and apply the nanomaterials for engineering applications.
Data Structures Lab (20AES0504)	CO1:	Select the data structure appropriate for solving the problem
	CO2:	Implement searching and sorting algorithms
	CO3:	Derive new data types
	CO4 :	Illustrate the working of linear and non linear data structure
	CO5:	Organize the data using Files structure
Environmental Studies (20AMC9903)	CO1	Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2	Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5	To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Discrete Mathematical Structures (20ABS9914)	CO1:	Make use of mathematical logic to solve problems.
	CO2:	Analyze the concepts and perform the operations related to sets, relations and functions.
	CO3:	Identify basic counting techniques to solve combinatorial problems
	CO4:	Evaluate solutions by using recurrence relations.
	CO5:	Utilize Graph Theory in solving computer science problems
Digital Electronics & Microprocessors (20APC3601)	CO1:	Design Logic circuit using basic concepts of Boolean algebra.
	CO2:	Design Logic circuit using basic concepts of PLDs.
	CO3:	Design sequential logic circuits.
	CO4:	Design application using 8086 Microprocessor.
	CO5:	Design application using 8051 Microcontroller.
Database Management Systems (20APC3602)	CO1:	know the fundamentals of Databases
	CO2:	Understand SQL and PL/SQL Concepts
	CO3:	Design a database for a real-world information system
	CO4:	Process and Optimize the query
	CO5:	Working of transaction and concurrency techniques in real time applications


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 Karakambadi Road, Venkatapuram (V)
 TIRUPATI - 517 520

Basics of Python Programming (20APC3604)	CO1:	Understanding the syntax and semantics of Python programming.
	CO2:	Apply modularity to programs.
	CO3:	Select appropriate data structure of Python for solving a problem.
	CO4:	Implement Mutable and Immutable data types
	CO5:	Interpret the concepts of object oriented programming as used in Python
Basics of Electrical & Electronics Engineering (20AES0205)	CO1:	Apply concepts of KVL/KCL in solving DC circuits
	CO2:	Illustrate working principles of induction motor - DC Motor
	CO3:	Identify type of electrical machine based on their operation
	CO4:	Describe operation and characteristics of diodes and transistors.
	CO5:	Make use of diodes and transistors in simple, typical circuit applications.
	CO6:	Understand operation of basic op-amp circuits
Database Management Systems Laboratory (20APC3603)	CO1:	Write SQL Queries
	CO2:	Implement PL/SQL programs
	CO3:	Design database for any real world problem
Basics of Python Programming Lab(20APC3605)	CO1:	Write, Test and Debug Python Programs
	CO2:	Implement Conditionals and Loops for Python Programs
	CO3:	Use functions and represent Compound data using Lists, Tuples and Dictionaries
	CO4:	Read and write data from & to files in Python and develop Application using Python
	CO5:	Implement the problem in terms of real world object using OOPs concepts
Basics of Electrical & Electronics Engineering Lab (20AES0206)	CO1:	Verify Kirchoff's Laws & Superposition theorem for dc supply
	CO2:	Analyze the performance of AC and DC Machines by testing.
	CO3:	Study I – V Characteristics of PV Cell & Perform speed control of dc shunt motor
	CO4:	Ability to operate diodes for finding V-I Characteristics.
	CO5:	Ability to construct and operate rectifiers without & with filters
	CO6:	Ability to construct and operate BJT & FET Characteristics.
Client Side Scripting (20ASC3601)	CO1:	Analyze and understand the basic concepts of web programming.
	CO2:	Implement Arrays, Functions and Strings
	CO3:	Apply techniques of form validation using Java Script.
	CO4:	Describe important concepts related to client side Web Security.
	CO5:	Save client information in cookie by server

Constitution Of India (20AMC9902)	CO1:	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics
	CO2:	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3:	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4:	Discuss the Powers and functions of Governor, President, Judiciary.
	CO5:	Discuss the functions of local administration bodies
Computer Organization (20APC3606)	CO1:	Understand computer architecture concepts related to the design of modern processors, memories and I/Os
	CO2:	Design Arithmetic and control unit
	CO3:	Identify the hardware requirements of Primary and Secondary memory
	CO4:	Understand the importance of I/O devices and its interface circuits.
	CO5:	Identify pipeline hazards and possible solutions to those hazards
Computer Networks (20APC3607)	CO1:	understand the basics of data communications and networking
	CO2:	classify the functionalities of two sub layers of Data link Layer
	CO3:	know briefly about Network Layer through algorithms and protocols
	CO4:	distinguish the services provided by Transport Layer
	CO5:	recognize the services offered by Application Layer to the user
Object Oriented Programming through Java (20APC3609)	CO1:	Understanding the Syntax, Semantics and features of Java Programming Language.
	CO2:	To gain knowledge on Object Oriented Programming concepts.
	CO3:	Raise Exceptions and handle exceptions.
	CO4:	Analyze the method of creating Multi-threading programs
	CO5:	Ability to create GUI applications & perform event handling.
Operating Systems(20APC3611)	CO1:	Distinguish between the different types of operating system environments.
	CO2:	Apply the concepts of process synchronization & CPU scheduling
	CO3:	Develop solutions to deadlock and memory management
	CO4:	Analyze various disk scheduling algorithms and file system interfaces
	CO5:	Analyze the various security issues and goals of protection

Managerial Economics And Financial Analysis (20AHSMB01)	CO1:	Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2:	Apply the Concept of Production cost and revenues for effective Business decision
	CO3:	Analyze how to invest their capital and maximize returns.
	CO4:	Evaluate the capital budgeting techniques.
	CO5:	Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity.
Universal Human Values (20AHS9905)	CO1:	Students are expected to become more aware of themselves, and their surroundings (family, society, nature)
	CO2:	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3:	They would have better critical ability.
	CO4:	They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	CO5:	It is hoped that they would be able to apply what they have learnt to their own self in different day-to- day settings in real life, at least a beginning would be made in this direction.
Computer Networks Lab (20APC3608)	CO1:	Deal with Error detection/ correction techniques
	CO2:	Learn about Data link layer protocols
	CO3:	Learn about network layer protocols
	CO4:	Able to get knowledge about simulator
Object Oriented Programming through Java Lab (20APC3610)	CO1:	Demonstrate java compiler and eclipse platform and learn how to use net beans IDE to create java application
	CO2:	Ability to create user friendly interfaces
	CO3:	Ability to solve the problem using object oriented approach and design solutions which are robust
	CO4:	Implement exception handling and Templates
	CO5:	Ability to create GUI components and implementations
Operating Systems Lab (20APC3612)	CO1:	Ensure the development of applied skills in operating systems related areas.
	CO2:	Able to write software routines modules or implementing various concepts of operating system.
Server Side Scripting (20ASC3602)	CO1:	Learn the installation guide of MYSQL,XAMPP5,APACHE and PHP
	CO2:	Able to design code for simple dynamic web pages
	CO3:	Design PHP and SQL/MySQL Integration.
	CO4:	Design Basic Projects
	CO5:	Able to provide protection to web server

Cryptography and Network Security (20APC3613)	CO1:	Understand basic Cryptographic algorithm, Security issues
	CO2:	Identify various type of vulnerabilities of a computer network
	CO3:	Outline various Security algorithms.
	CO4:	Design secure system
	CO5:	Investigate the threads and identify the solution for the threats
Embedded System and Internet of Things (20APC3615)	CO1:	Understand the Fundamental Concept of Embedded System
	CO2:	Analyze TM4C Architecture, Instruction Set, addressing modes to develop programs for various applications using Assembly and Embedded C.
	CO3:	Develop an embedded system by interfacing the microcontrollers and IDE tools.
	CO4:	Understand the basic concept of Internet of Things.
	CO5:	Implement the IoT basic application by Arduino Microcontroller.
Fundamentals of Blockchain Technology (20APC3617)	CO1:	Understand the fundamentals of Money used in blockchain
	CO2:	Describe the basics of Blockchain
	CO3:	State Decentralization Architecture
	CO4:	Relate Bitcoin usage in Blockchain Technology
	CO5:	Implement Blockchain for various use cases
Mathematical Modelling and Simulation (20AOE9926)	CO1:	Develop various mathematical techniques in modeling and modeling in dynamics through O.D.E of First order.
	CO2:	Analyze a modelling in Epidemics through system of O.D.E of First order.
	CO3:	Correlate a Mathematical modeling of Circular motion and Motion of Satellites.
	CO4:	Construct mathematical modeling through difference equations and also through Functional equations and Integral equations
	CO5:	Valuate the Simulation for given mathematical model in real problem
Optimization Techniques (20AOE0303)	CO1:	Explain the need of optimization of engineering systems
	CO2:	Understand optimization of electrical and electronics engineering problems
	CO3:	Apply classical optimization techniques, linear programming, simplex algorithm, transportation problem
	CO4:	Apply unconstrained optimization and constrained non-linear programming and dynamic programming
	CO5:	Formulate optimization problems.
Control Systems (20APC0213)	CO1:	Formulate Mathematical model and transfer function of the physical systems.
	CO2:	Determine the stability of linear systems in time domain.
	CO3:	Perform frequency domain analysis using bode and polar plot.
	CO4:	Formulate and design state-space analysis


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 Karakambadi Road, Venkatapuram (V)
 TIRUPATI - 517 520

Software Engineering (20APE3601)	CO1:	Characterize software engineering models
	CO2:	Focus on analysis in software project management
	CO3:	Design important features of software project management
	CO4:	Test the software specifications
	CO5:	Measure the software quality
Distributed database (20APE3602)	CO1:	Understand theoretical and practical aspects of distributed database systems.
	CO2:	Study and identify various issues related to the development of distributed database system.
	CO3:	Understand the design aspects of object-oriented database system and related development
Automata Theory and Compiler Design (20APE3603)	CO1:	understanding the basics of Formal Language and Regular Expressions.
	CO2:	understanding about parsing, syntax and control flow statement
	CO3:	know the concept of expressions and overloading functions
	CO4:	gain knowledge in run time storage.
	CO5:	generate code
Cryptography and Network Security Lab (20APC36143)	CO1:	Implement the cipher techniques
	CO2:	Develop the various security algorithms
	CO3:	Use different open source tools for network security and analysis
	CO4:	Configure and Implement Firewall
	CO5:	Implement Various Security Models and Tools
Embedded System and Internet of Things Lab (20APC3616)	CO1:	Interface peripherals like switches, LEDs, stepper motor etc
	CO2:	To Know the control of all embedded Components.
	CO3:	To apply the knowledge in real time applications.
	CO4:	To work on different actuating systems & sensors.
	CO5:	To understand technologies like IoT, machine languages.
Soft Skills (20ASA0502)	CO1:	Recognize the importance of verbal and non verbal skills
	CO2:	Develop the interpersonal and intrapersonal skills
	CO3:	Apply grammatical structures to formulate sentences and correct word forms.
	CO4:	Create trust among people and develop employability skills
	CO5:	Identify and apply communication skills effectively for professional
Biology for Engineers (20AMC9901)	CO1:	Explain about cells and their structure and function. Different types of cells and basics for classification of living Organisms.
	CO2:	Explain about biomolecules, their structure, function and their role in the living organisms. How biomolecules are useful in Industry.
	CO3:	Brief about human physiology.
	CO4:	Explain about genetic material, DNA, genes and RNA how they replicate, pass and preserve vital information in living Organisms.
	CO5:	Know about application of biological principles in different technologies for the production of medicines and pharmaceutical molecules through transgenic microbes, plants and animals.

CYBER SECURITY (20APC3618)	CO1:	Analyze threats and risks within context of the cyber security architecture
	CO2:	Appraise cyber security incidents to apply appropriate response
	CO3:	Evaluate decision making outcomes of cyber security scenarios
Advanced IoT Programming (20APC3620)	CO1:	Demonstrate knowledge on the characteristics of sensors and principles of IoT.
	CO2:	Select appropriate sensors for the given application development.
	CO3:	Design basic IoT Applications using Arduino.
	CO4:	Design IoT Applications using Raspberry Pi.
	CO5:	Perform Data Acquisition and analysis using Cloud and Tkinter
BUILDING PRIVATE BLOCKCHAIN (20APC3622)	CO1:	Recall the structure and mechanism of Bitcoin, Ethereum, Hyperledger and Multichain Blockchain platforms
	CO2:	Infer the importance of consensus in transactions and how transactions are stored on Blockchain.
	CO3:	Setup your own private Blockchain and deploy smart contracts on Ethereum.
	CO4:	Deploy the business network using Hyperledger Composer.
	CO5:	Implement Blockchain for various use cases.
MOBILE APPLICATION DEVELOPMENT (20APE3604)	CO1:	Demonstrate knowledge on mobile platforms, mobile user interface and user interface design requirements.
	CO2:	Design user interfaces by analyzing user requirements
	CO3:	Develop mobile applications for Messaging, Location-Based Services, and Networking
	CO4:	Develop mobile applications and publish in different mobile platforms
	CO5:	Use Android studio and iOS tools to develop mobile applications.
REAL TIME OPERATING SYSTEMS (20APE3605)	CO1:	Characterize real-time systems and describe their functions
	CO2:	Design and implement a real-time system
	CO3:	Apply formal methods to the analysis and design of real-time systems
	CO4:	Apply formal methods for scheduling real-time systems
	CO5:	Characterize and describe reliability and fault tolerance issues and approaches
Design and Analysis Of Algorithms (20APE3606)	CO1:	Analyze the complexity of the algorithms
	CO2:	Use techniques of greedy and dynamic programming to solve the problems.
	CO3:	Implement traversal, backtracking and searching techniques.
	CO4:	choose the appropriate algorithm for solving minimization problem.
	CO5:	Able to prove that a certain problem is NP-Complete
Cyber Security Lab (20APC3619)	CO1:	Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure.
	CO2:	Interpret and forensically investigate security incidents
	CO3:	Recognize attacks on systems and Designing a counter attack incident response and incident response methodology.
	CO4:	Use forensic tools and collect evidence of a computer crime.


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TECHNOLOGY & SCIENCES
 Karakambadi Road, Venkatapuram (V)
 TIRUPATI - 517 520

Advanced IoT Programming Lab (20ASA0502)	CO1:	Identify different types of Sensors and study their functionality in IoT
	CO2:	Demonstrate skills in connecting peripherals to Arduino/Raspberry Pi for data exchange.
	CO3:	Develop a Cloud platform to upload and analyze any sensor data
	CO4:	Demonstrate skills in connecting GSM, GPS, Gateways to micro controllers and perform Data Management in IoT.
	CO5:	Build a complete working IoT system involving prototyping, programming and data analysis.
Building Private Blockchain Lab (20APC3623)	CO1:	Recall the structure and mechanism of Bitcoin, Ethereum, Hyperledger and Multichain Blockchain platforms
	CO2:	Infer the importance of consensus in transactions and how transactions are stored on Blockchain.
	CO3:	Setup your own private Blockchain and deploy smart contracts on Ethereum.
	CO4:	Deploy the business network using Hyperledger Composer.
	CO5:	Implement Blockchain for various use cases.
Basics of Cloud Computing (20ASA0501)	CO1:	Ability to understand various service delivery models of a cloud computing architecture.
	CO2:	Understanding cloud service providers.
	CO3:	Configure various virtualization tools such as Virtual Box, VMware workstation.
	CO4:	Analyze authentication, confidentiality and privacy issues in cloud computing.
Professional Ethics and Human Values (20AMC9904)	CO1:	It ensures students sustained happiness through identifying the essentials of human values and skills.
	CO2:	The students will understand the importance of Values and Ethics in their personal lives and professional careers.
	CO3:	The students will learn the rights and responsibilities as an employee, team member and a global citizen.
	CO4:	Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.
	CO5:	Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life.


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 Karakambadi Road, Venkatapuram (V)
TIRUPATI - 517 520

B.Tech-CSE (Artificial Intelligence and Machine Learning)

Program outcomes:

PO Number	Programme Outcome
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.


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TIRUPATI - 517 520

Program Specific Outcomes:

PSO No.	Programme Specific Outcomes
PSO1	Demonstrate to understand the working principles of computer system and implementation of software products based on its professional engineering practices with
PSO2	Apply adaptive algorithms and techniques to solve problems in areas related to artificial intelligence, machine learning, data science and deep learning.

Course Outcomes:

COURSE NAME	COURSE OUTCOMES	
Algebra and Calculus (20ABS9901)	CO1:	Make use of matrix algebra techniques that is needed by engineers for practical application
	CO2:	Utilize mean value theorems to real life problems.
	CO3:	Interpret with functions of several variables which is useful in optimization. Variables which is useful in optimization.
	CO4:	Analyze 2-dimensional and 3- dimensional concepts in coordinate systems
	CO5:	Utilize the concept of special functions.
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	CO3:	Infer the properties of dielectric magnetic material
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	CO3:	Asses the electromagnetic wave propagation and its power in different media
	CO4:	Analyze the conductivity of semiconductors.
	CO5:	Interpret the dielectric and magnetic properties of materials and apply the nanomaterials for engineering applications.
Problem Solving And Programming Lab (20AES3302)	CO1:	Assemble and disassembling parts of a Computer
	CO2:	Identify to control structure to solving the problem
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	CO4:	Design solutions for computational problems
	CO5:	Develop C programs which utilize the memory efficiently using programming constructs like pointers.

Probability And Statistics (20ABS9911)	CO1:	Interpret the characteristics through correlation and regression tools.
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	CO3:	Apply discrete and continuous probability distributions.
	CO4:	Inference the components of a classical hypothesis test for large sample
	CO5:	Inspect the components of a classical hypothesis test for small samples.
Numerical Methods (20ABS9921)	CO1:	Make use of the concepts of Errors, Relative and Percentage Errors
	CO2:	Solve the concepts of Algebraic & Transcendental Equations to solve different Engineering problems
	CO3:	Examine Interpolation using the concepts of the Numerical Methods
	CO4:	Infer the concepts of Integration in Numerical Methods
	CO5:	Analyse the concepts of O.D.E on Numerical Methods
Basics of Python Programming (20AES3303)	CO1:	Understanding the syntax and semantics of Python programming.
	CO2:	Apply modularity to programs.
	CO3:	Select appropriate data structure of Python for solving a problem.
	CO4:	Implement Mutable and Immutable data types
	CO5:	Interpret the concepts of object oriented programming as used in Python
Data Structures (20AES3305)	CO1:	Analyze and evaluate the efficiency of an algorithm
	CO2:	Implement linear data structures
	CO3:	implement non -linear data structures
	CO4:	Solve the problem of efficiently using graphs and Hashing techniques
	CO5:	Implement advanced sorting and organizing the file
Web Design (20AES3307)	CO1:	Add elements to web pages, including colors, text, images, and more
	CO2:	Add advanced features to your website including special effects
	CO3:	Apply the CSS Knowledge to add colors and text formatting
	CO4:	Apply advanced CSS style presentation and techniques
	CO5:	Develop HTML and CSS Programs.
Basics of Python Programming Lab (20AES3304)	CO1:	Write, Test and Debug Python Programs
	CO2:	Implement Conditionals and Loops for Python Programs
	CO3:	Use functions and represent Compound data using Lists, Tuples and Dictionaries
	CO4:	Read and write data from & to files in Python and develop Application using Python
	CO5:	Implement the problem in terms of real world object using OOPs concepts

Computational Lab (20ABS9918)	CO1:	Determine problems in linear algebra using MS-Excel's Tools
	CO2:	Apply Central Tendency, Dispersion, Correlation and Regression analysis as basics of Statistics using Ms- Excel's Tools.
	CO3:	Utilize properties of probability distributions and to perform using Ms- Excel's Tools.
	CO4:	Solving problems in Definite integrals numerically using Trapezoidal and Simpson's methods in Ms- Excel's Tools.
	CO5:	Analyse Statistics to solve large samples and Small samples problems using Statistical Tools practicing in Ms- Excel's Tools.
Data Structures Lab (20AES3306)	CO1:	Select the data structure appropriate for solving the problem
	CO2:	Implement searching and sorting algorithms
	CO3:	Derive new data types
	CO4:	Illustrate the working of linear and non linear data structure
	CO5:	Organize the data using Files structure
Environmental Studies (20AMC9903)	CO1	Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2	Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5	To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Discrete Mathematical Structures (20ABS9914)	CO1:	Make use of mathematical logic to solve problems.
	CO2:	Analyse the concepts and perform the operations related to sets, relations and functions.
	CO3:	Identify basic counting techniques to solve combinatorial problems.
	CO4:	Evaluate solutions by using recurrence relations
	CO5:	Utilize Graph Theory in solving computer science problems
Digital Electronics & Microprocessors (20APC3301)	CO1:	Design Logic circuit using basic concepts of Boolean algebra.
	CO2:	Design Logic circuit using basic concepts of PLDs.
	CO3:	Design sequential logic circuits.
	CO4:	Design application using 8086 Microprocessor.
	CO5:	Design application using 8051 Microcontroller.
Database Management Systems (20APC3302)	CO1:	know the fundamentals of Databases
	CO2:	Understand SQL and PL/SQL Concepts
	CO3:	Design a database for a real-world information system
	CO4:	Process and Optimize the query
	CO5:	Working of transaction and concurrency techniques in real time applications

Object Oriented Programming through JAVA (20APC3304)	CO1:	Understanding the Syntax, Semantics and features of Java Programming Language.
	CO2:	To gain knowledge on Object Oriented Programming concepts.
	CO3:	Raise Exceptions and handle exceptions.
	CO4:	Analyze the method of creating Multi-threading programs
	CO5:	Ability to create GUI applications & perform event handling.
Computer Organization (20APC3306)	CO1:	Understand computer architecture concepts related to the design of modern processors, memories and I/Os
	CO2:	Design Arithmetic and control unit
	CO3:	Identify the hardware requirements of Primary and Secondary memory and Understand the importance of I/O devices and its interface circuits.
	CO4:	Identify pipeline hazards and possible solutions to those hazards
	CO5:	Understand Scalable Architectures, Pipelining, Superscalar processors, multiprocessors
Database Management Systems Laboratory (20APC3303)	CO1:	Write SQL Queries
	CO2:	Implement PL/SQL programs
	CO3:	Design database for any real world problem
Object Oriented Programming through Java Lab (20APC3305)	CO1:	Demonstrate java compiler and eclipse platform and learn how to use net beans IDE to create java Application
	CO2:	Ability to create user friendly interfaces
	CO3:	Ability to solve the problem using object oriented approach and design solutions which are robust
	CO4:	Implement exception handling and Templates
	CO5:	Ability to create GUI components and implementations
Computer Organization and Microprocessor Lab (20APC3307)	CO1:	Represent numbers and perform arithmetic operations.
	CO2:	Minimize the Boolean expression using Boolean algebra and design it using logic gates
	CO3:	Analyze and design combinational circuit.
	CO4:	Design and develop sequential circuits
	CO5:	Understand and apply the working of different operations on binary numbers.
Client Side Scripting (20ASC3301)	CO1:	Analyze and understand the basic concepts of web programming.
	CO2:	Implement Arrays, Functions and Strings
	CO3:	Apply techniques of form validation using Java Script.
	CO4:	Describe important concepts related to client side Web Security.
	CO5:	Save client information in cookie by server

Constitution Of India (20AMC9902)	CO1:	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2:	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3:	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4:	Discuss the Powers and functions of Governor, President, Judiciary.
	CO5:	Discuss the functions of local administration bodies
Software Engineering for AI (20APC3308)	CO1:	Understand the methods and issues in software engineering
	CO2:	Apply the principles of Artificial Intelligence for Software engineering
	CO3:	Design AI based software
	CO4:	Apply the algorithms of Machine learning in solving problems
	CO5:	Design Expert systems
Artificial Intelligence (20APC3309)	CO1:	Understand the basic concepts of Artificial Intelligence
	CO2:	Apply searching techniques for solving a problem
	CO3:	Analyze the concepts of Reinforcement Learning
	CO4:	Develop Natural Language Interface for Machines
	CO5:	Understanding the concepts to design a robotics
Data Mining and Data Warehousing (20APC3311)	CO1:	Understand the basic concepts of Data Warehouse and data Mining
	CO2:	Apply OLAP technology for Data Warehouse
	CO3:	Analyze and evaluate performance of Association Rules and classification algorithms
	CO4:	Evaluate various Clustering algorithms
	CO5:	Analyze advanced Data Mining techniques
Operating Systems (20APC3313)	CO1:	Distinguish between the different types of operating system environments.
	CO2:	Apply the concepts of process synchronization & CPU scheduling
	CO3:	Develop solutions to deadlock and memory management
	CO4:	Analyze various disk scheduling algorithms and file system interfaces
	CO5:	Analyze the various security issues and goals of protection
Managerial Economics And Financial Analysis (20AHSMB01)	CO1:	Understand the fundamentals of Economics and Managerial economics viz., Demand, Production, cost, revenue and markets.
	CO2:	Apply the Concept of Production cost and revenues for effective Business decision
	CO3:	Analyze how to invest their capital and maximize returns.
	CO4:	Evaluate the capital budgeting techniques.
	CO5:	Define the concepts related to financial accounting and management and able to develop the Accounting statements and evaluate the financial performance of business entity.

Universal Human Values (20AHS9905)	CO1:	Students are expected to become more aware of themselves, and their surroundings(family, society, nature)
	CO2:	They would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
	CO3:	They would have better critical ability
	CO4:	They would also become sensitive to their commitment towards what they have understood(human values, human relationship and human society).
	CO5:	It is hoped that they would be able to apply what they have learnt to their own self in different day- to-day settings in real life, at least a beginning would be made in this direction.
Artificial Intelligence Lab (20APC3310)	CO1:	Implement search algorithms
	CO2:	Solve Artificial Intelligence Problems
	CO3:	Develop the solutions using Backtracking
	CO4:	Design Chatbot
	CO5:	Implement basic problems by using NLTK(Natural Language Tool Kit)
Data Mining and Data Warehousing Lab (20APC3312)	CO1:	Learn how to use different data mining tools.
	CO2:	Learn to execute data mining tasks using a data mining toolkit (Orange data mining tool kit) and visualize the results.
	CO3:	Understanding linear regression model in the orange environment.
	CO4:	Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification and clustering.
	CO5:	Demonstrate the usage of Silhouettes.
Operating Systems Lab (20APC3314)	CO1:	Ensure the development of applied skills in operating systems related areas.
	CO2:	Able to write software routines modules or implementing various concepts of operating system
Server Side Scripting (20ASC3302)	CO1:	Learn the installation guide of MYSQL, XAMPP5, APACHE and PHP
	CO2:	Able to design code for simple dynamic web pages
	CO3:	Design PHP and SQL/MySQL Integration.
	CO4:	Design Basic Projects
	CO5:	Able to provide protection to web server


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B.Tech- CSE (DATA SCIENCE)

Program outcomes:

PO No	Programme Outcome
PO1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions
PO11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
PO12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

PSO	Programme Specific Outcomes
PSO1	Demonstrate to understand the working principles of computer system and implementation of software products based on its professional engineering practices with effective strategies.
PSO2	Apply adaptive algorithms and techniques to solve problems in areas related to data science.

Course Outcomes:

COURSE NAME	COURSE OUTCOMES	
Algebra and Calculus (20ABS9901)	CO1:	Make use of matrix algebra techniques that is needed by engineers for practical applications.
	CO2:	Utilize mean value theorems to real life problems.
	CO3:	Interpret with functions of several variables which is useful in optimization.
	CO4:	Analyse 2-dimensional and 3-dimensional concepts in coordinate systems
	CO5:	Utilize the concept of special functions
Chemistry (20ABS9904)	CO1:	Interpret the behaviour and interactions between matter and energy at both the atomic and molecular levels between matter and energy at both the atomic and molecular levels
	CO2:	Apply the electrochemical principles to the construction of batteries, fuel cells and electrochemical sensors
	CO3:	Outline the preparation, mechanism properties and applications of polymer and conducting polymers
	CO4:	Analyze the separation of gaseous and liquid mixtures using instrumental methods and their applications.
	CO5:	Understand the disadvantages of using hardwater in domestically and industrially and select suitable treatments.
Problem Solving and Programming (20AES0501)	CO1:	Able to know interconnection of peripherals and connects of algorithms and flowcharts
	CO2:	Able to know problem solving aspects, design and analysis of algorithm
	CO3:	Able to know flow control, input output and implementation functions
	CO4:	Able to solve computational problems using functions, array and pointers
	CO5:	Able to organise real world heterogeneous data and apply searching ,sorting techniques with exception handling


Engineering Graphics (20AES0301)	CO1:	Ability to discuss the conventions and methods of Engineering Drawing
	CO2:	Ability to demonstrate drafting practices, visualization and projection skills
	CO3:	Ability to perform basic sketching techniques of Engineering components
	CO4:	Ability to draft the orthographic and pictorial views of a given Engineering components
	CO5:	Ability to increasingly use architectural and engineering scales
Information Technology And Numerical Methods (20AES0505)	CO1:	Usage of Digital World and Exploring Cyber space
	CO2:	Explain the needs of hardware and software required for a computation task.
	CO3:	Peripheral devices, networking and internet concepts
	CO4:	Analyze the concepts of Errors, Algebraic & Transcendental Equations to solve different Engineering problems
	CO5:	Analyze Interpolation using the concepts of the numerical methods and apply the Integration in numerical methods
	CO6:	Apply the concepts of O.D.E on numerical method
Computer Science And Engineering Workshop (20AES0506)	CO1:	Assemble and disassembling parts of a computer
	CO2:	Develop Documents using Word processors
	CO3:	Develop presentations using the presentation tool
	CO4:	Perform computations using spreadsheet tool
	CO5:	Design Graphics, Videos and Web pages
Chemistry Lab (20ABS9909)	CO1:	Demonstrate volumetric analysis involved with emphasis on solution preparation, dilution
	CO2:	Develop knowledge to prepare advanced materials
	CO3:	Acquire knowledge to measure the strength of an acid present in secondary batteries
	CO4:	Familiarize with digital and instrumental methods of analysis
	CO5:	Apply important chemical concepts and principles to analyze mixture of components by
Problem Solving And Programming Lab (20AES0503)	CO1:	Assemble and disassembling parts of a Computer
	CO2:	Identify to control structure to solving the problem
	CO3:	Analyze different sorting algorithms
	CO4:	Design solutions for computational problems
	CO5:	Develop C programs which utilize the memory efficiently using programming constructs like pointers.
Applied Physics (20ABS9902)	CO1:	Analyze the intensity variation of light due to interference and diffraction & illustrate the propagation of electromagnetic waves.
	CO2:	Analyze and apply the concepts of LASER S and optical fibers.
	CO3:	Infer the properties of dielectric magnetic material
	CO4:	Apply the fundamentals of semi conductors for device applications
	CO5:	Implement the behavior of superconductors in diverse fields & interpret the properties of nanomaterials for multiple applications.

Probability And Statistics (20ABS9911)	CO1:	Interpret the characteristics through correlation and regression tools.
	CO2:	Make use of the concepts of probability and their applications.
	CO3:	Apply discrete and continuous probability distributions.
	CO4:	Inference the components of a classical hypothesis test for large sample.
	CO5:	Inspect the components of a classical hypothesis test for small samples.
Communicative English (20AHS9901)	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
Data Structures (20AES0502)	CO1:	Analyze and evaluate the efficiency of an algorithm
	CO2:	Implement linear data structures
	CO3:	implement non -linear data structures
	CO4:	Solve the problem of efficiently using graphs and Hashing techniques
	CO5:	Implement advanced sorting and organizing the file
Web Design (20AES0507)	CO1:	Add elements to web pages, including colors, text, images, and more
	CO2:	Add advanced features to your website including special effects
	CO3:	Apply the CSS Knowledge to add colors and text formatting
	CO4:	Apply advanced CSS style presentation and techniques
	CO5:	Develop HTML and CSS Programs.
Communicative English Lab (20AHS9902)	CO1:	Create Awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English
	CO2:	Understanding the different aspects of the language with emphasis on LSRW skills and make use of different strategies in discussion
	CO3:	Improve word knowledge and apply skills in various languages learning activities
	CO4:	Analyze speech sounds, stress ,rhythm, intonation and syllable division for better listening and speaking comprehension
	CO5:	Evaluate and exhibit acceptable etiquette essential in social and professional presentations.
Applied Physics Lab (20ABS9907)	CO1:	Analyze the wave properties of light and the interaction of energy with the matter.
	CO2:	Apply electromagnetic wave propagation in different guided media.
	CO3:	Asses the electromagnetic wave propagation and its power in different media
	CO4:	Analyze the conductivity of semiconductors
	CO5:	Interpret the difference between normal conductor and superconductor and apply the nanomaterials for engineering applications

Data Structures Lab (20AES0504)	CO1:	Select the data structure appropriate for solving the problem
	CO2:	Implement searching and sorting algorithms
	CO3:	Design new data types
	CO4:	Illustrate the working of stack and queue
	CO5:	Organize the data in the form of files
Environmental Studies (20AMC9903)	CO1	Students get sufficient information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles etc.
	CO2	Students realize the need to change their approach, so as to perceive our own environmental issues correctly, using practical approach based on observation and self-learning.
	CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
	CO4	Interpretation of different types of environmental pollution problems and designing of new solid waste management techniques usage
	CO5	To get knowledge on various environmental acts and to engage all the students life - long learning of rain water harvesting
Discrete Mathematical Structures (20ABS9914)	CO1:	Make use of mathematical logic to solve problems.
	CO2:	Analyse the concepts and perform the operations related to sets, relations and functions.
	CO3:	Identify basic counting techniques to solve combinatorial problems.
	CO4:	Evaluate solutions by using recurrence relations
	CO5:	Utilize Graph Theory in solving computer science problems
Digital Electronics & Microprocessors (20APC0503)	CO1:	Design Logic circuit using basic concepts of Boolean algebra.
	CO2:	Design any Logic circuit using basic concepts of PLDs.
	CO3:	Design sequential logic circuits
	CO4:	Design application using 8086 Microprocessor.
	CO5	Design application using 8051 Microcontroller.
Database Management Systems (20APC0502)	CO1:	know the fundamentals of Databases
	CO2:	Understand SQL and PL/SQL Concepts
	CO3:	Design a database for a real-world information system
	CO4:	Process and Optimize the query
	CO5:	Working of transaction and concurrency techniques in real time applications
Basics of Python Programming (20APC0526)	CO1:	Understanding the syntax and semantics of Python programming.
	CO2:	Apply modularity to programs.
	CO3:	Select appropriate data structure of Python for solving a problem.
	CO4:	Implement Mutable and Immutable data types
	CO5:	Interpret the concepts of object oriented programming as used in Python

Basics of Electrical & Electronics Engineering (20AES0205)	CO1:	Apply concepts of KVL/KCL in solving DC circuits
	CO2:	Illustrate working principles of induction motor - DC Motor
	CO3:	Identify type of electrical machine based on their operation
	CO4:	Describe operation and characteristics of diodes and transistors
	CO5:	Make use of diodes and transistors in simple, typical circuit applications.
	CO6:	Understand operation of basic op-amp circuits.
Database Management Systems Laboratory (20APC0505)	CO1:	Write SQL Queries
	CO2:	Implement PL/SQL programs
	CO3:	Design database for any real world problem
Basics of Python Programming Lab(20APC0527)	CO1:	Write, Test and Debug Python Programs
	CO2:	Implement Conditionals and Loops for Python Programs
	CO3:	Use functions and represent Compound data using Lists, Tuples and Dictionaries
	CO4:	Read and write data from & to files in Python and develop Application using Python
	CO5:	Implement the problem in terms of real world object using OOPs concepts
Basics of Electrical & Electronics Engineering Lab (20AES0206)	CO1:	Verify Kirchoff's Laws & Superposition theorem for dc supply
	CO2:	Analyze the performance of AC and DC Machines by testing.
	CO3:	Study I – V Characteristics of PV Cell & Perform speed control of dc shunt motor
	CO4:	Ability to operate diodes for finding V-I Characteristics
	CO5:	Ability to construct and operate rectifiers without & with filters
	CO6:	Ability to construct and operate BJT & FET Characteristics.
Client Side Scripting (20ASC0501)	CO1:	Analyze and understand the basic concepts of web programming.
	CO2:	Implement Arrays, Functions and Strings
	CO3:	Apply techniques of form validation using Java Script.
	CO4:	Describe important concepts related to client side Web Security.
	CO5:	Save client information in cookie by server
Constitution Of India (20AMC9902)	CO1:	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2:	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India
	CO3:	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4:	Discuss the Powers and functions of Governor, President, Judiciary
	CO5:	Discuss the functions of local administration bodies

Computer Organization (20APC0506)	CO1:	Understand computer architecture concepts related to the design of modern processors, memories and I/Os
	CO2:	Identify the hardware requirements for cache memory and virtual memory
	CO3:	Design algorithms to exploit pipelining and multiprocessors
	CO4:	Understand the importance and trade-offs of different types of memories.
	CO5:	Identify pipeline hazards and possible solutions to those hazards
Design And Analysis Of Algorithms (20APC0511)	CO1:	Analyze the complexity of the algorithms
	CO2:	Use techniques of greedy and dynamic programming to solve the problems.
	CO3:	Implement traversal, backtracking and searching techniques.
	CO4:	choose the appropriate algorithm for solving minimization problem.
	CO5:	Able to prove that a certain problem is NP-Complete
Object Oriented Programming through Java (20APC0512)	CO1:	Understanding the Syntax, Semantics and features of Java Programming Language.
	CO2:	To gain knowledge on Object Oriented Programming concepts.
	CO3:	Design the method of creating Multi-threading programs and handle exceptions
	CO4:	Understanding the concepts of java Collection Framework, Applets
	CO5:	Ability to create GUI applications & perform event handling


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M.Tech-Structural Engineering

Program outcomes:

PO1	An ability to independently carry out research /investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report/document.
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

Course Outcomes:

Course Name	Course Outcomes:
Matrix Methods of Structural Analysis (22DPC2001)	CO1 Understand the basic concepts of structural analysis.
	CO2 Apply numerical methods to solve continuum beams.
	CO3 Analysis of two dimensional portal frames using different methods.
	CO4 Understand the basic concepts of transformation of matrices from local to global coordinates.
	CO5 Solve the equations using different solution techniques.
Advanced Solid Mechanics (22DPC2002)	CO1 Understanding the basic concepts, Cartesian Tensors and Equations of Elasticity.
	CO2 Apply numerical methods to solve continuum problems.
	CO3 Solve simple problems of elasticity and plasticity understanding the basic concepts.
	CO4 Solve simple problems Two-Dimensional Problems of Elasticity and torsion
	CO5 Understand Plastic Stress-Strain Relations, Principle of Normality and Plastic Potential
Structural Optimization (22DPE2001)	CO1 To study the different optimization methodologies applied to structural systems.
	CO2 To study the different optimization methodologies applied to structural systems.
Advanced Concrete Materials and Technology (22DPE2002)	CO1 Understand various ingredients of concrete and their role.
	CO2 Examine knowledge on the fresh and hardened properties of concrete.
	CO3 Design concrete mixes using various methods.
	CO4 Perceive special concretes for accomplishing performance levels.
	CO5 Understand the durability of concrete and remedial methods.
Stability of Structures (22DPE2003)	CO1 Understand the difference between stability and instability of the structures
	CO2 Determine stability of columns
	CO3 Able to determine the buckling loads for columns
	CO4 Able to apply advanced numerical techniques to buckling analysis of structures.
	CO5 Determine stability of beams

Analytical and Numerical Methods for Structural Engineering (22DPE2004)	CO1 Analyze the concept of Linear equations.
	CO2 Understand the concept of Calculus of Variation.
	CO3 Understand methods of Numerical solutions of O.D.E .
	CO4 Analyze the concept of basic methods of P.D.E.
	CO5 Understand the concepts of Partial Difference Equation to solve engineering problems.
ENERGY EFFICIENT BUILDINGS (22DPE2005)	CO1 This course aims to provide an understanding of the concept of reduction in energy consumption through low energy building design.
	CO2 Highlight strategies to integrate day lighting and low energy heating/cooling in buildings.
	CO3 Understand the concept and theoretical background of low energy building design.
	CO4 Apply simulation tools to achieve energy efficiency in buildings.
	CO5 Understand importance of energy consumption.
Theory of Thin Plates and Shells (22DPE2006)	CO1 Use analytical methods for the solution of thin plates and shells.
	CO2 Use analytical methods for the solution of shells.
	CO3 Apply the numerical techniques and tools for the complex problems in thin plates.
	CO4 Apply the numerical techniques and tools for the complex problems in shells.
	CO5 Application to Pipes and Pressure Vessels
Research Methodology and IPR (22MBA0110)	CO1 To acquaint with basics of research problem formulation
	CO2 Familiar with research related information and ethics.
	CO3 Aware about research report writing and presentation.
	CO4 Understand and get knowledge of basic rights for protection of innovatives.
	CO5 Understand different types of IPRs
English for Research Paper Writing (22DMC9901)	CO1 Understand that how to improve your writing skills and level of readability
	CO2 Learn about what to write in each section
	CO3 Understand the skills needed when writing a Title
	CO4 Develop writing skill
	CO5 Able to quote phrases
Disaster Management (22DMC2001)	CO1 Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
	CO2 Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
	CO3 Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
	CO4 Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in

Sanskrit for Technical Knowledge (22DMC9902)	CO1 To get a working knowledge in illustrious Sanskrit, the scientific language in the world
	CO2 Learning of Sanskrit to improve brain functioning
	CO3 Understanding basic Sanskrit language
	CO4 Ancient Sanskrit literature about science & technology can be understood
	CO5 Being a logical language will help to develop logic in students
Value Education (22DMC9903)	CO1 Understand value of education and self- development
	CO2 Imbibe good values in students
	CO3 Let the should know about the importance of character
	CO4 Learn the importance of Human values
	CO5 Developing the overall personality
Structural Design Lab-I (22DPC2003)	CO1 Design and Detail of simple beams
	CO2
	CO3
	CO4 Design and Detail of simple frames and Truss
	CO5 Design and Detail complete all the Structural Components of Frame Buildings.
	CO6 Design and Detail complete Multi-Storey Frame Buildings.
	CO7 Analyze a Tall building for wind force
FEM in Structural Engineering (22DPC2005)	CO1 Analyze finite element method efficiently in order to solve field problems
	CO2 Understand the basic concepts of 1D Dimensional elements
	CO3 Understand the basic concepts of 2D Dimensional elements
	CO4 Analyze 4-Noded And 8-Noded Isoparametric elements
	CO5 Understand the concepts of 3-D Elements
Structural Dynamics (22DPC2006)	CO1 Understand the concept of dynamic loads and vibrations
	CO2 Analyze and study dynamics response of single degree freedom system using fundamental Theory and equation of motion.
	CO3 Analyze and study dynamics response of Multi degree freedom system using fundamental theory and equation of motion.
	CO4 Use the Approximate Methods for dynamic analysis.
	CO5 Analyze earthquake loads acting on structure.
Design of Advanced Concrete Structures (22DPE2007)	CO1 Analyze the deflections of Reinforced Concrete Beams And Slabs by understanding their behaviour.
	CO2 Analyze and Design the Deep Beams by understanding their behaviour.
	CO3 Analyze and Design the Flat Slabs by understanding their behaviour.
	CO4 Analyze and Design the Shear Walls by understanding their behaviour.
	CO5 Analyze and Design the concrete members for Fire Resistance

Advanced Steel Design (22DPE2008)	CO1 Use Design steel structures/ components by different design processes.
	CO2 Analyze and design beams for stability and strength, and drift.
	CO3 Determine the stability of column and strength
	CO4 Understand the method of design criteria
	CO5 Design welded and bolted connections
Design of High Rise Structures (22DPE2009)	CO1 Analyse, design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions.
	CO2 Analyse, design and detail the RC Chimney
	CO3 Analyse, design and detail Steel Chimney.
	CO4 Analyse. design and detail the tall buildings subjected to different loading conditions using
	CO5 Analysis and Design by using software application
Design of Pre-stressed Concrete Structures (22DPE2010)	CO1 Understand the basic aspects of prestressed concrete fundamentals, including pre and post-tensioning processes.
	CO2 Find out losses in the prestressed concrete.
	CO3 Analysis and design of prestressed concrete sections for flexure
	CO4 Analyze and design for shear and anchorage in prestressed concrete.
	CO5 Analysis of Statically Indeterminate Structures
Design of Bridges (22DPE2011)	CO1 Understand the basic aspects of Bridges
	CO2 Able to design Box Culvert and Slab Deck bridge
	CO3 Able to design T Beam bridge and Longitudinal Girder
	CO4 Able to design Prestressed Concrete Bridges
	CO5 Analysis of Piers and Abutments
Advanced Design of Foundations (22DPE2012)	CO1 Decide the suitability of soil strata for different projects.
	CO2 Design shallow foundations deciding the bearing capacity of soil.
	CO3 Analyze and design the pile and well foundation.
	CO4 Understand analysis methods for tunnel and open cuts.
	CO5 Understand analysis methods for coffer dams
Constitution of India (22DMC9904)	CO1 Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2 Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3 Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4 Discuss the passage of the Hindu Code Bill of 1956.
	CO5 Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.

Pedagogy Studies (22DMC5801)	CO1 What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
	CO2 What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
	CO3 How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Perspective.
	CO4 Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
	CO5 Identify critical evidence gaps to guide the development.
Stress Management by Yoga (22DMC9905)	CO1 Develop healthy mind in a healthy body thus improving social health also
	CO2 Improve efficiency
	CO3 To achieve overall health of body and mind
	CO4 To overcome stress
	CO5 Identify critical evidence gaps to guide the development.
Personality Development through Life Enlightenment Skills (22DMC9906)	CO1 Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
	CO2 The person who has studied Geeta will lead the nation and mankind to peace and prosperity
	CO3 Study of Neetishatakam will help in developing versatile personality of students.
	CO4 To become a person with stable mind, pleasing personality and determination
	CO5 To awaken wisdom in students
Structural Design Lab- II (22DPC2007)	CO1 Design and Detail of Prestressed Concrete members
	CO2 Design and Detail of Water Tanks.
	CO3 Design and Detail of bridge girder and cylindrical shell.
	CO4 Determine the Dynamic of tall building.
	CO5 Design and Detailing of different foundations.
FEM Laboratory (22DPC2008)	CO1 Identify mathematical model for solution of common engineering problems
	CO2 Understand the concept of meshing for rectangular and circular plates
	CO3 Analyze the bar elements and truss elements using FEM software
	CO4 Analyze the 2D Frame and 3D frame using FEM software
	CO1 To apply theoretical and practical aspects of project management planning techniques to achieve project goals.
	CO2 To understand the resources, cost and accounts managements
	CO3 To know about the project implementation, and contract management and procurement management
	CO4 Understand to apply knowledge and skills of quality and safety managements in construction

M.Tech-Power Systems

Program outcomes:

PO1	Conduct investigations of complex problems: An ability to independently carry out research/investigations and development work to solve practical problem.
PO2	Design/development of solutions: An ability to write and present a substantial technical report/document.
PO3	Modern tool usage: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program
PO4	Simulation and implementation: Attain the ability to simulate and implement different Power system models, evaluate and recognize to provide creative solutions.
PO5	Real time solutions and project management: Develop key models for real world problems in the domain of Electrical Power Systems for effective project management.
PO6	Engineer and Society: Ability to function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility.

Program Specific Outcomes:

PSO1	Modelling and Analysis: An ability to mathematically model and analyze the Performance of Electrical Machines, Control Systems, Power Systems and Power Electronic Systems.
PSO2	Design and Development: Ability to understand the recent technological development in Electrical and Electronics Engineering and Develop Products/Software to cater the Societal & Industrial needs.

Course Outcomes:

Course Name	Course Outcomes:
POWER SYSTEMS ANALYSIS (22DPC8201)	CO1: Calculate voltage phasors at all buses , given the data using various methods of load flow
	CO2: Calculate fault currents in each phase
	CO3: Rank various contingencies according to their severity
	CO4: Estimate the bus voltage phasors given various quantities viz. power flow, voltages, taps , CB status etc
	CO5: Estimate closeness to voltage collapse and calculate PV curves using continuation power flow
Power Systems Dynamics-I (22DPC8202)	CO1: Understand the modeling of synchronous machine in details.
	CO2: Carry out simulation studies of power system dynamics using MATLAB- SIMULINK, MI-POWER.
	CO3: Carry out stability analysis with and without power system stabilizer (PSS).
	CO4: Understand the load modeling in power system.

Renewable Energy Systems (22DPE8201)	CO1: Knowledge about renewable energy
	CO2: Understand the working of distributed generation system in autonomous/grid Connected modes
	CO3: Know the Impact of Distributed Generation on Power System
Smart Grids (22DPE8202)	CO1: Appreciate the difference between smart grid & conventional grid
	CO2: Apply smart metering concepts to industrial and commercial installations
	CO3: Formulate solutions in the areas of smart substations ,distributed generation and wide area measurements
	CO4: Come up with smart grid solutions using modern communication technologies
High Power Converter (22DPE8203)	CO1: Analyze various single phase and three phase power converters.
	CO2: Select and design DC - DC converter topologies for a broad range of power conversion applications.
	CO3: Develop improved power converters for any stringent application requirements.
	CO4: Design AC - AC converters for variable frequency applications.
Wind & Solar Systems (22DPE8204)	CO1: Appreciate the importance of energy growth of the power generation from the renewable energy sources and participate in solving these problems
	CO2: Demonstrate the knowledge of the physics of wind power and solar power generation and all associated issues so as to solve practical problems
	CO3: Demonstrate the knowledge of physics of solar power generation and the associated issues
	CO4: Identify, formulate and solve the problems of energy crises using wind and solar energy
Electrical Power Distribution System (22DPE8205)	CO1: Knowledge of power distribution system
	CO2: Study of Distribution automation and its application in practice
	CO3: To learn SCADA system
Mathematical Methods for Power Engineering (22DPE8206)	CO1: Knowledge about vector spaces, linear transformation, eigen values and eigenvectors of linear operators
	CO2: To learn about linear programming problems and understanding the simplex method for solving linear programming problems in various fields of science and technology
	CO3: Acquire knowledge about nonlinear programming and various techniques used for solving constrained and unconstrained nonlinear programming problems
	CO4: Understanding the concept of random variables, functions of random variable and their probability distribution
	CO5: Understand stochastic processes and their classification

Pulse Width Modulation for PE Converters (22DPE8207)	CO1: Use the knowledge of PWM techniques in controlling different power electronic converters.
	CO2: Apply the knowledge of power electronics in design and analysis of DC-PWM converters.
	CO3: Design and analyze DC-AC and AC-DC converters and control their operation using PW techniques.
	CO4: Design and analyze different resonant converters and their control circuits
	CO5: Analyze AC – AC converters and multilevel converters.
Electric and Hybrid Vehicles (22DPE8208)	CO1: Acquire knowledge about fundamental concepts, principles, analysis and design of hybrid and electric vehicles.
	CO2: To learn electric drive in vehicles / traction.
Research Methodology and IPR (22MBA0110)	CO1: Understand the research problem and research process.
	CO2: Understand research ethics.
	CO3: Prepare a well -structured research paper and scientific presentations.
	CO4: Explore on various IPR components and process of filing.
	CO5: Understand the adequate knowledge on patent and rights.
English for Research Paper Writing (22DMC9901)	Understand that how to improve your writing skills and level of readability
	CO1: Learn about what to write in each section
	CO2: Understand the skills needed when writing a Title
	CO3: Develop writing skill
Disaster Management (22DMC2001)	CO4: Able to quote phrases
	CO1: Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
	CO2: Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
	CO3: Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
Sanskrit for Technical Knowledge (22DMC9902)	CO4: Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in
	CO1: To get a working knowledge in illustrious Sanskrit, the scientific language in the world
	CO2: Learning of Sanskrit to improve brain functioning
	CO3: Understanding basic Sanskrit language
	CO4: Ancient Sanskrit literature about science & technology can be understood
Value Education (22DMC9903)	CO5: Being a logical language will help to develop logic in students
	CO1: Understand value of education and self- development
	CO2: Imbibe good values in students
	CO3: Let the students know about the importance of character
	CO4: Learn the importance of Human values
	CO5: Developing the overall personality


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Power System Steady State Analysis Lab (22DPC8203)	CO1: Calculate voltage phasors at all buses , given the data using various methods of load flow
	CO2: Calculate fault currents in each phase
	CO3: Estimate closeness to voltage collapse and calculate PV curves using continuation power flow
Renewable Energy Lab (22DPC8204)	CO1: Knowledge about renewable energy
	CO2: Understand the working of distributed generation system in autonomous/grid Connected modes
	CO3: Know the Impact of Distributed Generation on Power System
Digital Protection of Power System (22DPC8205)	CO1: Learn the importance of Digital Relays.
	CO2: Apply Mathematical approach towards protection
	CO3: Learn to develop various Protection algorithms.
Power System Dynamics-II (22DPC8206)	CO1: Gain valuable insights into the phenomena of power system including obscure ones.
	CO2: Understand the power system stability problem.
	CO3: Analyze the stability problems and implement modern control strategies.
	CO4: Simulate small signal and large signal stability problems.
Restructured Power Systems (22DPE8209)	CO1: Learners will have knowledge on restructuring of power industry.
	CO2: Learners will attain knowledge about locational margin prices and financial.
	CO3: Learners will understand basics of congestion management.
Advanced Digital Signal Processing (22DPE8210)	CO1: Knowledge about the time domain and frequency domain representations as well analysis of discrete time signals and systems
	CO2: Study the design techniques for IIR and FIR filters and their realization structures.
	CO3: Acquire knowledge about the finite word length effects in implementation of digital filters.
	CO4: Knowledge about the various linear signal models and estimation of power spectrum of stationary random
Dynamics of Electrical Machines (22DPE8211)	CO1: Formulation of Electrodynamic equations of all electric machines and analyze the performance characteristics
	CO2: Knowledge of transformations for the dynamic analysis of machines
	CO3:
	CO4: Study about synchronous machine
Power Apparatus Design (22DPE8212)	CO1: To give a systematic approach for modeling and analysis of all rotating machines Under both transient and steady state conditions with the dimensions and material used
	CO2: Ability to model and design all types of rotation machines including special machines

Advanced Micro-Controller Based Systems (22DPE8213)	CO1: To learn how to program a processor in assembly language and develop an advanced processor based system.
	CO2: To learn configuring and using different peripherals in a digital system.
	CO3: To compile and debug a Program.
	CO4: To generate an executable file and use it.
SCADA Systems and Applications (22DPE8214)	CO1: Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications.
	CO2: Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system.
	CO3: Knowledge about single unified standard architecture IEC 61850.
	CO4: To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.
	CO5: Learn and understand about SCADA applications in transmission and distribution sector, industries etc.
Artificial Intelligence Techniques (22DPE8215)	CO1: Learn the concepts of biological foundations of artificial neural networks
	CO2: Learn Feedback networks and radial basis function networks and fuzzy logics
	CO3: Identifications of fuzzy and neural network
	CO4: Acquire the knowledge of GA
Power Quality (22DPE8216)	CO1: Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonics on system equipment and loads
	CO2: Develop analytical modeling skills needed for modeling and analysis of harmonics in networks and components
	CO3: To introduce the student to active power factor correction based on static VAR compensators and its control techniques
	CO4: To introduce the student to series and shunt active power filtering techniques for harmonics.
Constitution of India (22DMC9904)	CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4: Discuss the passage of the Hindu Code Bill of 1956.
	CO5: Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.

Pedagogy Studies (22DMC5801)	CO1: What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
	CO2: What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
	CO3: How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Perspective.
	CO4: Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
	CO5: Identify critical evidence gaps to guide the development.
Stress Management by Yoga (22DMC9905)	CO1: Develop healthy mind in a healthy body thus improving social health also
	CO2: Improve efficiency
	CO3: To achieve overall health of body and mind
	CO4: To overcome stress
	CO5: Identify critical evidence gaps to guide the development.
Personality Development through Life Enlightenment Skills. (22DMC9906)	CO1: Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
	CO2: The person who has studied Geeta will lead the nation and mankind to peace and prosperity
	CO3: Study of Neetishatakam will help in developing versatile personality of students.
	CO4: To become a person with stable mind, pleasing personality and determination
	CO5: To awaken wisdom in students
Power System Protection Lab (22DPC8207)	CO1: Analyze the protection of parallel, radial feeders & over voltage induction relay
	CO2: Understand the principle of Reverse Power protection
	CO3: Analyze the functioning of over voltage induction relay & Differential Relay
Artificial Intelligence Lab (22DPC8208)	CO1: Learn the concepts of biological foundations of artificial neural networks
	CO2: Learn Feedback networks and radial basis function networks and fuzzy logics
	CO3: Identifications of fuzzy and neural network
	CO4: Acquire the knowledge of GA
Power System Transients (22DPE8217)	CO1: Knowledge of various transients that could occur in power system and their mathematical Formulation.
	CO2: Ability to design various protective devices in power system for protecting equipment and Personnel.
	CO3: Coordinating the insulation of various equipments in power system.
	CO4: Modeling the power system for transient analysis

FACTS and Custom Power Devices (22DPE8218)	CO1: Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems.
	CO2: Learn various Static VAR Compensation Schemes like Thyristor/GTO Controlled Reactive Power Systems; PWM Inverter based Reactive Power Systems and their controls.
	CO3: To develop analytical modeling skills needed for modeling and analysis of such Static VARS systems.
Industrial Load Modeling & Control (22DPE8219)	CO1: Know about load control techniques in industries and its application
	CO2: Learn different types of industrial processes and optimize the process using tools like LINDO and LINGO
	CO3: Apply load management to reduce demand of electricity during peak time
	CO4: Apply different energy saving opportunities in industries
Dynamics Of Linear Systems (22DPE8220)	CO1: To learn linear system modeling, analysis and design so as to obtain the ability to apply the same to engineering problems in a global perspective.
	CO2: Knowledge on carrying out detailed stability analysis of both linear and nonlinear systems
	CO3: Design observers and controllers for linear systems
	CO4: Acquire knowledge of discrete time linear systems modeling, analysis and design
	CO5: Develop and utilize modern software tools for analysis and design of linear continuous and Discrete time systems.
Waste to Energy (22DOE2001)	CO1: Able to classify types of wastes
	CO2: Understand the method of pyrolysis
	CO3: Understand the use and application of Biomass gasifiers
	CO4: Design biomass combustors
	CO5: Analyze the properties of Biogas
Project Management (22DOE2002)	CO1: Able to understand the importance of construction project management, organization and leadership capabilities
	CO2: Able to apply theoretical and practical aspects of project management planning techniques to achieve project goals.
	CO3: Possess ideas on contract, tender and arbitration in construction projects.
	CO4: Understand to apply knowledge and skills of quality and safety management in construction.
	CO5: Have necessary knowledge in resource planning, costing and accounting.
Industrial Safety (22DOE9001)	CO1: Analyze the basics of industrial safety.
	CO2: Understand the Fundamentals of maintenance engineering
	CO3: Apply the methods of prevention of corrosion and wear.
	CO4: Understand the Fault tracing and their applications.
	CO5: Understand the methods of preventive measures and maintenance

Operations Research (22DOE9002)	CO1: Understand the characteristics and phases, types of models, allocation in linear programming
	CO2: Apply the concept of optimal solution, unbalanced problem, degeneracy and Transportation problem & sequencing.
	CO3: Understand the concept of replacement of items and related problems, theory of games related problems
	CO4: Apply the concept of the knowledge of queuing models, inventory management models.
	CO5: Apply the knowledge of dynamic programming, the concept of the simulation and simulation languages.
Composite Materials (22DOE9004)	CO1: Understanding of basic concepts and characteristics of geometric and physical applications of composites.
	CO2: Explain different reinforcements and their properties.
	CO3: Study of micromechanics and properties of composite material.
	CO4: Study of coordinate transformations of stress and strain laws.
	CO5: Study of elastic behavior of unidirectional composites; Joining Methods and Failure Theories

M.Tech-Production Engineering & Engineering Design

Program outcomes:

PO1	An ability to independently carry out research /investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report/document.
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

Course Outcomes:

Course Name	Course Outcomes:
Advanced Mathematics for Engineers (22DBS9901)	CO1: Analyze the concept of matrix in Numerical Methods.
	CO2: Understand the wave equation and method of solutions.
	CO3: Analyze the types of distributions and Sampling Theory.
	CO4: Understand the concept of Estimation and Hypothesis.
	CO5: Understand the concept of ANOVA and Curve fitting
Mechanical Vibrations (22DPC9001)	CO1: Determine the natural frequency of transverse vibrations of the shaft and torsional vibrations of rotor systems.
	CO2: Analyse the mathematical modelling of the two degrees of freedom systems and explain about the working principle of vibration absorber
	CO3: Compute the natural frequencies and mode shapes of a multi degree of freedom system and explain the modal analysis of a vibrating system
	CO4: Select the numerical methods to determine natural frequencies of the beam and rotor systems
	CO5: Describe the vibration measurement by using transducers and vibration exciters
Advanced Material Science & Metallurgy (22DPC9002)	CO1: Determine the natural frequency of transverse vibrations of the shaft and torsional vibrations of rotor systems
	CO2: Analyze the mathematical modeling of the two degrees of freedom systems and explain about the working principle of vibration absorber
	CO3: Compute the natural frequencies and mode shapes of a multi degree of freedom system and explain the modal analysis of a vibrating system
	CO4: Select the numerical methods to determine natural frequencies of the beam and rotor systems
	CO5: Describe the vibration measurement by using transducers and vibration exciters
Non-Destructive Evaluation (22DPE9001)	CO1 Analysis of ultra sonic hardness testing methods and principles of eddy current testing
	CO2 Study of X-ray radiography and image scattering and quality.
	CO3 Study of methods of X-ray radiography process and techniques used.
	CO4 Study and analysis of holography and practices and techniques.
	CO5 Applications of NDT in castings, welding and different case studies

Rapid Prototyping (22DPE9002)	CO1 Identify the need for reduction of product development time.
	CO2 Model any complex part for rapid manufacture
	CO3 Illustrate the working principles of rapid manufacturing technologies.
	CO4 Able to learn the different tools and errors in RPT
	CO5 Identify and minimize errors that occur during conversion of CAD models
Advanced Mechanisms (22DPE9003)	CO1 Study of elements of mechanisms in different geometry.
	CO2 Study and construction of kinematics of plane motions
	CO3 Design and determination of different mechanisms in advanced kinematics of plane motion.
	CO4 Study and analysis of synthesis graphical method
	CO5 Design of different functions and methods of graphical method and theorems
Research Methodology and IPR (22MBA0110)	CO1 Understand research problem formulation.
	CO2 Analyze research related information
	CO3 Follow research ethics
	CO4 Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
	CO5 Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
Disaster Management (22DMC2001)	CO1 Understand the basics and definition of disaster
	CO2 Understand the repercussions of disaster and hazards
	CO3 Understand disaster prone area in India
	CO4 Apply the disaster preparedness and management
	CO5 Understand risk assessment
English for Research Paper Writing (22DMC9901)	CO1 Improve writing skills and level of readability
	CO2 Learn what to write in each section, avoiding plagiarism
	CO3 Understand the review of research literature
	CO4 Apply skills in writing a Title, abstract and literature
	CO5 Learn the skills of drafting Summations
Sanskrit for Technical Knowledge (22DMC9902)	CO1 Understanding basic Sanskrit language
	CO2 Ancient Sanskrit literature about science & technology can be understood
	CO3 Being a logical language will help to develop logic in students
Value Education (22DMC9903)	CO1 Knowledge of self-development
	CO2 Learn the importance of Human values
	CO3 Developing the overall personality
	CO4 Developing the Character and Competence
Mechanical Vibrations Lab (22DPC9003)	CO1 Determine the radius of gyrations in suspension types.
	CO2 Study the pressure profile at different conditions of loads
	CO3 Determine different frequency of undamped torsional vibrations.
	CO4 Determine frequency of damped force vibration
	CO5 Determine undamped free vibration of spring mass system


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Design for Manufacturing & Assembly (22DPC9005)	CO1 Outline the appropriate design for economical production and select the materials.
	CO2 Select between various machining and metal joining processes.
	CO3 Apply a systematic understanding of knowledge in the field of metal casting and forging.
	CO4 Integrate the knowledge of compliance analysis and interference analysis for assembly.
	CO5 Integrate the knowledge of compliance analysis and interference analysis for automatic assembly.
Advanced Finite Element Methods (22DPC9006)	CO1 Demonstrate understanding of FE formulation for linear problems in solid mechanics
	CO2 Understand behaviour of elastic-plastic materials and visco-plasticity, Use of Newton-Raphson method for solving nonlinear equations of equilibrium
	CO3 Understand flow rules and strain hardening, loading and unloading conditions, Drucker's suitability postulates, J2 flow of theory of plasticity
	CO4 Demonstrate use of FE formulation to solve the problems of large deformation of structures under loads
	CO5 Able to solve contact problems by using the techniques of non-linear FEM
Advanced Manufacturing Processes (22DPC9007)	CO1 To produce useful research output in machining of various materials
	CO2 Use this knowledge to develop hybrid machining techniques
	CO3 Application of this knowledge to manage shop floor problems
	CO4 Apply the reverse engineering process for product development
	CO5 Develop a prototype with modern prototyping techniques
Simulation & Modelling of Manufacturing systems (22DPE9004)	CO1 Students gain knowledge on various types of simulation and simulation languages steps in simulation and applications of simulation
	CO2 Students gain knowledge on parameter estimation and hypothesis
	CO3 Students can build simulation model and also can validation and verify model
	CO4 Can Generation of random variants and variables
	CO5 Applications of simulation and systems
Advanced Mechanics of Solids (22DPE9005)	CO1 Analyze and determine beams under unsymmetrical loading
	CO2 Apply shear center of thin wall beams, torsion & axi-symmetric problems
	CO3 Analyze and determine the contact stresses
	CO4 Understand and analyze stresses and strains at a point in 2D
	CO5 Understand and analyze stresses and strains at a point in 3D
Tribology in Design (22DPE9006)	CO1 Ability to select material / surface properties based on the tribological requirements
	CO2 Methodology for deciding lubricants and lubrication regimes for different operating conditions
	CO3 Analysis ability of different types of bearings for given load / speed conditions
	CO4 Familiar with common anti-friction and anti-wear components.
	CO5 Methodology for deciding the lubricants used therein

Pedagogy Studies (22DMC5801)	CO1 What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries
	CO2 What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners
	CO3 How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Perspective
	CO4 Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers
	CO5 Identify critical evidence gaps to guide the development
Constitution of India (22DMC9904)	CO1 Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics
	CO2 Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India
	CO3 Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4 Discuss the passage of the Hindu Code Bill of 1956
Stress Management by Yoga (22DMC9905)	CO5 Discuss about Local Administration and Election Commission
	CO1. Develop healthy mind in a healthy body thus improving social health
	CO2. Improve efficiency
	CO3. Understanding the role of yoga in mental hygiene
	CO4. Develop strong mental health
Personality Development through Life Enlightenment Skills (22DMC9906)	CO5. Understand the role of yoga in stress management
	CO1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
	CO2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
	CO3. Study of Neetishatakam will help in developing versatile personality of students.
	CO4. To become a person with stable mind, pleasing personality and determination
Design Simulation Lab (22DPC9008)	CO5. To awaken wisdom in students
	CO1 Designing of different modeling of components
	CO2 Drafting of individual components and analysis
	CO3 Analyzing of different components using structure analysis
	CO4 Designing of Modal, Buckling and static analysis
Manufacturing Simulation (Virtual) Lab (22DPC9009)	CO5 Analysis of composites and fracture mechanics
	CO1 Designing of different modeling of components
	CO2 Drafting of individual components and analysis
	CO3 Analyzing of different components using structure analysis
	CO4 Designing of Modal, Buckling and static analysis
	CO5 Analysis of composites and fracture mechanics

Product Design and Development (22DPE9007)	CO1 Understand a product design brief
	CO2 Know how to communicate product design ideas and concepts
	CO3 Be able to develop product design proposals
	CO4 Be able to realize outcomes to a design brief
	CO5 Be able to develop prototype proposals
Engineering Fracture Mechanics (22DPE9008)	CO1 Identify and explain the types of fractures of engineered materials and their characteristic features
	CO2 Understand the differences in the classification of fracture mechanics (LEFM and EPFM) and how their corresponding parameters can be utilized
	CO3 To determine conditions under which engineering materials will be liable to fail catastrophically in service
	CO4 Understand and explain the mechanisms of fracture; and learn how to carry out engineering failure analysis
	CO5 Appreciate the theoretical basis of the experimental techniques utilized for fracture and failure analysis
Waste to Energy (22DOE2001)	CO1 Understand introduction to energy from waste
	CO2 Apply biomass pyrolysis
	CO3 Understand biomass gasification
	CO4 Understand biomass combustion
	CO5 Understand biogas and its applications
Project Management (22DOE2002)	CO1 Able to understand the importance of construction project management, organization and leadership capabilities
	CO2 Able to apply theoretical and practical aspects of project management planning techniques to achieve project goals.
	CO3 Possess ideas on contract, tender and arbitration in construction projects.
	CO4 Understand to apply knowledge and skills of quality and safety management in construction.
	CO5 Have necessary knowledge in resource planning, costing and accounting
Business Analytics (22DOE5801)	CO1 Students will demonstrate knowledge of data analytics
	CO2 Students will demonstrate the ability of think critically in making decisions based on data and deep analytics
	CO3 Students will demonstrate the ability to use technical skills in predicative and prescriptive modelling to support business decision-making
	CO4 Students will demonstrate the ability to translate data into clear, actionable insights
Industrial Safety (22DOE9001)	CO1 Analyze the basics of industrial safety.
	CO2 Understand the Fundamentals of maintenance engineering
	CO3 Apply the methods of prevention of corrosion and wear.
	CO4 Understand the Fault tracing and their applications.
	CO5 Understand the methods of preventive measures and maintenance

Operations Research (22DOE9002)	CO1 Understand the characteristics and phases, types of models, allocation in linear programming
	CO2 Apply the concept of optimal solution, unbalanced problem, degeneracy and Transportation problem & sequencing.
	CO3 Understand the concept of replacement of items and related problems, theory of games related problems
	CO4 Apply the concept of the knowledge of queuing models, inventory management models.
	CO5 Apply the knowledge of dynamic programming, the concept of the simulation and simulation languages.
Composite Materials (22DOE9003)	CO1 Understanding of basic concepts and characteristics of geometric and physical applications of composites
	CO2 Explain different reinforcements and their properties.
	CO3 Study of micromechanics and properties of composite material.
	CO4 Study of coordinate transformations of stress and strain laws.
	CO5 Study of elastic behaviour of unidirectional composites; Joining Methods and Failure Theories


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M.Tech Digital Electronics & Communication Systems

Program outcomes:

PO No.	Programme Outcomes
PO1	Conduct investigations of complex problems: An ability to independently carry out research/investigations and development work to solve practical problem.
PO2	Design/development of solutions: An ability to write and present a substantial technical report/document.
PO3	Modern tool usage: Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program.
PO4	Simulation and implementation: Attain the ability to simulate and implement different communication models, evaluate and recognize to provide creative solutions.
PO5	Real time solutions and project management: Develop key models for real world problems in the domain of digital electronics and communication systems for effective project management.
PO6	Engineer and Society: Ability to function as a member of a multidisciplinary team with sense of ethics, integrity and social responsibility.

Course Outcomes:

Course Name	Course Outcomes:
Digital Communication Techniques (22DPC3801)	CO1: Understand the concepts of Random Variables and Random Processes
	CO2: Understand baseband signal concepts and different equalizers
	CO3: Analyze various coherent detection schemes.
	CO4: Understand receiver synchronization and properties of stationary random process
	CO5: Describe and analyze the Digital Communication systems with spread spectrum systems
Advanced Digital Signal Processing (22DPC3802)	CO1: Understand FFT Algorithms and Design and analyze Digital filters.
	CO2: Acquire the basics of Multirate Digital Signal Processing.
	CO3: Understand theory of prediction and solution of normal equations
	CO4: Analyze adaptive filter algorithms
	CO5: Implement power spectrum estimation techniques
Advanced Computer Architecture (22DPE3801)	CO1: Understand parallel processing and pipelining concepts and applications
	CO2: Understand vector processing and parallel algorithms for array processors.
	CO3: Analyze the high performance scalable multiprocessor systems
	CO4: Understand multithreaded architecture and parallel programming techniques
	CO5: Understand different parallel algorithms for multiprocessors
Low Power VLSI	CO1: Identify the sources of power dissipation in digital ICs systems.

Design (22DPE3802)	CO2: Understand different power estimation techniques.
	CO3: Demonstrate circuit level techniques for reducing power
	CO4: Illustrate behavioral level and logic level approaches for low power design
	CO5: Understand Low Power memory and Microprocessor design
Audio Video Coding and Compression (22DPE3803)	CO1: Understand image lossless compression systems and coding techniques
	CO2: Understand lossy compression systems and transform techniques
	CO3: Understand video coding concept & motion estimation algorithm
	CO4: Analyze various video coding standards
	CO5: Understand audio coding concept and multimedia synchronizations
Transform Techniques (22DPE3804)	CO1: Understand different 1D & 2D transforms, properties and applications
	CO2: Understand Short Time Fourier Transform and need for wavelets
	CO3: Understand scaling functions in multiresolution analysis and wavelet generation
	CO4: Analyze multirate systems, filter banks and Discrete Wavelet Transform
	CO5: Apply transform techniques to signal denoising, sub-band coding & signal compression
Data Networks (22DPE3805)	CO1: Know the network design concept and various network terminologies.
	CO2: Understand layered & layer less Communication and switching concepts
	CO3: Design Data Networks and analyze various protocols.
	CO4: Understand Queuing Models of Networks and Inter Networking concepts
	CO5: Understand End to End Protocols and Packet Scheduling Algorithms
Error Control Coding (22DPE3806)	CO1: Understand coding concepts for reliable digital transmission and storage
	CO2: Understands concepts involved in formulation and computation of linear block codes.
	CO3: Understands concepts involved in generation of cyclic codes and binary BCH codes.
	CO4: Get knowledge regarding block codes and relevant algorithms
	CO5: Get knowledge regarding convolutional codes and relevant algorithms
Research Methodology and IPR (22MBA0110)	CO1: To acquaint with basics of research problem formulation
	CO2: Familiar with research related information and ethics.
	CO3: aware about research report writing and presentation.
	CO4: Understand and get knowledge of basic rights for protection of innovative.
	CO5: Understand different types of IPRs
English for Research Paper Writing (22DMC9901)	CO1: Understand that how to improve your writing skills and level of readability
	CO2: Learn about what to write in each section
	CO3: Understand the skills needed when writing a Title
	CO4: Develop writing skill
	CO5: Able to quote phrases
Disaster Management	CO1: Learn to demonstrate a critical understanding of key concepts in

(22DMC2201)	disaster risk reduction and humanitarian response.
	CO2: Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
	CO3: Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
	CO4: Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in
Sanskrit for Technical Knowledge (22DMC9902)	CO1: To get a working knowledge in illustrious Sanskrit, the scientific language in the world
	CO2: Learning of Sanskrit to improve brain functioning
	CO3: Understanding basic Sanskrit language
	CO4: Understanding basic Sanskrit language
	CO5: Understanding basic Sanskrit language
Value Education (22DMC9903)	CO1: Understand value of education and self- development
	CO2: Imbibe good values in students
	CO3: Let the should know about the importance of character
	CO4: Learn the importance of Human values
	CO5: Developing the overall personality
Digital Communication Techniques Lab (22DPC3803)	CO1: Design Encoder and Decoder for single bit error correction.
	CO2: Simulate and Analyze Digital Signals.
	CO3: Generate and Detect Pass band modulation signals with Error controlling codes.
	CO4: Analyze Performance of M-ary Digital Communication Techniques.
	CO5: Analyze the error performance of Gaussian, Rician, and Rayleigh channels.
Advanced Digital Signal Processing Lab (22DPC3804)	CO 1: Design different digital filters in software.
	CO 2: Apply various transforms in time and frequency.
	CO 3: Perform decimation and interpolation
	CO 4: Able to realize different filters
	CO 5: Perform convolution and correlation.
Pattern Recognition (22DPC3805)	CO1: Understand the principles of Bayesian parameter estimation and apply them in relatively simple probabilistic models
	CO2: Understand various linear models.
	CO3: Understand Neural Network concepts related to pattern recognition.
	CO4: Apply and analyze various linear discriminant algorithms
	CO5: Apply and develop machine independent and unsupervised learning techniques.
Detection and Estimation of Signals (22DPC3806)	CO1: Understand the basic concepts of signal detection and estimation.
	CO2: Understand different hypotheses in detection and estimation problems.
	CO3: Understand the concepts of Stochastic Processes.
	CO4: Understand the conceptual basics of detection theory.
	CO5: Derive and apply filtering methods for parameter estimation
Wireless	CO1: Understand the Cellular Concepts related to wireless communication

Communication and Networks (22DPE3807)	systems
	CO2: Know about the mobile radio propagation related to large scale path loss.
	CO3: Know about the mobile radio propagation related to Small – Scale Fading and Multipath.
	CO4: Understand the concepts of Equalization and various diversities of wireless communication.
	CO5: Understand the different protocols used for wireless communication systems and networks.
Microcontrollers and Programmable Digital Signal Processors (22DPE3808)	CO1: Understand ARM Cortex – M3 Processor architecture and other features.
	CO2: Understand LPC 17XX Microcontroller various Input and output peripherals
	CO3: Understand the concepts of Programmable DSP Processors architecture and its features.
	CO4: Understand the TMS322C6000 series processor architecture and instructions.
	CO5: Able to Develop small applications by utilizing the ARM processor core and DSP processor-based platform using Code Composer Studio
Sensors and Actuators (22DPE3809)	CO1: Understand some basic principles and techniques of micro sensors and actuators.
	CO 2: Understand basic laws and phenomena on which operation of sensors and actuators transformation of energy.
	CO 3: Knowledge about of the working principles and architecture of a large number of sensors and their elements
	CO 4: Choose and use sensors and equipment for measuring mechanical quantities and temperature.
	CO 5: knowledge about the architecture and working principles of the most common electrical motor types.
Speech Processing (22DPE3810)	CO1. Express the speech signal in terms of its time domain and frequency domain representations and the different ways in which it can be modelled;
	CO2. Derive expressions for simple features used in speech classification applications;
	CO3. Explain the operation of example algorithms covered in lectures, and discuss the effects of varying parameter values within these;
	CO4. Synthesize block diagrams for speech applications, explain the urpose of the various blocks, and describe in detail algorithms that could be used to implement them;
	CO5. Implement components of speech processing systems, including speech recognition and speaker recognition, in MATLAB.
Network Security and	CO1: Understand need for Network Security and various techniques related


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TIRUPATI - 517 520

Cryptography (22DPE3811)	to security.
	CO2: Understand the concepts of number theory and private-key cryptography
	CO3: Understand the concept of Public key cryptography
	CO4: Understand various protocols for message authentication
	CO5: Understand various issues of network security.
Optical Communication Technology (22DPE3812)	CO1: Understand the concepts signal propagation in optical fibers.
	CO2: Understand fiber optic components for communication and networking.
	CO3: Understand the concepts modulation and demodulation of optical signal.
	CO4: Understand the concepts transmission system engineering
	CO5: Understand the concepts of Fiber Nonlinearities and System Design Considerations
Constitution of India (22DMC9904)	CO1: Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
	CO2: Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3: Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4: Discuss the passage of the Hindu Code Bill of 2256.
	CO5: Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
Pedagogy Studies (22DMC5801)	CO1: What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
	CO2: What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
	CO3: How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Perspective.
	CO4: Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers
	CO5: Identify critical evidence gaps to guide the development
Stress Management by Yoga (22DMC9905)	CO1: Develop healthy mind in a healthy body thus improving social health also
	CO2: Improve efficiency
	CO3: To achieve overall health of body and mind
	CO4: To overcome stress
	CO5: Identify critical evidence gaps to guide the development
Personality	CO1: Study of Shrimad-Bhagwad-Geeta will help the student in developing

Development through Life Enlightenment Skills (22DMC9906)	his personality and achieve the highest goal in life
	CO2: The person who has studied Geeta will lead the nation and mankind to peace and prosperity
	CO3: Study of Neetishatakam will help in developing versatile personality of students
	CO4: To become a person with stable mind, pleasing personality and determination
	CO5: To awaken wisdom in students
Pattern Recognition Lab (22DPC3807)	CO1: Develop and Design Machine Learning solutions to classification, regression and clustering problems.
	CO2: Evaluate and interpret the results of various algorithms.
Detection and Estimation of signals Lab (22DPC3808)	CO1: Simulate Signals and Noise
	CO 2: Detect signals in the presence of noise
	CO 3: Compare various estimation techniques
Remote Sensing (22DPE3813)	CO1: Understand basic concepts of remote sensing and its physics.
	CO2: Understand different platform for acquiring satellite images using remote sensing
	CO3: Understand various sensors used in Remote sensing to acquire data
	CO4: Analyze and apply thermal and hyper spectral remote sensing based on sensor characteristics.
	CO5: Understand and analyze remote sensing data processing
High Performance Networks (22DPE3814)	CO1: Apply knowledge of mathematics, probability, and statistics to model and analyze some networking protocols.
	CO2: Identify formulate and solve network protocol issues.
	CO3: Understand network routing and security issues
	CO4: Understand Traffic Modeling and network management and security
	CO5: Understand various standards in network management
MIMO Systems (22DPE3815)	CO1: Understand channel modeling and propagation, MIMO Concepts
	CO2: Understand cooperative and coordinated multi-cell MIMO,
	CO 3: Perform Mathematical modeling and analysis of MIMO systems.
	CO4: Understand MIMO in LTE and Time & frequency channel dispersion
	CO5: Understand channel Estimation and different channel estimation techniques
Business Analytics (22DOE5801)	CO1: Students will demonstrate knowledge of data analytics.
	CO2: Students will demonstrate the ability of think critically in making decisions based on data and deep analytics
	CO3: Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making
	CO4: Students will demonstrate the ability to translate data into clear, actionable insights
Industrial Safety (22DOE9001)	CO1: Analyze the basics of industrial safety.
	CO2: Understand the Fundamentals of maintenance engineering
	CO3: Apply the methods of prevention of corrosion and wear.
	CO4: Understand the Fault tracing and their applications
	CO5: Understand the methods of preventive measures and maintenance
Operations Research	CO1: Understand the characteristics and phases, types of models, allocation



(22DOE9002)	in linear programming
	CO2: Apply the concept of optimal solution, unbalanced problem, degeneracy and Transportation problem & sequencing.
	CO3: Understand the concept of replacement of items and related problems, theory of games related problems
	CO4: Apply the concept of the knowledge of queuing models, inventory management models.
	CO5: Apply the knowledge of dynamic programming, the concept of the simulation and simulation languages
Composite Materials (22DOE9004)	CO1: Understanding of basic concepts and characteristics of geometric and physical applications of composites.
	CO2: Explain different reinforcements and their properties
	CO3: Study of micromechanics and properties of composite material
	CO4: Study of coordinate transformations of stress and strain laws
	CO5: Study of elastic behaviour of unidirectional composites; Joining Methods and Failure Theories
Waste to Energy (22DOE2201)	CO1: Able to classify types of wastes
	CO2: Understand the method of pyrolysis
	CO3: Understand the use and application of Biomass gasifiers
	CO4: Design biomass combustors
	CO5: Analyze the properties of Biogas
Project Management (22DOE2202)	CO1: Able to understand the importance of construction project management, organization and leadership capabilities
	CO2: Able to apply theoretical and practical aspects of project management planning techniques to achieve project goals.
	CO3: Possess ideas on contract, tender and arbitration in construction projects.
	CO4: Understand to apply knowledge and skills of quality and safety management in construction.
	CO5: . Have necessary knowledge in resource planning, costing and accounting.


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TIRUPATI - 517 520

M.Tech- Computer Science & Engineering

Program outcomes:

PO1	An ability to independently carry out research/investigation and development work to solve practical problems.
PO2	An ability to write and present a substantial technical report/document.
PO3	Students should be able to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program

Course Outcomes:

Course Name	Course Outcomes	
ADVANCED DATA STRUCTURES AND ALGORITHMS (22DPC5801)	CO1:	Able to analyze the efficiency of algorithm.
	CO2:	Understand the graph algorithms.
	CO3:	Come up with analysis of efficiency and proofs of correctness
	CO4:	Understand The Adt/Libraries, And Use It To Design Algorithms For A Specific Problem.
FUNDAMENTALS OF DATA SCIENCE (22DPC5802)	CO1:	Students in this course will be able to decide and predict outputs based on data
	CO2:	Apply the concept of Linear & NonLinear Programming Problem to the engineering problems
	CO3:	Compare various methods of classifications
	CO4:	Demonstrate ability to manipulate matrices and compute Eigen values and Eigen vectors.
	CO5:	Apply the concept of sampling theory to the engineering problems
RESEARCH METHODOLOGY AND IPR (22MBA0110)	CO1:	Understand the research problem and research process.
	CO2:	Understand research ethics
	CO3:	Prepare a well -structured research paper and scientific presentations.
	CO4:	Explore on various IPR components and process of filing.
	CO5:	Understand the adequate knowledge on patent and rights
SOFTWARE PROJECT MANAGEMENT (22DPE5801)	CO1:	Identify the different project contexts and suggest an appropriate management strategy.
	CO2:	Practice the role of professional ethics in successful software development.
	CO3:	Identify and describe the key phases of project management.
	CO4:	Determine an appropriate project management approach through an evaluation of the business context and scope of the project.

ADVANCED COMPUTER NETWORKS (22DPE5802)	CO1:	Independently understand basic computer network technology
	CO2:	Understand and explain Data Communications System and its components.
	CO3:	Identify the different types of network topologies and protocols.
	CO4:	Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
	CO5:	Identify the different types of network devices and their functions within a network
	CO6:	Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation
ARTIFICIAL NEURAL NETWORKS (22DPE5803)	CO1:	Model Neuron and Neural Network
	CO2:	Learning Methods in Dynamic Models
	CO3:	Perform Pattern Recognition
	CO4:	Analyze Feedback Neural Networks
ARTIFICIAL INTELLIGENCE (22DPE5804)	CO1:	Demonstrate fundamental understanding of the history of artificial intelligence (AI) and its foundations.
	CO2:	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
	CO3:	Demonstrate proficiency in applying scientific method to models of machine learning.
INTERNALS OF OPERATING SYSTEMS (22DPE5805)	CO1:	Understand the operational concepts of Buffer, Inode
	CO2:	Understand the context of process with system calls that manipulates and control process context.
	CO3:	Understand the windows architecture and get familiar with its environment
MULTICORE ARCHITECTURE AND PROGRAMMING (22DPE5806)	CO1:	Identify the limitations of ILP and the need for multicore architectures
	CO2:	Understand multicore communication using shared memory and its advantages
	CO3:	Understand the cell performance and power efficiency beyond what is achieved by PC processors
	CO4:	Understand the prism model of parallel computation
ENGLISH FOR RESEARCH PAPER WRITING (22DMC9901)	CO1:	Understand that how to improve your writing skills and level of readability
	CO2:	Learn about what to write in each section
	CO3:	Understand the skills needed when writing a Title
	CO4:	Develop writing skill
	CO5:	Able to quote phrases
DISASTER MANAGEMENT (22DMC2001)	CO1:	Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.
	CO2:	Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.
	CO3:	Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.
	CO4:	Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in


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SANSKRIT FOR TECHNICAL KNOWLEDGE (22DMC9902)	CO1:	To get a working knowledge in illustrious Sanskrit, the scientific language in the world
	CO2:	Learning of Sanskrit to improve brain functioning
	CO3:	Understanding basic Sanskrit language
	CO4:	Ancient Sanskrit literature about science & technology can be understood
	CO5:	Being a logical language will help to develop logic in students
VALUE EDUCATION (22DMC9903)	CO1:	Understand value of education and self- development
	CO2:	Imbibe good values in students
	CO3:	Let the should know about the importance of character
	CO4:	Learn the importance of Human values
	CO5:	Developing the overall personality
ADVANCED DATA STRUCTURES AND ALGORITHMS LAB (22DPC5803)	CO1:	Implement List ADTs and their operations.
	CO2:	Develop programs for sorting.
	CO3:	Develop programs for implementing trees and their traversal operations.
	CO4:	Implement graph traversal algorithms.
	CO5:	Apply algorithm design techniques
R & ANALYTICS LAB (22DPC5804)	CO1:	Understand the basics in R programming in terms of constructs, control statements, string functions
	CO2:	Understand the use of R for Big Data analytics
	CO3:	Usage of Advanced SQL functions, Hive, Mongo DB and PIG
BIG DATA ANALYTICS (22DPC5805)	CO1:	Understand the key issues in big data management and its associated applications in intelligent business and scientific computing
	CO2:	Acquire fundamental enabling techniques and scalable algorithms like Hadoop, Map Reduce and NOSQL in big data analytics.
	CO3:	Understand the working of Hadoop frameworks like PIG and HIVE
MOBILE APPLICATION DEVELOPMENT (22DPC5806)	CO1:	Create data sharing with different applications and sending and intercepting SMS.
	CO2:	Develop applications using services and publishing android applications.
	CO3:	To demonstrate their skills of using Android software development tools
INTERNET OF THINGS (22DPE5807)	CO1:	Able to understand the application areas of IoT
	CO2:	Able to realize the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
	CO3:	Able to understand building blocks of Internet of Things and characteristics
NETWORK SECURITY AND CRYPTOGRAPHY (22DPE5808)	CO1:	Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
	CO2:	Ability to identify information system requirements for both of them such a client and server.
	CO3:	Ability to understand the current legal issues towards information security.


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NO SQL DATABASES (22DPE5809)	CO1:	Differentiate between a relational database and a non-relational (NoSQL) database
	CO2:	Perform CRUD operations (create, read, update and delete) on data in NoSQL environment
	CO3:	Understand the basic storage architecture and distributed file systems
MACHINE LEARNING (22DPE5810)	CO1:	Ability to understand what is learning and why it is essential to the design of intelligent machines.
	CO2:	Ability to design and implement various machine learning algorithms in a wide range of real-world applications.
	CO3:	Acquire knowledge deep learning and be able to implement deep learning models for language, vision, speech, decision making, and more
CLOUD COMPUTING (22DPE5811)	CO1:	Apply the security models in the cloud environment.
	CO2:	Use the cloud tool kits.
	CO3:	Apply the concept of virtualization.
	CO4:	Apply techniques to solve large scale scientific problems
NATURAL LANGUAGE PROCESSING (22DPE5812)	CO1:	Build NLP applications using Python.
	CO2:	Apply various Parsing techniques, Bayes Rule, Shannon game, Entropy and Cross Entropy.
	CO3:	Explain the fundamentals of CFG and parsers and mechanisms in ATN's.
	CO4:	Apply Semantic Interpretation and Language Modeling.
	CO5:	Interpret Machine Translation and multilingual Information Retrieval systems and Automatic Summarization.
CONSTITUTION OF INDIA (22DMC9904)	CO1:	Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics
	CO2:	Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
	CO3:	Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
	CO4:	Discuss the passage of the Hindu Code Bill of 1956.
	CO5:	Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
PEDAGOGY STUDIES (22DMC5801)	CO1:	Understand the concept, nature, characteristics of growth and development
	CO2:	Appreciate the contribution of the school and society on various aspects of development.
	CO3:	Update their knowledge about the personality development.
	CO4:	Understand the concept and process of teaching-learning.
	CO5:	Understand the concept and importance of individual differences.
STRESS MANAGEMENT BY YOGA (22DMC9905)	CO1:	Develop healthy mind in a healthy body thus improving social health also
	CO2:	Improve efficiency
	CO3:	To achieve overall health of body and mind
	CO4:	To overcome stress
	CO5:	Identify critical evidence gaps to guide the development.

PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS (22DMC9906)	CO1:	Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
	CO2:	The person who has studied Geeta will lead the nation and mankind to peace and prosperity
	CO3:	Study of Neetishatakam will help in developing versatile personality of students.
	CO4:	To become a person with stable mind, pleasing personality and determination
	CO5:	To awaken wisdom in students
MAP REDUCE PROGRAMMING LAB (22DPC5807)	CO1:	Configure Hadoop and perform File Management Tasks
	CO2:	Applying Map Reduce programs to real time issues like word count, weather dataset and sales of a company
	CO3:	Critically analyze huge data set using hadoop distributed file systems and mapreduce programs
MOBILE APPLICATION DEVELOPMENT LAB (22DPC5808)	CO1:	Create data sharing with different applications and sending and intercepting SMS.
	CO2:	Develop applications using services and publishing android applications.
	CO3:	To demonstrate their skills of using Android software development tools
DATA PREPARATION AND ANALYSIS (22DPE5813)	CO1:	Gain knowledge to identify the data parsing and transformations. and understand the difference between data and information with formats.
	CO2:	Explain the basic concept of data cleaning for valuable information with a minimum consistency checking
	CO3:	Understand statistical exploratory analysis with hypothesis generation
	CO4:	Design visualizations for exploratory analysis and understand the concept of correlations and connections for geo located data.
	CO5:	Learn data transformations and segmentation to solve statistical problems.
SECURE SOFTWARE DESIGN AND ENTERPRISE COMPUTING (22DPE5814)	CO1:	Understand Software process vulnerabilities for an organization and design and develop multi-tier solution of a problem.
	CO2:	Able to administer Enterprise System
	CO3:	Troubleshoot Enterprise Network.
	CO4:	Develop secure software which can defend against attackers
COMPUTER VISION (22DPE5815)	CO1:	Apply fundamental image processing techniques required for computer vision
	CO2:	Illustrate shape analysis
	CO3:	Evaluate boundary tracking techniques
	CO4:	Apply chain codes and other region descriptors
	CO5:	Apply 3D vision techniques
	CO6:	Develop applications using computer vision techniques
BUSINESS ANALYTICS (22DOE5801)	CO1:	Ability to work with different data types.
	CO2:	Ability to solve various problems related to businesses.
	CO3:	Ability to effectively utilize the time and involve in collaborative tasks.

INDUSTRIAL SAFETY (22DOE9001)	CO1:	Analyze the basics of industrial safety.
	CO2:	Understand the Fundamentals of maintenance engineering
	CO3:	Apply the methods of prevention of corrosion and wear.
	CO4:	Understand the Fault tracing and their applications.
	CO5:	Understand the methods of preventive measures and maintenance
OPERATION RESEARCH (22DOE9002)	CO1:	Understand the characteristics and phases, types of models, allocation in linear programming
	CO2:	Apply the concept of optimal solution, unbalanced problem, degeneracy and Transportation problem & sequencing.
	CO3:	Understand the concept of replacement of items and related problems, theory of games related problems
	CO4:	Apply the concept of the knowledge of queuing models, inventory management models.
	CO5:	Apply the knowledge of dynamic programming, the concept of the simulation and simulation languages
PROJECT MANAGEMENT (22DOE2002)	CO1:	Able to understand the importance of construction project management, organization and leadership capabilities
	CO2:	Able to apply theoretical and practical aspects of project management planning techniques to achieve project goals.
	CO3:	Possess ideas on contract, tender and arbitration in construction projects.
	CO4:	Understand to apply knowledge and skills of quality and safety management in construction.
	CO5:	Have necessary knowledge in resource planning, costing and accounting.
COMPOSITE MATERIALS (22DOE9004)	CO1:	Understanding of basic concepts and characteristics of geometric and physical applications of composites.
	CO2:	Explain different reinforcements and their properties.
	CO3:	Study of micromechanics and properties of composite material.
	CO4:	Study of coordinate transformations of stress and strain laws.
	CO5:	Study of elastic behaviour of unidirectional composites; Joining Methods and Failure Theories
WASTE TO ENERGY (22DOE2001)	CO1:	Able to classify types of wastes
	CO2:	Understand the method of pyrolysis
	CO3:	Understand the use and application of Biomass gasifiers
	CO4:	Design biomass combustors
	CO5:	Analyze the properties of Biogas

PG- MASTER OF BUSINESS ADMINISTRATION

Program outcomes:

PO1	Apply knowledge of management theories and practices to solve business problems.
PO2	Foster Analytical and critical thinking abilities for data-based decision making.
PO3	Ability to develop Value based Leadership ability.
PO4	Ability to understand, analyze and communicate global, economic, legal, and ethical aspects of business.
PO5	Ability to lead themselves and others in the achievement of organizational goals, contributing effectively to a team environment.

Course Outcomes:

Course Title	Course Outcomes(COs)
MANAGEMENT & ORGANIZATIONAL BEHAVIOR (22MBA0101)	CO1 Understand the Fundamentals of Management & Organizational Behavior.
	CO2 Analyze the various aspects of individual behavior.
	CO3 Apply the various motivational theories in organizations.
	CO4 Understand the characteristics of groups and group behavior.
	CO5 Understand the various organizational processes
MANAGERIAL ECONOMICS (22MBA0102)	CO1 Learn the basic concepts of economics.
	CO2 Analyze the techniques of Demand forecasting.
	CO3 Able to know supply concepts.
	CO4 Know the importance of Cost types and cost-output relationship.
	CO5 Study about Inflation and Business Cycles.
LEGAL AND BUSINESS ENVIRONMENT (22MBA0103)	CO1 Know the importance of Business Environment.
	CO2 Understand the basic procedures of monetary and fiscal policy.
	CO3 Learn different types of Business Laws.
	CO4 Understand the components of a contract & contractual performance obligation
	CO5 Understand application of IT in Business.
ACCOUNTING FOR MANAGERS (22MBA0104)	CO1 Understand the importance of accounting concepts and principles.
	CO2 Able to prepare the financial statements (trading, profit & loss account and balance sheet).
	CO3 Able to assess the fair value of the assets in the organization.
	CO4 Able to assess the performance of earnings of a firm and predict the future of the business.
	CO5 Appreciate the role of computers in accounting.
BUSINESS STATISTICS (22MBA0105)	CO1 Understand the basic concepts of business statistics
	CO2 Identify and analyze the regression and correlation variables
	CO3 Analyze probability and identify different distributions
	CO4 Estimate parameters and test hypothesis
	CO5 Improve the skills to identify the appropriate statistical techniques.

COMPUTER APPLICATIONS FOR BUSINESS (22MBA0106)	CO1	Understand the importance and the role of information technology
	CO2	Able to identify different types of database management systems.
	CO3	Able to perform MS office tools.
	CO4	Familiar with different types of network technologies.
	CO5	Able to apply different types of ERP packages.
BUSINESS COMMUNICATION LAB (22MBA0107)	CO1	Know the essential principles and use these in oral presentation.
	CO2	Understand and apply effective written communication skills.
	CO3	Practice Business Correspondence.
	CO4	Learn & Practice Written & Oral Instructions.
	CO5	Learn effective Report Writing.
DATA ANALYTICS LAB (22MBA0108)	CO1	Able to apply MS word and MS Power Point tools
	CO2	Able to understand and apply MS Excel functions
	CO3	Able to perform problems related parametric tests
	CO4	Familiar with the concept of the correlation
	CO5	Able to apply regression equations
HUMAN RESOURCE MANAGEMENT (22MBA0201)	CO1	Understand the importance of human resources in organizations.
	CO2	Know the employee recruitment, selection and retention plans and processes.
	CO3	Gain knowledge on employee induction, training and development.
	CO4	Analyze the extent to which human resource management affects firm's performance.
	CO5	Study various trends in the human resource management.
MARKETING MANAGEMENT (22MBA0202)	CO1	Learn the basic concepts of marketing and environment.
	CO2	Know the various factors that influence consumer behavior.
	CO3	Gain knowledge about various product and pricing strategies.
	CO4	Know the importance of promotion and distribution.
	CO5	Study various trends in the marketing.
FINANCIAL MANAGEMENT (22MBA0203)	CO1	Understand the importance of Finance in an Organization.
	CO2	Understand the Investment evaluation criteria.
	CO3	Understand capital structure and value of a firm and their relationship.
	CO4	Able to Analyze the cost of Capital and also Distribution of Profits.
	CO5	Analyze the working capital requirements in an enterprise.

OPERATIONS MANAGEMENT (22MBA0204)	CO1	Able to understand role, importance and functions of the POM
	CO2	Understand types of product and process systems.
	CO3	Able to understand types of location and layouts.
	CO4	Able to solve various productivity related issues.
	CO5	Familiar with the knowledge of quality management techniques.
BUSINESS RESEARCH METHODS (22MBA0205)	CO1	Understand relevance of research in business decision making
	CO2	Understand the need and application of data and sampling methods
	CO3	Know and apply inferential statistical methods
	CO4	Study and practice the Dependency and Independency Techniques
	CO5	Study and practice Report Writing.
OPERATIONS RESEARCH (22MBA0206)	CO1	Understand basic concepts of operations research applications of LPP problems
	CO2	Study and solve various Assignment and Transportation Problems
	CO3	Understand and solve various game theory problems
	CO4	Study various queuing models
	CO5	Study various project management techniques
BUSINESS ANALYTICS LAB (22MBA0210)	CO1	Formulate and analyze sales department data
	CO2	Analyze the financial capital budgeting decisions
	CO3	Familiar with the processes, analyze and report human resources data
	CO4	Understand and use of accounting packages for analysis of business problems
	CO5	Create, Manage and Report the company related information
STRATEGIC MANAGEMENT (22MBA0301)	CO1	Know the basic concepts of corporate and business strategies
	CO2	Aware of various models involved in strategic decision making
	CO3	Familiar with the strategy formulation process in a business context
	CO4	Gain knowledge about various competitive strategies
	CO5	Understand the various strategic control mechanisms
ENTREPRENEURSHIP DEVELOPMENT (22MBA0302)	CO1	Understand and learn basic concepts of entrepreneurship.
	CO2	Learn various aspects of Idea generation and Financing of projects.
	CO3	Familiar with the concept of project Planning and Feasibility Studies.
	CO4	Aware of various strategies related to marketing.
	CO5	Able to learn women and rural entrepreneurship.

INVESTMENT ANALYSIS & PORTFOLIO MANAGEMENT (22MBA0303)	CO1	Understand the importance of savings and investments.
	CO2	Able to Measure & evaluate risk and return of stocks.
	CO3	Familiar valuation techniques of equity and bonds etc.
	CO4	Gain knowledge on company and industry performance and economy indicators.
	CO5	Obtain knowledge on Portfolio analysis.
HUMAN RESOURCE ANALYTICS (22MBA0304)	CO1	Understand the importance of HR metrics to support HR decisions.
	CO2	Understand the various reporting requirements related to HR .
	CO3	Identify the quantitative techniques suitable for the analysis of employee data.
	CO4	Understand the Analytics process.
	CO5	Know how to present the HR data effectively.
CONSUMER BEHAVIOR (22MBA0305)	CO1	Understand the factors influencing individual consumer behavior
	CO2	learn different modes of consumer behavior
	CO3	Study and analyze different types consumer behavior
	CO4	Study the cross cultural behavior of different consumers
	CO5	Gain knowledge on consumer protection mechanism
MANAGING DIGITAL INNOVATION AND TRANSFORMATION (22MBA0306)	CO1	Study the fundamental concepts of digital transformation
	CO2	Aware on digital transformation models
	CO3	Familiar with social media transformation process
	CO4	Study the challenges facing in a digital media strategy
	CO5	Understand the recent trends in digital transformation
FINANCIAL MARKETS AND SERVICES (22MBA0307)	CO1	Able to understand Indian Financial System.
	CO2	Gain knowledge on Money and Capital Markets
	CO3	Study the operation of Banking and Non-banking Institutions
	CO4	Understand the fund based financial services
	CO5	Learn the fee based financial services.
PERFORMANCE MANAGEMENT (22MBA0308)	CO1	Know the basic concept of Performance Management.
	CO2	Familiar with various methods of assessing performance.
	CO3	Understand various concepts of counseling and mentoring process
	CO4	Gain an insight of team performance management
	CO5	Familiar with ethical issues relating to performance management

SALES AND DISTRIBUTION MANAGEMENT (22MBA0309)	CO1	Understand the basics of sales management
	CO2	Gain knowledge on personal selling and sales force management
	CO3	Know the recent trends in sales management
	CO4	Understand the importance of the marketing channels
	CO5	Gain knowledge about the recent trends in distribution management
E-COMMERCE AND DIGITAL MARKETS (22MBA0310)	CO1	Learn about foundations of E-Commerce.
	CO2	Understand E-Business plan and address E-Commerce related issues.
	CO3	Gain insights on E-business Channel functions
	CO4	learn about the E-marketing strategies and digital payment systems.
	CO5	Learn about E-marketing tools and E-Business entrepreneurship.
BANKING AND FINANCIAL INSTITUTIONS (22MBA0311)	CO1	Understand the importance of banking system
	CO2	Able to know Banking and Non-banking Institutions
	CO3	Identify the various risks in bank operations and manage the risk while investing the funds
	CO4	Familiar with International Banking
	CO5	Understand the International Financial Institutions
ORGANIZATIONAL CHANGE AND DEVELOPMENT (22MBA0312)	CO1	learn the concept of organizational change
	CO2	Understand Organizational development and role of the OD professionals
	CO3	Familiar with different types of OD interventions
	CO4	Study tools and techniques for the evaluation of the OD
	CO5	Know the recent trends in Organizational Development
RETAIL MANAGEMENT (22MBA0313)	CO1	Understand the retailing concepts
	CO2	Gain Knowledge on the retail formats
	CO3	Understand the strategies to design store location and SCM
	CO4	Understand retail buying and merchandise buying systems
	CO5	Understand the role of internet technologies in retailing
DATA SCIENCE USING R (22MBA0314)	CO1	Understand the basic elements of R software
	CO2	Learn how data can be transferred, stored, analyzed using R
	CO3	learn how the data is manipulated
	CO4	learn how to plot/chart the data
	CO5	Learn the statistic analysis using R

PROJECT APPRAISAL AND FINANCE (22MBA0315)	CO1	Understand project selection and management.
	CO2	Study the feasibility of projects.
	CO3	Gain knowledge on appraisal methods in project management
	CO4	Familiar with assessment of a project to obtain finance and managing project risks.
	CO5	Obtain knowledge on available sources in the market to develop the projects.
COMPENSATION AND BENEFITS MANAGEMENT (22MBA0316)	CO1	Understand the basic concepts of compensation management
	CO2	Gain the knowledge of job design, evaluation and compensation methods
	CO3	Understand the employee benefits and welfare.
	CO4	Understand the legal aspects of compensation.
	CO5	Study various compensation mechanisms of executive and expatriate levels.
PRODUCT AND BRAND MANAGEMENT (22MBA0317)	CO1	Understand the importance of Product Planning
	CO2	Familiar with the Product management strategies
	CO3	Obtain knowledge on Branding decisions
	CO4	Analyze the brand equity and its strategies
	CO5	Identify the various sectors in Branding
DATA MINING FOR BUSINESS DECISIONS (22MBA0318)	CO1	Study the basic concepts of data mining for business decisions
	CO2	Acquainted with the theoretical elements of Data Mining and their applications.
	CO3	Acquainted with the practical elements of Data Mining and their applications.
	CO4	Acquire experience in analyzing a business problem using appropriate model
	CO5	Develop the skills to use the model for a predictive analytical solution
ADVANCED COMMUNICATION (22MBA0319)	CO1	Understand basic concepts Managerial Communication
	CO2	familiar with Business correspondence
	CO3	Understand the concept of organizing meetings
	CO4	Study various communication strategies.
	CO5	Get Acquainted with Computer based communication technologies.
E- BUSINESS (22MBA0320)	CO1	Understand basic concept of e-business
	CO2	Familiar with security threats to e-business
	CO3	Understand the concept of electronic payment system
	CO4	Study various e-business strategies.
	CO5	Get acquainted with e-business applications infrastructure
INDUSTRY 4.0 & INNOVATION (22MBA0321)	CO1	Understand the basic concepts of Industry 4.0 and new technologies in decision making
	CO2	Outline the features of Artificial Intelligence and application domains
	CO3	Summarize the Big data domain stack and Internet of Things
	CO4	Identify the applications and Tools of Industry 4.0
	CO5	Learn and think innovative ideas based on technology

HUMAN VALUES AND PROFESSIONAL ETHICS (22MBA0322)	CO1	Understand the variety of moral issues
	CO2	know the principles of Ethics and morality
	CO3	Gain knowledge on Risk benefit analysis
	CO4	Understand the topics related to intellectual property rights and corporateresponsibility
	CO5	Gain knowledge about Competence and Professional Ethics
SPREAD SHEET MODELLING LAB (22MBA0323)	CO1	Understand the basic operations in Excel
	CO2	Learn the advanced formulas for effective business decision making
	CO3	Learn and practice frequency distributions
	CO4	Analyze different statistical tools
	CO5	Familiar with the overview of statistical Analysis tool -SPSS
FINANCIAL DERIVATIVES (22MBA0401)	CO1	Understand basic types of derivatives
	CO2	familiar with the features of the existing financial derivatives
	CO3	Understand the concept of options
	CO4	learn the option strategies
	CO5	Understand the concept of swaps
INDUSTRIAL RELATIONS (22MBA0402)	CO1	Understand the Employee Relations and Industrial Climate in India
	CO2	Familiar with the Indian labour laws
	CO3	Understand Collective bargaining and employee grievance and redressalmechanisms
	CO4	understand the statutory norms to settle Industrial Disputes
	CO5	Familiar about laws relating to social security
SERVICES MARKETING (22MBA0403)	CO1	Understand the evolution and growth of services
	CO2	Gain the knowledge about service marketing mix
	CO3	Understand the concepts of Service design and development
	CO4	Study the Service delivery and channel management issues
	CO5	Understand strategic marketing planning process of services
E-RETAILING (22MBA0404)	CO1	Understand the fundamental principles of e-retailing and e-Commerce
	CO2	Able to understand e-retailing merchandising process
	CO3	Gain knowledge about the e-retail organization
	CO4	Understand the fundamental of e-retailing technologies
	CO5	Understand various e-retailing consumer behavior models
INTERNATIONAL FINANCE (22MBA0405)	CO1	Understand the importance and goals of international financial management
	CO2	Understand the foreign exchange management system
	CO3	Understand the global exchange rates and theories.
	CO4	Understand the foreign exchange management exposure and the risksinvolved in it
	CO5	Describe the international capital budgeting decisions


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INTERNATIONAL HRM (22MBA0406)	CO1	Understand role of HRM in the global organizations.
	CO2	understand cultural differences among different countries
	CO3	Understand the HRM practices to manage people in global organizations
	CO4	Able to understand the different issues related to international performance management
	CO5	understand the emerging trends related to international labour
INTERNATIONAL MARKETING (22MBA0407)	CO1	Understand the international marketing concepts
	CO2	Study the entry strategies of different environments
	CO3	Understand the product management and positioning in international marketing
	CO4	Familiar with various international distribution strategies
	CO5	Gain knowledge about export policy and procedures
MARKETING ANALYTICS (22MBA0408)	CO1	Understand the product management decisions
	CO2	Study various product and service analytics
	CO3	Understand the pricing analytics
	CO4	Familiar with distribution analytics
	CO5	Understand the concepts of digital marketing


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PG- MASTER OF COMPUTER APPLICATIONS

Program outcomes:

PO1	Computational Knowledge: Apply knowledge of computing fundamentals, computing specialization, mathematics, and domain knowledge as appropriate for the computing specialization.
PO2	Problem Analysis: Identify, formulate, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines that lead to research.
PO3	Design /Development of Solutions: Design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	Conduct Investigations of Complex Computing Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	Modern Tool Usage: Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations.
PO6	Professional Ethics: Understand and commit to professional ethics and cyber regulations, responsibilities, and norms of professional computing practice.
PO7	Life-long Learning: Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional.
PO8	Project management and finance: Demonstrate knowledge and understanding of the computing and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO9	Communication Efficacy: Communicate effectively with the computing community, and with society at large, about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions.
PO10	Societal and Environmental Concern: Understand and assess societal, environmental, health, safety, legal, and cultural issues with local and global contexts, and the consequential responsibilities relevant to professional computing practice.
PO11	Individual and Team Work: Function effectively as an individual and as a member or leader in teams and also in multidisciplinary environments.
PO12	Innovation and Entrepreneurship: Identify a timely opportunity and using innovation to pursue that opportunity to create value and wealth for the betterment of the individual and society at large.

Program Specific Outcomes:

PSO1	Ability to pursue career in core programming sector related to computer science and information technology
PSO2	Ability to work in software programming tools related to latest technologies


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Course Outcomes:

Course Name	Course Outcomes:
Mathematical Foundations Of Computer Science (22MCA0101)	CO1: Understand mathematical reasoning in order to read, comprehend, and construct mathematical arguments.
	CO2: Perform combinatorial analysis to solve counting problems and analyze algorithms
	CO3: work with discrete structures that include sets, permutations, relations, graphs, trees, and finite-state machines, which are the abstract mathematical structures
	CO4: describe how an output of a mathematical function is computed given an input
	CO5: Perform combinatorial analysis to analyze algorithms
Software Engineering (22MCA0102)	CO1: Introduce SE and Models
	CO2: Discuss Techniques on SPM, Requirements analysis and Specification
	CO3: Highlights some important facets of Software Design
	CO4: Testing Techniques and Quality Control Activities
	CO5: Comprehend on Software Quality Assurance and Trends
Web Programming (22MCA0103)	CO1: Design a Web Page using HTML
	CO2: Create Page with Client-side validation
	CO3: Create, Organize and Manage a web site
	CO4: Create dynamic PHP web pages
	CO5: Implement database connectivity with Front-end
C-Programming & Data Structures (22MCA0104)	CO1: Understand the basics of C Programming Language
	CO2: Map the C concepts with memory usage
	CO3: Implement Searching and Sorting algorithms, and Linear Data Structures using arrays
	CO4: Implement Stacks, Queues and Tree Data Structure using Linked List
	CO5: Implement Graph Data structure
Database Management Systems (22MCA0105)	CO1: Know the fundamentals of Databases
	CO2: Code SQL and PL/SQL programming Concepts
	CO3: Design a database for a real-world information system
	CO4: Process and Optimize the query
	CO5: Understand transaction and concurrency techniques in real time applications
Web Programming Laboratory (22MCA0106)	CO1: Create a web page in HTML and css
	CO2: Validate Web page at client side
	CO3: Store/Retrieve data from databases to web page
C and Data Structures Laboratory (22MCA0107)	CO1: Write basic c programs
	CO2: Perform searching and sorting techniques on data
	CO3: Write programs on derived data types
	CO4: Implement linear and non-linear data structures
Database Management Systems Laboratory (22MCA0108)	CO1: Create and insert records into table
	CO2: Retrieve information from table(s)
	CO3: Use procedures to program the data access and manipulation
	CO4: Create user interfaces and generate reports


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Foundations Of R Software (22MCA0109)	CO1: Understand the basics of R
	CO2: Implement Data Structures
	CO3: Implement Statistical Graphics, Control Statements and Group manipulation
	CO4: Implement Iteration, Data Reshaping and String Manipulation
	CO5: Apply basic statistics in R
Mobile Application Development (22MCA0201)	CO1: Demonstrate knowledge on mobile platforms, mobile user interface and user interface design requirements.
	CO2: Design user interfaces by analyzing user requirements.
	CO3: Develop mobile applications for Messaging, Location-Based Services, and Networking
	CO4: Develop mobile applications and publish in different mobile platforms
	CO5: Use Android studio and iOS tools to develop mobile applications.
Machine Learning (22MCA0202)	CO1: Understand the basics of machine learning and decision tree learning
	CO2: Comprehend the working of ANN and hypothesis evaluation
	CO3: Illustrate Bayesian Learning and dimensionality reduction
	CO4: Estimate clustering models and non-parametric methods
	CO5: Perform Linear Discrimination and Multilayer Perceptrons
Object-Oriented Programming Through Java (22MCA0203)	CO1: Understand the basics of Java Programming Environment
	CO2: Code on Objects, classes, and Inheritance
	CO3: Relate with Interfaces, Multi threading and Exception handling
	CO4: Demonstrate Generic Programming and Collection Framework
	CO5: Create GUI Programming with Swing
Mobile Application Development Laboratory (22MCA0206)	CO1: Create data sharing with different applications
	CO2: Develop applications using services
	CO3: Publishing android applications.
Machine Learning Laboratory (22MCA0207)	CO1: Explore the data
	CO2: Train the dataset
	CO3: Test the dataset
	CO4: Evaluate the model
Object-Oriented Programming Through Java Laboratory (22MCA0208)	CO1: Implement object oriented programming concepts using java
	CO2: Develop interactive programs using swings.
Python Programming (22MCA0209)	CO1: Work with Strings, numbers, expressions, and conditional statements
	CO2: Implement files, lists, dictionaries and functions
	CO3: Implement graphics and GUI-based programming
	CO4: Implement searching and sorting algorithms
Soft Skills (22MCA0210)	CO1: Effectively communicate through verbal/oral communication and improve the listening skills
	CO2: Write precise briefs or reports and technical documents
	CO3: Actively participate in group discussion / meetings / interviews and prepare, deliver presentations
	CO4: Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships and leadership quality.

