2.6.1 Supporting Documents: POs and COs for all the departments



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2.6.1 Program outcomes, program specific outcomes and course outcomes for all programs offered by the Institution are stated and displayed on website and communicated to teachers and students.

S.NO	Description	Page Number		
		From	То	
POs, PSOs ,	COs	(8)		
1	B.TECH AGRI(R20)	1	- 24	
2	B.TECH CIVIL(R20)	25	47	
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12	B.TECH CSE AIML(R23)	216	221
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14	B.TECH CSE(R23)	228	- 233
15	B.TECH ECE(R23)	234	239
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Program Outcomes

(Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 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.
- 6. 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.
- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate

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the knowledge of, and need for sustainable development.

- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. 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 Educational Objectives (PEOs)

- To excel in their chosen careers, demonstrating competence in areas such as food processing, soil management, farm machinery design, irrigation systems, and agribusiness.
- To be able to communicate and collaborate proficiently with diverse stakeholders within the agricultural industry.

Program Specific Outcomes (PSOs)

 Posses the knowledge of food safety and quality assurance practices to ensure that agricultural products are safe and meet regulatory standards.

Understanding of sustainable practices in soil and water management, including the
responsible use of resources and the conservation of ecosystems and capable of
maintaining the agricultural machinery and equipment



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Agricultural Courses Outcomes

	B.	Tech 1st Sem	
Course Name	Course Outcomes		
	CO1	Utilize mean value theorems to real life problems	
	CO2	Solve the differential equations related to various engineering fields	
Subject: Mathematics 1(Calculus & differential	CO3	Familiarize with functions of several variables which is useful in optimization	
(BS1101)	CO4	Apply double integration techniques in evaluating areas bounded by region	
	CO5	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems	
	CO1	Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information	
	CO2	Ask and answer general questions on familiar topics an introduce oneself/others	
Subject: English(HS1101)	CO3	Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information	
	CO4	Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs	
	CO5	Form sentences using proper grammatical structures and correct word forms.	
Subject: Engineering	COI	Assemble and disassemble components of a PC	
Workshop and IT Workshop(BP103T)	CO2	Construct a fully functional virtual machine, Summariz various Linux operating system commands	
N N	CO3	Secure a computer from cyber threats, Learn and practice programming skill in Github, Hacker rank, Code chef, Hacker Earth, etc	
	CO4	Recognize characters & extract text from scanned images, Create audio files and podcasts	
	CO5	Create video tutorials and publishing, Use office tools for documentation, Build interactive presentations, Build websites, Create quizzes & analyze responses.	



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	В	Tech 2 nd Sem	
Course Name	Course Outcomes		
Subject: MATHEMATICS - II (BS)	CO1	develop the use of matrix algebra techniques that is needed by engineers for practical applications	
	CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel	
	CO3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms	
14	CO4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals	
	CO5	apply numerical integral techniques to different Engineering problems	
	CO6	apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations	
Subject: Engineering Chemistry(BS1210)	COI	Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.	
	CO2	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.	
	CO3	Synthesize nonmaterial's for modern advances of engineering technology. Summarize the techniques that detect and measure changes of state of reaction. Illustrate the commonly used industrial materials.	
	CO4	Differentiate petroleum, petrol, synthetic petrol and have knowledge how they are produced. Study alternate fuels and analyze flue gases.	
	CO5	Analyze the suitable methods for purification and treatment of hard water and brackish water.	
Subject: ENIGINEERING MECHANICS (BS1204)	COI	The student should be able to draw free body diagrams for FBDs for particles and rigid bodies in plane and space and problems to solve the unknown forces, orientations and geometric parameters.	



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	CO2	He should be able to determine centroid for lines, areas and center of gravity for volumes and their composites.
	CO3	He should be able to determine area and mass movement of inertia for composite sections
	CO4	He should be able to analyze motion of particles and rigid bodies and apply the principles of motion, work energy and impulse – momentum
Subject: PROGRAMMING FOR PROBLEM SOLVING	CO1	To write algorithms and to draw flowcharts for solving problems
USING C (ES1201)	CO2	To convert flowcharts/algorithms to C Programs, compile and debug programs
	CO3	To use different operators, data types and write programs that use two-way/ multi-way selection
	CO4	To select the best loop construct for a given problem
59	CO5	To design and implement programs to analyze the different pointer applications
	CO6	To decompose a problem into functions and to develop modular reusable code
	CO7	To apply File I/O operation
Subject: ENGINEERING DRAWING (ES1103)	COI	The student will learn how to visualize 2D & 3D objects
Subject : PROGRAMMING	COI	Gains Knowledge on various concepts of a C language
FOR PROBLEM SOLVING USING C LAB (ES1202)	CO2	Able to draw flowcharts and write algorithms.
USING C LAB (ES1202)	CO3	Able design and development of C problem solving skills
	CO4	Able to design and develop modular programming skills
	CO5	Able to trace and debug a program
Subject: ENGINEERING CHEMISTRY	CO1	The students entering into the professional course have practically very little exposure to lab classes.
LABORATORY (BS1211)	CO2	The experiments introduce volumetric analysis; redoxtitrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis.
	CO3	Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.



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Subject: MACHINE DRAWING AND COMPUTER GRAPHICS	CO1	Practical skills on preparing manual drawings of model isometric view of the objects, machine components, assembly drawings of different joints.
LABORATOR(ES1220)	CO2	Practice on drawing of missing views; principles of dimensions and their methods
	CO3	Practical skills on sectioning concepts and its drawing & mechanical parts.
	CO4	Practical skills on types of rivet heads & parts, square headed and hexagonal nuts, bolts, different types lock nuts; stands machine screws.
	CO5	Practical knowledge on components of CAD and its hardware requirements, terms & command in Auto CAL software for practice.
	CO6	Practical skills on drawing of riveted joints and thread fasteners, computer graphics in agricultural engineering applications, practice of commands in Auto CAD software.
	CO7	Practical skills on 2-D drawings and projects in Auto CAD.

hinagine gyly 2011	В	.Tech 3 rd Sem
Subject : MATHEMATICS-III	.CO1	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO2	Estimate the work done against a field, circulation and flux using vector calculus
2	CO3	Apply the Laplace transform for solving differential equations
	CO4	Find or compute the Fourier series of periodic signals
	CO5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
	CO6	Identify solution methods for partial differential equation



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		that model physical processes
Subject : PROPERTIES AND STRENGTH OF	CO1	Skill development on basic properties of engineering materials and their uses, testing of materials
MATERIALS(ES)	CO2	Knowledge development on properties and application of difference of concrete, varieties, distempers, glass, rubber and plywood, plastics, iron-based materials, alloys etc.,
	CO3	Development of skill on stress – strain analysis of beams under different types of loading patterns.
	CO4	Acquaintance of skill on Euler's theory and buckling load, analysis on columns & different types of columns
-	CO5	Skill development on different types of joints (Riveting), welding analysis cantilever, fixed, continuous beams, theory of moments and their analysis.
Subject - FARM POWED AND	COI	Skill development on farm power sources classification I.C engine components & construction, operating systems
Subject : FARM POWER AND TRACTOR SYSTEMS(PC)	CO2	Skill development on fuel supply ignition, cooling & lubrication electrical ignition, fuels & their properties, governing systems of IC engines, power transmission, clutches & its applications
	CO3	Acquaintance of knowledge on clutch types, concepts & principles, single & multiple plates clutches, working mechanism, gear theory and principles, differential unit of its functions, final drive & its applications.
	CO4	Skill development on principles of fluid coupling &torque connector, brakes principles, classification & friction concepts of hydraulic system in factors.
9	CO5	Skill development on tractor powers outlets, P.T.O and its applications, Tractor testing and its main components, Co estimation, Tractor chassis its mechanics.
Subject : FLUID MECHANICS AND OPEN CHANNEL HYDRAULICS LAB(ES)	.CO1	Imparting practical skills on determination of meta centric height and Bernoulli's theorem.
- 11 ×	CO2	Exposure to practical skills on measurement of discharge with venture meter and pilot tubes.
	CO3	Acquiring practical skills on determining discharge coefficient of rectangular, triangular and trapezoidal weir and orifices.
	CO4	Imposing practical skills on flow measurement Broad crested weirs and open channels.



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	CO5	Imposing practical skills on determination of head losses in pipes, roughness coefficient of open channels.
	CO6	Practical exposes on determination of velocity and pressure in open channels, construction of flow net problems on flow nets
Subject : FIELD OPERATIONSAND MAINTENANCE OF TRACTORS LAB(PC)	CO1	Improved practical skills on air kind fuel filtration systems, lubrication system and their maintenance in tractors.
TRACTORS LAB(TC)	CO2	Practical skills improvement on maintenance of transmission and radiators cooling systems in tractor.
	CO3	Practical skills development on maintenance of tractor ignition and hydraulic systems.
4	CO4	Practical knowledge on periodical maintenance of tractors, emission of smoke, clutch and brake system maintenance
	CO5	Practical skill development on maintenance of train machinery and implements
	CO6	Practical knowledge on tractor on-off practice of tractors
Subject : CONSTITUTION OF INDIA(MC)	CO1	Understand historical background of the constitution making and its importance for building a democratic India.
	CO2	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
	CO3	Understand the value of the fundamental rights and duties for becoming good citizen of India.
	CO4	Analyze the decentralization of power between central, state and local self-government.
	CO5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
	er .	Know the sources, features and principles of Indian Constitution.
		 Learn about Union Government, State government and its administration.
6		Get acquainted with Local administration and Pachayati Raj.
		4. Be aware of basic concepts and developments of Human Rights.



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5. Gain knowledge on roles and	I functioning of Election
Commission	55(74)

	1	B.Tech 4th Sem
Course Name		Course Outcomes
Subject : HEAT AND MASS TRANSFER(PC)	COI	Skill development on principles of heat and mass transfer, steady state heat transfer & its analysis, measurement of thermal conducting of pleasure & composite walls, tubes and spheres, multilayer tubes.
*6	CO2	Skill development on conduction principles of different materials in parallel, combined convection and conduction concept of insulation.
	CO3	Skill development on conduction, convection and radiation analysis of heat and mass transfer, different laws on radiation theory.
	CO4	Imparting skills on unsteady state analysis of heat transfer in fins, free & force convection, cooling theories and principles.
	CO5	Skill development on theory and principles of heat exchanges, their analysis, frick's law of mass transfer coefficients, Reynolds analogy
Subject : GROUND WATER HYDROLOGY, WELL AND	COI	Skill development on principles of ground water resources development, different acquaintance and their principles.
PUMPS(PC)	CO2	Imparting knowledge on theory of open well hydraulics and drilling methods.
	CO3	Skill development on aquifers characteristics under steady and unsteady state conditions, multiples well systems for coastal areas.
	CO4	Knowledge development to students on artificial ground water recharge classification of indigenous pumps, solar pumps, wind mill pumps etc.,
	CO5	Skill development on principles of Centrifugal pumps, principles & characteristics, High lift pumps, mixed flow pumps and vertical turbine pump sets.
Subject: THEORY OF	COI	Skill development on RCC theory and practice of principles, stress – Strain analysis.



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STRUCTURES(PC)	CO2	Skill development on single, double reinforced sections, their theory & principles, shear stress analysis.
	CO3	Acquaintance of knowledge on design principles of shear reinforcement, anchorage of bars & analysis
	CO4	Skill development on theory and principles of design of one – way reinforced beams/slabs, two way slabs and columns.
	CO5	Skill development on principles of auxiliary loaded columns, foundations retaining walls, stability analysis.
Subject: SOIL	COI	Skill development on principles of soil mechanics soil classification, stresses in soils.
MECHANICS(PC)	CO2	Skill development on Bousinesq's analysis for vertical pressure applications & western guard's analysis for point load applications
	CO3	Acquaintance of knowledge on shear stress analysis, Mohr's stress circle, measurement of shear strength.
	CO4	Skill development on soil consolidations theory and principles.
	CO5	Skill development on earth pressure and its effects on soil stability of slopes.
Subject : MANAGERIAL ECONOMICS AND	CO1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product.
FINANCIAL ANALYSIS(HSS)	CO2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
	CO3	The pupil is also ready to understand the nature of differen markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
	CO4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
.7	CO5	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

	B.Tech 5th Sem
Course Name	Course Outcomes.



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Subject: FARM MACHINERY AND EQUIPMENT – I(PC)	CO1	Apply Principles of Farm Mechanization to calculate field capacities and cost of cultivation
	CO2	Calculate the forces acting on tillage tools, Draft and Unidraft.
	CO3	Explain Earth moving Equipment.
	CO4	Analyze Seeding methods, Plant protection Equipment
	CO5	Discuss the features of Transplanting machinery and Fertilizer application equipment
Subject: SURFACE WATER HYDROLOGY (PC)	CO1	Analyze probability of rainfall, Return Period, Plotting position
=	CO2	Determine net effective rainfall, Peak runoff and Peak runoff rate
	CO3	Discuss the factors affecting flood hydrographs, hydrograph Separation for simple and complex storms.
	CO4	Describe method of superposition, S-Curve and determine duration graphs.
	CO5	Use the Concepts of Flood raining.
Subject : POST HARVEST ENGINEERING OF CEREALS, PULSES AND OILSEEDS(PC)	CO1	Apply principles of Bond's law, Kick's law, Rittinger's law for size reduction
	CO2	Explain the features and application of Material Handling equipment
and the second s	CO3	Explain the concepts of Dryers
	CO4	Use CFTRI and Jadavpur methods for Mixing and Milling Practices
3	CO5	Apply the principles of milling wheat and Oil seeds
Subject: SEED PROCESSING AND	CO1	Estimate the moisture content by using different methods
STORAGE ENGINEERING (Professional Elective - I)(PE)	CO2	Calculate drying air temperature and air flow rate, air pressure within the grain bed.
	CO3	Explain the causes for the spoilage in storage and calculate the parameters associated.
9	CO4	Design grain storage structures
	CO5	Analyze Grain handling equipment.
Subject: GREENHOUSE	CO1	Classify the greenhouses based on different parameters



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TECHNOLOGY (Professional Elective - I)(PE)	CO2	Identify the required environmental factors for crop growth
	CO3	Analyze the Natural and forced ventilation, summer and winter cooling systems
	CO4	Explain Greenhouse irrigation systems.
	CO5	Describe protected Agricultural techniques
Subject: TRACTOR DESIGN AND TESTING (Professional Elective - I) (PC)	CO1	Analyze parameters for balanced design of a tractor
	CO2	Explain the Elements of mechanical power transmission in Agricultural tractor
	CO3	Design seat controls of an agricultural tractor
	CO4	Design gear box
	CO5	Determine turning space, turning radius and other parameters associated
Subject : ELECTRICAL CIRCUITS LAB(PC)	CO1	Apply various theorems
ia .	CO2	Determination of self and mutual inductances
	CO3	Two port parameters of a given electric circuits
	CO4	Draw locus diagrams
	CO5	Draw Waveforms and phasor diagrams for lagging and leading networks
Subject : SOFT SKILLS(SOC)	CO1	Problem solving regards numerical methods in Linear Algebra
	CO2	Analyze about Eigen values and Eigenvectors
	CO3	Differentiation and Integration Finite difference formula using Taylor series.
	CO4	Differentiation of Lagrange polynomials, Simpson's rule Gauss-quadrature rule, Romberg method
	CO5	Solving of Partial Differential Equations



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Subject : PROFESSIONAL ETHICS AND HUMAN VALUES(MC)	COI	Judge the concepts of human values.
	.CO2	Justify knowledge about the principles of engineering ethics.
	CO3	Interpret engineering as social experimentation
	CO4	Realize engineers' responsibility for safety and risk.
	CO5	Discuss about the engineers' rights and responsibilities

	В	.Tech 6th Sem
Course Name		Course Outcomes
Subject: SOIL AND WATER	COI	Calculate Peak run off, time of conservation
CONSERVATION ENGINEERING(PC)	CO2	Estimate soil loss by using Universal Soil Loss equation and modified soil loss equation,
	CO3	Discuss factors affecting wind erosion, mechanics of wind
	CO4	Design contour bunds, graded bunds and bench terrace
	CO5	Design vegetated water ways, WH Structures
Subject: FARM	CO1	Describe Crop harvesting machinery
MACHINERY AND EQUIPEMNT – II(PC)	CO2	Analyze the Power operated vertical conveyer reapers
EQUITEDINI - II(FC)	CO3	Apply the threshing principles for all types of thresher
	CO4	Analyze the factors affecting the harvesters.
	CO5	Explain the features of cotton harvesting equipment.
Subject: AGRICULTURAL	CO1	Discuss different types of Material handling devices.
PROCESS ENGINEERING(PC)	CO2	Analyze the effectiveness and mixing index for granular solids, mixing indices
	CO3	Explain Aerodynamics of Agricultural product .
	CO4	Estimate moisture content in wet basis and dry basis for different types of grains
	CO5	Apply milling principles for wheat, pulses and oil seeds.
Subject: FOOD	COI	Apply principles of packaging for cost effective



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PACKAGING		packaging
TECHNOLOGY (Professional Elective - II)(PE)	CO2	Estimate the Shelf life of processed foods
	CO3	Describe different types of packaging materials.
	.CO4	Analyze the different techniques used for packaging of milk, fruits and meat.
	CO5	Explain various container making processes
Subject: WATERSHED	CO1	Plan for watershed development
MANAGEMENT(PE)	CO2	Analyze the factors affecting the watershed management.
8	CO3	Explain rainwater conservation technologies.
	CO4	Estimate the Effect of cropping systems, land management and cultural practices on watershed hydrology
	CO5	Prepare project proposal for watershed management program including cost-benefit analysis.
Subject: HUMAN	COI	Design workspace for standing and seated workers.
ENGINEERING AND SAFETY (Professional Elective - II)	CO2	Interpret the functions of the skeletal and muscular systems
	CO3	Apply Biometries and energy for muscle contraction for the design of Hand tools.
	CO4	Estimate the Physical work capacity
	CO5	Calculate sound, the nature of sound, damages due to noise
Subject: SOIL AND WATER	COI	Estimation of soil and water conservation practices.
CONSERVATION ENGINEERING LAB(PC)	CO2	Estimation using erosivity index and erodibility index
	CO3	Measurement of irrigation water with H-Flume
	CO4	Estimate the discharge rate of water by using current meter and water meter.
Subject : FARM MACHINERY	COI	Study of various implements and functional element
AND EQUIPMENT LAB(PC)	CO2	Evaluation of field efficiencies and fuel efficiencies.
	CO3	Evaluate performance of various agricultural implements and machines.
	CO4	Design and calibration of seed drills and matching mechanism



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Subject: AGRICULTURAL PROCESS ENGINEERING LAB(PC)	CO1	Conducts the procedure, calculation of uniformity and milling index.
	CO2	Design the procedural calculation of cyclone and pneumatic separation.
-	CO3	Solve the problems on psychometric chart, definition and various loss on site reduction.
	,CO4	Conduct the performance evaluation of hammer and attribution mills.
Subject: STRUCTURAL DESIGN WITH ANSYS(SOC)	CO1	Design of connections, structural steel members in tension, and compression and bending.
	CO2	Analyze singly and doubly reinforced sections, Shear, Bond and Torsion.
	CO3	Design of Reinforced concrete Cantilever and Counter fort Retaining Walls
	CO4	Design of Flat Slabs with and without drops by Direct Design Method of IS code.
	CO5	Design of Eccentric Shear and Moment Resisting connections.
Subject : EMPLOYABILITY SKILLS(MC)	CO1	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems
	CO2	Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
	CO3	Analyze, summarize and present information in quantitative forms including table, graphs and formula
	CO4	Understand the core competencies to succeed in professional and personal life
	CO5	Learn and demonstrate a set of practical skills such as time management, self-management, handling conflicts, team leadership, etc.
	В	Tech 7th Sem
Course Name		Course Outcomes
Subject: IRRIGATION AND DRAINAGE ENGINEERING	CO1	Explain the terminology related to Irrigation and calculate Soil moisture by different methods.
(Professional Elective - III)(PE)	CO2	Determine infiltration under check basin conditions and adaptability



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	CO3	Design irrigation canals using Lacey's and Kennedy's theories.
	CO4	Describe the factors affecting drainage requirement, drainage coefficient based on the given criteria
	CO5	Design subsurface drains under Steady State conditions.
Subject: PRODUCTION TECHNOLOGY OF	CO1	Choose appropriate cutting tool material for a given application
AGRICULTURAL	CO2	Explain CNC tooling
MACHINERY (Professional	CO3	Calculate limits, fits & tolerances.
Elective - III)(PE)	CO4	Apply the relevant motion control system of CNC machine for a given application.
	CO5	Develop Part programmer for a given product.
Subject: FOOD PLANT	COI	Explain the principles of plant layout.
DESIGN AND	CO2	Select a suitable plant layout for a given product.
MANAGEMENT (Professional Elective -	CO3	Use principal considerations for plant location and design of layout
III)(PE)	CO4	Describe the design criteria of plant building
	CO5	Estimate Cost indices, total product cost.
Subject: DESIGN OF SOIL	COI	Analyze types of flow, state of flow, regimes of flow.
AND WATER CONSERVATION AND FARM SYSTEMS (Professional Elective - IV)(PE)	CO2	Estimate runoff by using Parshall flume, H-Flume and weirs, water stage recorders, straight drop spill way-general description.
	CO3	Design Chute spillway and SAF stilling basic
	CO4	Design trapezoidal notch fall and siphon well drop type of canal falls.
	CO5	Analyze different components of diversions head works
Subject: FOOD PROCESS EQUIPMENT DESIGN	CO1	Apply design engineering principles for process Equipment Design
(Professional Elective - IV)(PE)	CO2	Design Food Process equipment.
	CO3	Design high pressure monobolic and multilayer vessels
	CO4	Analyze the design Parameters of the Conveyors, dryers and other processing equipment.
	CO5	Determine process efficiency, energy utilization and cost.



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Subject: DESIGN OF AGRICULTURAL MACHINERY (Professional Elective - IV)(PE)	COI	Analyze the general considerations in machine design.
	CO2	Calculate the design Parameters of socket, spigot cotter joint and Knuckle joint.
	CO3	Choose appropriate levers and springs for a given application
	CO4	Design shafts and keys for the specified conditions.
	CO5	Design Tillage equipment.
Subject: MICRO IRRIGATION ENGINEERING (Professional	COI	Explain the concept of Sprinkler Irrigation and its components.
Elective - V)(PE)	CO2	Discuss Precipitation profiles and Moisture distribution patterns, sprinkler spacing's.
	CO3	Design Sprinkler system, layout, laterals and mains.
	CO4	Describe drip Irrigation and its components.
	CO5	Plan for installation of drip irrigation system.
Subject: MECHATRONICS IN AGRICULTURAL ENGINEERING (Professional Elective - V)	COI	Describe various mechatronics systems, measurement systems, sensors and transducers.
	CO2	Explain the functionality of solid state electronic devices.
	CO3	Identify the components in the design of electro mechanical systems.
	CO4	Apply the concepts of digital electronics and applications of PLCs for control.
	CO5	Analyze the system interfacing, data acquisition and design of mechatronics systems
Subject: DAIRY AND FOOD ENGINEERING (Professional	COI	Estimate the physical and chemical properties of milk, water content, acidity, pH, developed acidity.
Elective - V)(PE)	CO2	Analyze the parameters that influence Pasteurization
	CO3	Describe emulsification and types of emulsions
96	CO4	Estimate the carbohydrates, protein, lipids, minerals, vitamins in food product.
	CO5	Analyze the factors influencing rate of evaporation, thermodynamics of evaporation, and circulation in Evaporators.
Subject: UNIVERSAL HUMAN	COI	Analyze Principles of Solar Radiation.
VALUES: 2 UNDERSTANDING HARMONY (Humanities and	CO2	Apply solar heating/cooling technique, solar distillation



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Social Science Elective)(HSS)		and drying, photovoltaic energy conversion.
	CO3	Apply Principles of bio-conversion.
	CO4	Analyze Geothermal Energy techniques.
,	CO5	Discus Direct Energy Conversion
Subject: COMPUTATIONAL FLUID DYNAMICS WITH FLUENT(SOC)	CO1	Explain elementary details and numerical techniques for solving various engineering problems involving fluid flow.
	CO2	Study about finite difference applications in heat conduction and convection.
	CO3	Apply finite difference for flow modeling.
	CO4	Understand the concepts of finite volume method.
	CO5	Understand the concepts of finite element method applied to heat transfer problems

	F	3,Tech 8th Sem	
Course Name	Course Outcomes		
Subject: MANAGEMENT OF CANAL IRRIGATION	CO1	Apply the knowledge on canal classification and its alignment.	
SYSTEM	CO2	Determine duty, delta, base period relationships and canal capacity.	
et e	CO3	Design channels using Kennedy's theory and Lacey's regime theory.	
	CO4	Differentiate between lined and unlined channels.	
	CO5	Explain different irrigation structures.	
Subject : POST HARVEST ENGINEERING OF HORTICULTURAL CROPS	COI	Explain about the properties and factors affecting qualit of fruits and vegetables.	
	CO2	Classify post harvest operations involved in horticulture processing.	
	CO3	Identify preservation techniques for processed foods.	
	CO4	Apply the advanced packaging technology in food preservation.	
	CO5	Identify post harvest disorders in horticultural produce.	



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Subject: INFORMATION TECHNOLOGY FOR LAND AND WATER MANAGEMENT	COI	Analyze Information Technology (IT) and its application potential
	CO2	Discuss about application and production of multimedia, internet application tools and web technology
	CO3	Development of database concept for effective natural resources management.
4	CO4	Apply agricultural information management systems.
	CO5	Application of decision support systems, multi sensor data loggers.
Subject: THEORY OF MACHINES	CO1	Analyze element, link, pairs, kinematics of chains and pairs
	CO2	Apply helical, spiral, bevel and worm gear. Simple, compound, reverted and epicyclical mechanisms
28	CO3	Estimate the length of belt, power transmitted, velocity ratio, belt size for flat and v-belts
	CO4	Discus Effect of friction, controlling force, curves, sensitiveness, stability, hunting, Isochronisms', power and effort of a governor.
	CO5	Apply Partial primary balancing of reciprocating masses
Subject: INSTRUMENTATION	COI	Estimate Temperature and temperature scales
AND PROCESS CONTROL IN FOOD INDUSTRY	CO2	Analyze the different methods of liquid level - measurement
	CO3	Estimate the moisture content, specific gravity, measurement of humidity
	CO4	Discus simple system analysis, dynamic behavior of simple process
	CO5	Apply Temperature control, electronic controllers, flow ratio control, atmosphere control
Subject: LANDSCAPE IRRIGATION DESIGN AND MANAGEMENT	CO1	Discus landscape irrigation- hose irrigation system, quick release coupling system
	CO2	Incorporate modern methods of landscape irrigation- popup sprinklers, spray pop-up sprinkler, shrub adopter.
	CO3	Estimation of Modern methods of landscape irrigation- popup sprinklers, spray pop-up sprinkler, shrub adopter.
74	CO4	Apply Automation system for landscape irrigation
	CO5	Design of modern landscape irrigation systems



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Subject: TRACTOR SYSTEMS AND CONTROLS	CO1	Analyze functions of power transmission system and clutch system
	CO2	Discus Gear Box - Gearing theory, principle of operation, gear box types.
	CO3	Apply principle of operation, construction, calculation for braking torque.
	CO4	Familiarization with system the Hýdraulic adjustments and ADDC
	CO5	Analyze the importance of moment of inertia of a tractor. Study of tractor static equilibrium, tractor stability especially at turns.
Subject: FOOD QUALITY AND CONTROL	COI	Estimate Measurement of color, flavor, consistency, viscosity, texture and their relationship with food quality
	CO2	Analyze sampling: purpose, sampling techniques, sampling procedures for liquid, powdered and granular materials.
*	CO3	Interpretation of sensory results. Instrumental method for testing quality.
	CO4	Detection of adulteration and examination of various food products
	CO5	Discus about Food Safety Management Systems GAP, GHP, GMP, Hazards and HACCP
Subject: FLOODS AND CONTROL MEASURES	COI	Estimation and cause of floods.
	CO2	Discus flood forecasting. Flood routing - channel routing, Muskingum structural and nonstructural measures of flood control.
	CO3	Analyze the Gully erosion and its control structures.
	CO4	Design and construction of earthen dam, stability of earthen embankments against failure by tension
	CO5	Discus about Subsurface dams - site selection and constructional features
Subject: BIO-ENERGY SYSTEMS: DESIGN AND APPLICATIONS	CO1	Analyze fermentation processes and its general requirements.
	CO2	Discus Biomass Production.
	CO3	Apply Biomass preparation techniques for harnessing.
	CO4	Discus about Biomass preparation techniques for harnessing.



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	1.	
	CO5	Apply shaft power generation, thermal application and economics
Subject: AQUACULTURAL FINGINEERING	CO1	Analyze fresh water, brackish water and marine farms.
ENGINEERING	CO2	Estimation of area of regular and irregular plane surfaces.
	CO3	Plan for fish ponds, layout planning, materials planning, manual planning, comparison of square and rectangular ponds, large and small ponds.
	CO4	Plan for construction of coastal aqua farms. Brackish water fish farms- tide fed, pump fed farms.
8	CO5	Discus about pumps purpose of pumping, types, selection of pump, total head, horse power calculation. Filters- types and constructions.
Subject : PRECISION FARMING TECHNIQUES FOR PROTECTED	COI	Analyze the importance of agro climatic factors available inside of green house
CULTIVATION	CO2	Discuss about controlling of greenhouse environment factors by using active devices
	CO3	Design and installation of micro irrigation system inside the greenhouse
	CO4	Optimize temperature and relative humidity in green house.
	CO5	Select Crops for green house cultivation
Subject: WASTELAND DEVELOPMENT	COI	Plan for the development of wasteland
	CO2	Analyze about conservation structures.
	CO3	Discuss the reclamation of water logged and salt – affected lands.
	CO4	Interpret the impact of land degradation, reclamation and rehabilitation.
	CO5	Prepare proposal for wasteland development and benefit- cost analysis.
Subject: FARM MACHINERY DESIGN AND PRODUCTION	COI	Explain the basic concept of machine design.
	CO2	Apply principles of design to mechanical power transmission elements such as shafts, keys & couplings, bearings.
	CO3	Apply principles of design in designing farm machinery implements

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	CO4	Explain the advanced manufacturing techniques in Production.
	COS	Explain Industrial lay-out planning.
Subject: TESTING AND	COI	Testing of agricultural machines
EVALUATION OF TRACTORS AND FARM EQUIPMENT	CO2	Testing of Sub-soiler, laser land leveler, Rotavator, Cultivator, Disc Harrow, Seed cum fertilizer drill and planters.
	CO3	Testing of manual and power operated weeders, reaper and thresher.
	CO4	Testing of Combine harvesters. Plant protection machines
	CO5	Testing of farm tractor.
Subject: EARTH MOVING MACHINES	CO1	Explain Engineering fundamentals of Earth Moving Machines.
	CO2	Apply Principles of mechanisms in Crawler mounted tractors and Dump trucks.
	CO3	Select suitable equipment for Land cleaning and reclamation.
· ·	CO4	Discuss the role of Earth diggers and ditches.
,	CO5	Analyze land development machines on Economic aspects.
Subject: SPRINKLER AND MICRO IRRIGATION SYSTEMS	CO1	Explain scenario, types and different components of sprinkler irrigation system.
	CO2	Evaluate performance and head losses calculation in sprinkler irrigation system.
9	CO3	Explain about various micro irrigation systems and components of drip irrigation system.
	CO4	Evaluate performance and head losses calculation in drip irrigation system.
	CO5	Identify proper method for maintenance of emitter and apply fertilizer through drip irrigation system.
Subject: MINOR IRRIGATION AND COMMAND AREA	COI	Analyze the Factors affecting performance of irrigation projects
DEVELOPMENT	CO2	Design lift irrigation systems
	CO3	Explain Components, need, scope of command area development



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	CO4	Use remote sensing techniques for CAD works and enhancing water productivity
	CO5	Plan and layout the water Conveyance systems and determine Storage Capacity of Tanks.
Subject: DEVELOPMENT OF PROCESSED FOOD PRODUCTS	CO1	Analyze the unit operations and equipment for processing
a l	CO2	Development of new products
	CO3	Extraction of oil and refining of oil.
	CO4	Study about value added products from fruits, vegetables and spices, Canned foods.
	CO5	Preparation of Practical Process design and process flow chart
Subject: ENGINEERING PROPERTIES OF AGRICULTURAL PRODUCE	COI	Calculate the basic engineering properties of a biological material.
	CO2	Analyze the flow behavior of biological materials and force deformation.
	CO3	Analyze the Maxwell and Kelvin model equations in the theology for important biological materials.
	CO4	Explain the applications of frictional and aerodynamic properties in the design of processing equipment
	CO5	Explain the applications of electrical and thermal properties in the design of processing equipment
Subject: AGRICULTURAL STRUCTURES AND ENVIRONMENTAL CONTROL	CO1	Plan and layout farmstead.
	CO2	Design farm structures
	CO3	Design grain storage go downs, Bag storage structures, Shallow and Deep bin
	CO4	Analyze the sources of water supply, norms of water supply for human beings and animals
	CO5	Measure environmental parameters and cooling load of a farm building
Subject: FOOD WASTE AND BY- PRODUCTS UTILIZATION	CO1	Analyze the basic applications of agro industries and by- products utilization, importance of rice husk and their uses and rice husk combustion
		01/01/0



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	CO2	Describe the manufacturing of alcohol processes and production of furfural
	CO3	Explain by-products of coconut, mango, cashew nut and banana
	CO4	Explain about the feed manufacturing equipments, paper making process and different types of sugarcane by-products.
	CO5	Justify the biological treatment with their advantages and disadvantages.

P88 WORK

Program Outcomes

(Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 4. 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.
- 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.
- 6. 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.
- 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.
- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and team work: Function effectively as an individual, and as a

member or leader in diverse teams, and in multidisciplinary settings.

10. 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.

11. 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.

12. 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 Educational Objectives (PEOs)

 To produce the students to solve real life problems rendering safe and economical structures with environmental sustainability

To be able to work in diversified fields of industry by acquiring knowledge of latest technologies

Program Specific Outcomes (PSOs)

1. Design and solve the real time problems using latest technological tools

2. Able to communicate with the stakeholders and execute engineering projects effectively

CIVIL ENGINEERING Courses Outcomes

		B.Tech 1stSem	
Course Name	Course Outcomes		
	CO4	apply double integration techniques in evaluating areas bounded by region (L3)	
	CO5	 students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems (L5) 	
Subject: Engineering Physics(Integrated)(Theory & Lab)	COI	Explain the need of coherent sources and the conditions for sustained interference (L2). Identify applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary polarized light and extraordinary polarized light (L2) The different realms of physics and their applications in both scientific and technological systems are achieved through the study of wave optics.	
	CO2	Explain various types of emission of radiation (L2). Identify lasers as tools in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify the optical fibers based on refractive index profiles and modes of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).	
	CO3	Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Clausius- Mosti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3).	
	CO4	Explain sound waves and its propagation/absorption of construction material used in design of buildings (L2). Analyze acoustic parameters of typical materials used in buildings (L4). Recognize sound level disruptors and thei application in architectural acoustics (L2). Identify the use of ultrasonics in diversified fields of engineering (L3)	
	CO5	Interpret various crystal systems (L2) and Analyze the characterization of materials by XRD (L4). Identify the important properties of crystals like the presence of long-range order and periodicity, structure determination using	

		X-ray diffraction technique (L3). Analysis of structure of the crystals by Laue and Powder techniques (L2).
Subject: Engineering Drawing	COI	The student will learn how to visualize 2D & 3D objects.
4		70 E
	COI	Identify and classify the geological minerals
	CO2	Measure the rock strengths of various rocks
Subject: Engineering Geology	CO3	Classify and measure the earthquake prone areas to practice the hazard zonation
-	CO4	Classify, monitor and measure the Landslides and subsidence
	CO5	Prepares, analyses and interpret the Engineering Geolog maps
S. Li. d. Facility and re	CO1	Identify Megascopic minerals & their properties.
Subject: Engineering Geology(LAB)	CO2	Identify Megascopic rocks & their properties.
Subject:BASICS OF CIVIL ENGG. (WORK SHOP) LAB (ESC1103)	CO1	identify various components of a building and give lump- sum estimate. To Determine distances and irregular areas using conventional survey instruments like chain, tape, cross-staff and compass To Identify different soils To Know various traffic signs & signals To Determine center of gravity and moment of inertia of channel and I-sections. Set out a signal room building as per given plan To Install simple sanitary filling and find discharge/velocity in a water pipe line as density of water To Know to the process of making cement mortar / concrete for nominal mix
4	CO2	Determine distances and irregular areas using convention survey instruments like chain, tape, cross-staff and compass
	CO3	Identify different soils & Know various traffic signs & signals
	CO4	Determine center of gravity and moment of inertia of channel and I-section

CO5	Set out a signal room building as per given plan was Install simple sanitary filling and find discharge/velocity in a water pipe line as density of water
CO6	Know to the process of making cement mortar / concrete for nominal mix.

B.Tech2 nd Sem			
Course Name		Course Outcomes	
Subject: Mathematics-II (Linear Algebra &Numerical	CO1	develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)	
Methods)	CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3)	
	CO3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)	
*	CO4	 apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3) 	
	CO5	apply numerical integral techniques to different Engineering problems (L3)	
	CO6	apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3).	
Subject: Engineering Chemistry	CO1	At the end of this unit, the students will be able to • Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.	
Subject:Programing for problem solving using c.	CO1	To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program	
	CO2	To gain knowledge of the operators, selection, control statements and repetition in C	
	CO3	To learn about the design concepts of arrays, strings, enumerated structure and union types. To learn about their usage.	

	CO4	To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor
	CO5	To assimilate about File I/O and significance of functions
Subject: Building Materials and Concrete Technology	CO1	. Know various engineering properties of building construction materials and suggest their suitability
	CO2	Identify the functional role of ingredients of concrete and apply this knowledge to concrete mix design.
	CO3	Acquire and apply fundamental knowledge in the fresh and hardened properties of concrete
Subject: Building Planning And Aided Building Drawing	CO1	Perform basic commands of any suitable CAD software to draw 2D drawings
	CO2	Interpret the conventions, signs and symbols from a given drawing.
	CO3	Prepare line plans of residential and public buildings using principles of planning.
	CO4	Prepare submission and working drawing from the giver requirement for Load Bearing and Framed structures

Subject: CHEMISTRY LAB (BSC1203)	COI	practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills
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	11/1	B.Tech3 rd Sem
Course Name	Course Outcomes	
Mathematics -III (Vector Calculus, Transforms and PDE	CO1	interpret the physical meaning of different operators such as gradient, curl and divergence(L50
	CO2	estimate the work done against a field, circulation and flux using vector calculus (L5)
ů.	CO3	apply the Laplace transform for solving differential equations (L3)

	CO4	find or compute the Fourier series of periodic signals (L3)
	CO5	know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non- periodic waveforms (L3)
	CO6	identify solution methods for partial differential equations that model physical processes (L3)
Strength of Materials - I	CO1	The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions.
	CO2	The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces
	CO3	The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions.
	CO4	The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation.
Fluid Mechanics	CO1	 Understand the various properties of fluids and their influence on fluid motion and analyses a variety of problems in fluid statics and dynamics.
	CO2	variety of problems in fluid statics and dynamics.
	CO3	Calculate the forces that act on submerged planes and curves.
	Co4	Ability to analyses various types of fluid flows.
19	CO5	 Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipe and ducts in order to predict relevant pressures, velocities and forces.
	CO6	Able Measure the quantities of fluid flowing in pipes, tanks and channels.
	COI	Apply the knowledge to calculate angles, distances and levels
Surveying And Geometries	CO2	Identify data collection methods and prepare field notes
Surveying And Geometrics.	CO3	Understand the working principles of survey instruments, measurement errors and corrective measures.
	CO4	Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies.
	COI	Plan highway network for a given area.

HIGHWAY ENGINEERING	CO2	Determine Highway alignment and design highway geometrics
	CO3	Design Intersections and prepare traffic management plans
	CO4	Judge suitability of pavement materials and design flexible and rigid pavements

CONCRETE TECHNOLOGY LAB	CO1	n successful completion of this course, student will be able to • Determine consistency and fineness of cement.
	CO2	Determine consistency and fineness of cement
	CO3	Determine setting times of cement
	CO4	Determine specific gravity and soundness of cement.
	CO5	Determine compressive strength of cement
	CO6	Determine workability of cement concrete by compaction factor, slump and Vee – Bee test
3	CO7	Determine specific gravity of coarse aggregate and fine aggregate by Sieve analysis
	CO8	Determine flakiness and elongation index of aggregates.
	CO9	Determine bulking of sand.
	C10	Understand non-destructive testing procedures on concrete
W.	COI	. Test aggregates and judge the suitability of materials for the road construction
HIGHWAY ENGINEERING LAB		
	CO2	Test the given bitumen samples and judge their suitability for the road construction
16	CO3	Obtain the optimum bitumen content for Bituminous Concrete.
	CO4	Determine the traffic volume, speed and parking characteristics.
	CO1	Understand the concept of Indian constitution

CONSTITUTION OF INDIA (MC)	CO2	Apply the knowledge on directive principle of state policy
	CO3	Analyze the History, features of Indian constitution
	CO4	Evaluate Preamble Fundamental Rights and Duties.

		B.Tech4thSem
Course Name		Course Outcomes
*	CO4	apply discrete and continuous probability distributions (L3)
	CO5	design the components of a classical hypothesis test (L6)
	CO6	infer the statistical inferential methods based on small and large sampling tests (L4)
Subject:Strength of Materials -II	CO1	The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected t stresses along different axes and design the sections.
	CO2	The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected t different loading conditions
Subject:Hydraulics and Hydraulic Machinery	CO1	Solve uniform and non-uniform open channel flow problems.
	CO2	Apply the principals of dimensional analysis and similitude in hydraulic model testing.
	CO3	Understand the working principles of various hydraulic machineries and pumps.
Subject:Environ mental Engineering	CO1	Select a source based on quality and quantity and Estimate design population and water demand
	CO2	Design a water treatment plant for a village/city
	CO3	Design a sewer by estimating DWF and Strom water flow and plumbing system for buildings
	CO4	Design a Sewage Treatment Plant for a town/city
Subject: Managerial Economics & Financial Analysis	COI	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
	CO2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
	CO3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business

		Units.
	CO4	The Learner is able to prepare Financial Statements and the usage of various accounting tools for Analysis.
*	CO5	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
	CO4	Interpret survey data and compute areas and volumes, levels by different type of equipment and relate the knowledge to the modern equipment and methodologies.
Subject:Environ mental Engineering	CO1	Estimate some important characteristics of water, wastewater and soil in the laboratory .
	CO2	Draw some conclusion and decide whether the water is suitable for Drinking/Construction / Agriculture/ Industry
	CO3	Estimate Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture
	CO4	Estimation of the strength of the sewage in terms of BOD and COD and Decide whether the water body is polluted or not with reference to the stated parameters in the list of experiments
l e	CO5	Demonstration of various instruments used in testing of water and soil and study of Drinking water standards, WHO guidelines, Effluent standards and standards for Construction/ Agriculture

B.Tech5 th Sem				
Course Name	Course Outcomes			
Subject: Professional Core courses (STRUCTURAL ANALYSIS)	CO1	Distinguish between the determinate and indeterminate structures.		
75	CO2	Identify the behavior of structures due to the expected loads, including the moving loads, acting on the structure		
	CO3	Estimate the bending moment and shear forces in beams for different fixity conditions.		
	CO4	Analyze the continuous beams using various methods -, three moment method, slope deflection method, energy theorems		
9	CO5	Draw the influence line diagrams for various types of Shoving loads on beams/bridges.		
	CO6	Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.		
Subject: Professional Core courses (DESIGN AND DRAWING OF REINFORCED CONCRETE	COI	Work on different types of design methods		
	CO2	Carryout analysis and design of flexural members and detailing		

STRUCTURES)	CO3	Design structures subjected to shear, bond and torsion
	CO4	Design different type of compression members and footings
Subject:Professional Core courses (GEOTECHNICAL ENGINEERING-1)		The student must know the definition of the various quantities related to soil mechanics and establish their inter-relationships
*	CO2	The student should be able to know the methods of determination of the various index properties of the soils and classify the soils
	CO3	. The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.
	CO4	The student should be able to apply the above concepts in day-to-day civil engineering practice.
Subject: GeotechnicalEngineering(Lab)	CO1	Determine index properties of soil and classify them. b. Determine permeability of soils. c. Determine Compaction, Consolidation and shear strength characteristics.
	CO2	Determine permeability of soils
	CO3	Determine Compaction, Consolidation and shear strength characteristics
Subject: Construction Technology &Management.	CO1	appreciate the importance of construction planning 2. understand the functioning of various earth moving equipment 3. know the methods of production of aggregate products and concreting 4. apply the gained knowledge to project management and construction techniques
	CO2	understand the functioning of various earth moving equipment.
34	CO3	. know the methods of production of aggregate products and concreting.
	CO4	apply the gained knowledge to project management and construction techniques.
	CO1	Be familiar with ground, air and satellite-based sensor platforms.
	CO2	Interpret the aerial photographs and satellite imageries
Na.	CO3	Create and input spatial data for GIS application.
	CO4	. Apply RS and GIS concepts for application in Civil Engineering
Subject: Construction Technology &Management.	CO1	Prepare EMP, EIS and EIA report, estimate cost benefit ration of a project.
	CO2	Selection of an appropriate EIA me

Subject:Remote sensing and Giss	CO3	Evaluation of impacts on environment	
4		Evaluation of risk assessment.	

	B.T	ech6thSem	
Course Name	Course Outcomes		
Subject: Design And Drawing	COI	Work with relevant Is codes.	
OfSteel Structure.	CO2	Carryout analysis and design of flexural members and detailing	
	CO3	Design compression members of different types with connection detailing	
	CO4	Design Plate Girder and Gantry Girder with connection detailing	
	CO5	Produce the drawings pertaining to different components of steel structures.	
Subject: Water Resources Engineering	COI	Have a thorough understanding of the theories and principles governing the hydrologic processes.	
	CO2	Be able to quantify hydrologic components and apply concepts in hydrologic design of water resources projects.	
	CO3	Develop Intensity-Duration-Frequency and Depth-Area Duration curves to design hydraulic structures	
	CO4	Develop design storms and carry out frequency analysis	

	CO5	Develop flow mass curve and flow duration curve, apply hydrograph analysis in the design of water resources projects
	CO6	Develop unit hydrograph and synthetic hydrograph.
Subject: Geotechnical Engineering-II	CO1	The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
	CO2	The student must be able to compute the magnitude of foundation settlement and decide on the size of the foundation accordingly
	CO3	. The student must be able to use the field test data and arrive at the bearing capacity.
	CO4	The student must be able to apply the principles of bearing capacity of piles and design them accordingly.
Subject: Estimation Costing Construct (Lab)	CO1	The student should be able to determine the quantities of different components of buildings.
en contrat en en el Arrive de la	CO2	The student should be in a position to find the cost of various building components.
	CO3	The student should be capable of finalizing the value of structures.
	CO4	Understand design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceuticparameters
	CO5	Apply non linear kinetics.
Subject: PC-Lab-Remote Sensing & Giss LAB	CO1	Work comfortably on GIS software.
	CO2	Digitize and create thematic map and extract important features
	CO3	Develop digital elevation model
	CO4	Interpretation and Estimation of features from satellite imagery
	CO5	Analyze and Modelling using GIS software.
Subject: PC-Lab -Civil Engineering Practice LAB	CO1	Gains adequate confidence to work as a consulting engineer in any field of Civil.
r 2000 - T ureniu Visu (190 7 - 12 mainte 1944 - 1707 (1907 - 1704	CO2	Understands the duties, responsibilities and coal practices of Civil Engineering profession
	CO3	Will be ready to plan, design and execute Civil Engineering projects
	CO4	Can build safety related and environmental impact related
40	CO5	Can optimize project costs using sustainability concepts

Subject:SC-Lab-Cad LAB	CO1	Model the geometry of real-world structure Represent the physical model of structural element/structure.
	CO2	Perform analysis
	CO3	Interpret from the Post processing results
	CO4	Design the structural elements and a system as per IS Codes
Subject: MC-Employability Skills	COI	To solve aptitude and reasoning problems.
34	CO2	Apply the soft skills in dealing the issues related to Employability
	CO3	Successful in getting employment in campus placement interview.
B.Tech 7th Sem		
Subject; PE-601-II a) ADVANCED	CO1	Differentiate Determinate and Indeterminate Structures
STRUCTURAL ANALYSIS	CO2	Carryout lateral Load analysis of structure
	CO3	Analyze Cable and Suspension Bridge structures
	CO4	Analyze structures using Moment Distribution, Kani's Method and Matrix methods
Subject:PE-601- II b). Architecture And Town Planning	CO1	Distinguish architectural styles of eastern and western world.
And I will in mining	CO2	Understand the importance of Orders of architecture
	CO3	 Compose spaces of buildings using design concepts, planning principles
	CO4	Understand the town planning standards, landscaping features and regulations controlling expansion of the towns and the cities.
Subject: PE-601- II c). Road Safety	CO1	To understand fundamental of Traffic Engineering.
Engineering	CO2	To investigate & determine the collective factors & remedies of accident involved
	CO3	To design & planning various road geometrics
	CO4	To massage the traffic system from road safety point of view
Subject:PE-601- II (d) - Traffic	COI	Determine traffic speed, volume, travel time and density
Engineering	CO2	Design traffic signals
	CO3	Determine highway capacity and LOS

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Subject: HSC701- INTELLECTUAL PROPERTY RIGHTS AND PATENTSs	CO1	understood the significance of innovations, distinguish different kinds of IPRs and know the legislative framework, practice and procedure relating to Patents, Copyrights, Trademarks, Designs, Trade Secrets, Geographical Indications, Traditional Knowledge and certain emerging areas.
	CO2	understood the various components of copyright law, its protection and enforcement to know the application of copyright law, its duration, advantages and the issues of 'fair use' and 'plagiarism' in the digital era.
	CO3	Understood the Patent law in India and its global instruments and spell out the procedural requirements of novelty, non-obviousness and inventive step involved in obtaining a Patent, its exclusive rights besides assignment and licensing patterns and how the patent does benefit the society.
	CO4	understood the conceptual and legal framework, procedural requirements relating to Trade Marks and its infringement and gives an insight how the Trademark is commercially advantageous to its owner and to prevent unfair competition and further safeguarding the trade secrets of the business enterprises.
	CO5	Understood the importance of E-commerce, data security, online transactions and how the confidentiality and privacy can be safeguarded through the digital signatures and the prevention and punishment of cybercrimes under the law.
Subject: SC-701- Project Planning, Town Planning.	CO1	Design raft foundations and different types of RCC retaining walls.
•	CO2	Carryout analysis and design of different types of RCC water tanks.
	CO3	Solve the problems regarding design of RCC Bunkers, Silos and Chimneys.
34	CO4	Understand the concepts of prefabricated construction.
Subject:PE-701- III b) BRIDGE ENGINEERING	CO1	Explain different types of Bridges with diagrams and Loading standards.
	CO2	Carryout analysis and design of Slab bridges, T Beam bridges, Box culvers and suggest structural detailing
	CO3	Carryout analysis and design of Plate girder bridges
97	CO4	Organize for attending inspections and maintenance of bridges and prepare reports
Subject: PE-701- III c) STRUCTURAL DYNAMICS	CO1	CO1 Understand the response of structural systems to dynamic loads loads Harmonic
STRUCTURED THE MAN	CO2	Realize the behavior and response of linear and nonlinear SDOF and MDOF structures with various dynamic

		loading
	CO3	CO3 Understand the behavior and response of MDOF structures with various dynamic Loading.
	CO4	CO4 Possess the ability to find out suitable solution for continuous system.
	CO5	Understandthe behavior of structures subjected toddy manic loads underfree vibration.

Subject: PE-701- III d) URBAN TRANSPORTATION PLANNING	CO1	. Estimate travel demand for an urban area .
	CO2	Plan the transportation network for a city
	CO3	Identify the corridor and plan for providing good transportation facilities
	CO4	Evaluate various alternative transportation proposals
Subject: PE-702- IV a). GROUND IMPROVEMENT TECHNIQUES	CO1	By the end of the course, the student should be able to possess the knowledge of various methods of ground improvement and their suitability to different field situations, of grouting.
	CO2	The student should be in a position to design a reinforced earth embankment and check its stability
	. CO3	. The student should know the various functions of Geo synthetics and their applications in Civil Engineering practice
	CO4	The student should be able to understand the concepts and applications of grouting
Subject: PE-702- IV (b) GEO- SPATIAL TECHNOLOGIES	CO1	Understand the geospatial technology relating to the data acquiring and processing that is associated with geographic locations.
·9	CO2	Apply Geospatial techniques in the decision support systems useful for decision makers and community services
	CO3	Ability to solve the problems related to the natural resource management, environment, urban planning and Infrastructure development, etc
	CO4	Able to generate the thematic maps using Geospatia techniques e) Apply the concept of Geospatial Techniques to the Civil Engineering problems
Subject: PE-702- IV d). SOIL DYNAMICS AND MACHINE	CO1	Use theory of vibrations to find the behavior of soil under dynamic loading.
FOUNDATIONS	, CO2	Design machine foundations under different loads and soil conditions
	CO3	. Understand the liquefaction phenomena.

	CO4	. Conduct various laboratory and filed tests to determine the dynamic soil prosperities and its interpretation		
	CO5	Design vibration isolators under any vibratory machines.		
	CO3	Canal drop-Notch type.		
	CO4	Canal regulator.		
Subject:PE-703- V b). EARTH &	CO1	Able to design earth and rock fill dams.		
ROCKFILL DAMS	CO2	Get familiarity with slope stability calculations.		
	CO3	Prevention techniques for slope failures.		
Subject: PE-703- V c). URBAN HYDROLOGY	CO1	develop intensity duration frequency curves for urban drainage systems.		
	CO2	Develop design storms to size the various components of drainage systems		
	CO3	Apply best management practices to manage urban flooding		
	CO4	Prepare master drainage plan for an urbanized area		
	B.Tech 8th Sem			
a) STRENGTH OF MATE(RIALS	CO1	The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions		
		The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces.		
		The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions.		
er e		The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame's equation		
(b) FLUID MECHANICS	Course Name	Course Outcomes		
	CO1	Understand the various properties of fluids and their influence on fluid motion and analyze a variety of problems in fluid statics and dynamics. 2. Calculate the forces that act on submerged planes and curves. 3. Analyze various types of flow problems through closed conduits. 4. Measure the quantities of		

		fluid flowing in pipes and channels. 5. Understand the concepts of Boundary layer and solve problems on boundary layer.
	CO2	Calculate the forces that act on submerged planes and curves.
	CO3	Analyze various types of flow problems through closed conduits.
*	. CO4	. Measure the quantities of fluid flowing in pipes and channels.
	CO5	Understand the concepts of Boundary layer and solve problems on boundary layer.
(c) SURVEYING & GEOMATICS	CO1	 Describe the function of surveying and work with survey instruments, take observations, and prepare plan, profile, and cross-section and perform calculations.
H	CO2	Calculate, design and layout horizontal and vertical curves.
	CO3	Operate a total station and GPS to measure distance, angles, and to calculate differences in Elevation. Reduce data for application in a geographic information system.
	CO4	Relate and apply principles of photogrammetry for surveying.
	CO5	Apply principles of Remote Sensing and Digital Image Processing for Civil Engineering problems.
d) HIGHWAY ENGINEERING	CO1	Plan highway network for a given area.
	CO2	Plan highway network for a given area. Determine Highway alignment and design highway geometrics.
(a)	CO3	Design Intersections and prepare traffic management plans.
	CO4	Judge suitability of pavement materials and design flexible and rigid pavement.
e). ROAD SAFETY	CO1	a) To understand fundamental of Traffic Engineering
ENGINEERING	CO2	To investigate & determine the collective factors & remedies of accident involved.
*	CO3	To massage the traffic system from road safety point of view.
(f) ENVIRONMENTAL	COI	, a. Plan and design the water and wastewater system
MANAGEMENT	CO2	Identify the source of emissions and select proper control systems.

	CO3	Design & estimation of water supply system for a city.
	CO4	to get knowledge about various environmental aspects.
	CO5	Selection of suitable treatment flow for raw water treatments.
(g) URBAN PLANNING	CO1	. A Estimate travel demand for an urban area .
	CO2	Plan the transportation network for a city.
	CO3	Identify the corridor and plan for providing good transportation facilities.
	CO4	D Evaluate various alternative transportation proposals.
9	CO5	
(a) ELEMENTS OF CIVIL	CO1	a) basics of Civil Engineering concepts .
ENGINEERING	CO2	the surveying the elevations and mapping.
.*	CO3	the construction materials and elements.
	CO4	water resource development and.
	CO5	overall infrastructure development.
(b) ENVIRONMENTAL ENGINEERING	COI	 A Plan and design the water and distribution networks and sewerage systems.
	CO2	Identify the water source and select proper intake structure.
	CO3	Design & estimation of water supply system of an apartment.
	* CO4	. Select the appropriate appurtenances in the water supply.
	CO5	Selection of suitable treatment flow for raw water treatments.
c) DISASTER MANAGEMENT	CO1	 a. Affirm the usefulness of integrating management principles in disaster mitigation.
	CO2	Distinguish between the different approaches needed to manage pre- during and post- disaster periods.
	CO3	Explain the process of risk management.
	CO4	Relate to risk transfer.
	CO5	
(d) WATER RESOURCES ENGINEERING	COI	 A Have a thorough understanding of the theories and principles governing the hydrologic processes.
	CO2	. Be able to quantify hydrologic components and apply concepts in hydrologic design of water

		resources projects.
	CO3	. Develop Intensity-Duration-Frequency and Depth- Area Duration curves to design hydraulic structures.
96	CO4	D Develop design storms and carry out frequency analysis.
	CO5	Develop flow mass curve and flow duration curve, apply hydrograph analysis in the design of water resources projects.
	CO6	Develop unit hydrograph and synthetic hydrograph.
(e) HYDRAULICS AND HYDRAULIC MACHINERY	. CO1	Solve uniform and non-uniform open channel flow problems.
	CO2	 Apply the principals of dimensional analysis and similitude in hydraulic model testing.
	CO3	. Select suitable pumps and turbines.
	CO4	
	CO5	₩
f) GREEN TECHNOLOGY	COI	 Enlist different concepts of green technologies in a project.
	CO2	Understand the principles of Energy efficient technologies.
3	CO3	- Estimate the carbon credits of various activities.
	CO4	Identify the importance of life cycle assessment.
	CO5	Recognize the benefits of green fuels with respect to sustainable development.
g) REMOTE SENSING & GIS	CO1	At the end of the course the student will be able to .
	CO2	interpret the aerial photographs and satellite imageries.
	CO3	create and input spatial data for GIS application.
	CO4	 apply RS and GIS concepts for application in Civil Engineering.
	CO5	2
a) FINITE ELEMENT METHOD(HONOR COURSE)	CO1	Develop finite element formulations of 1 degree of freedom problems and solve them
	CO2	Understand any Finite Elements of twaretoper form stress, thermal and modal analysis
	CO3	Compute the stiffness matrices of different elements and system
+	CO4	Interpret displacements, strains and stress resultants

	CO5	Analyze planar structural systems using finite element modeling Mapping of Course
e) EARTHQUAKE RESISTANT DESIGN	CO1	CO1 To learn the fundamentals of seismology and basic earthquake mechanisms, Tectonics types of ground motion, and propagation of ground motion.
*	CO2	Understand qualitative and quantitative representations of earthquake magnitude.
	CO3	Determinethenaturalfrequencyofasingledegreeoffreed omdynamicsystem For given mass, stiffness and damping properties.
	CO4	Determinethemaximumdynamicresponseofanelasticv bratingstructuretoa given forcing function.
	- CO5	Learn the fundamentals of building code based structural design.
d) PRE-STRESSED CONCRETE	COI	Understand different methods of pre stressing
	CO2	. Estimate effective pre stress including short and long-term losses.
	CO3	Analyze and design pre stressed concrete beams under flexure and shear.
	CO4	. Understand the relevant IS Code provisions for pre stressed concrete.
	CO5	
e) REPAIR AND REHABILITATION OF STRUCTURES	CO1	CO1 Recognize the mechanisms of degradation of concrete structures and to design durable Concrete structures. DEPARTMENT OF CIVIL ENGINEERING CO2 Conduct field monitoring and
w w	CO2	Conduct field monitoring and non-destructive evaluation of concrete structures. Design and suggest repair strategies for deteriorated concrete structures including Repairing with composites.
	. CO3	Understand the methods of strengthening methods for concrete structures.
3a - #	CO4	Assessment of the service ability and residual life span of concrete structures by Visual inspection and in situ tests.
	CO5	
a) REINFORCED SOIL STRUCTURES	CO1	Understand the history and mechanism of reinforced soil.
	CO2	Become aware about situations where geo-synthetics can be used.
	CO3	Know about various types of geo-synthetics and their functions.

the load carrying capacity of piles by various metho CO2 Determine the load carrying capacity of pile groups. CO3 Evaluate the pull-out capacity of piles and down dra forces on piles due to negative skin friction. CO4 Determine the load carrying capacity of laterally loaded piles. CO5 Determine the load carrying capacity of piers and caissons. CO6 Uquantify the lateral earth pressures associated with different earth systems. CO7 Evaluate the mechanical properties of geo synthetics used for soil reinforcement. CO8 Jelentify the merits and demerits of different earth retaining systems. CO9 Evaluate the most technically appropriate type of retaining wall for the application from a thorough knowledge of available systems. CO9 Design of retaining structures using appropriate design methods, factors of safety, earth pressure diagrams and field verification methods. CO9 Understand various ground contaminations, pollutio transport phenomena. CO9 Understand various ground contaminations, pollutio transport phenomena. CO9 Develop various models for contamination transport CO9 Out Comes PO1 PO2 PO3 PO4 PO5 CO1 2 - 1 - CO2 11 - 31 CO3 11 1 2 1 CO4 2 - 2 2 11. Slightly 2. Moderately 3. Substantially Detailed. CO9 CO1 Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO9 PO1 PO2 PO3 PO4 PO5 CO1 1 1 1 1 1 CO2 1 - 2 CO2 CO2 PO3 PO4 PO5 CO1 1 1 1 1 1 CO2 1 - 2 CO2 CO2 PO3 PO4 PO5 CO1 1 1 1 1 1 CO2 1 - 2	2	CO4	Be able to do dimple design of reinforced soil retaining walls and reinforced earth beds.
the load carrying capacity of piles by various methorous per capacity of piles and down dra forces on piles due to negative skin friction. CO4 Determine the load carrying capacity of piles and down dra forces on piles due to negative skin friction. CO5 Determine the load carrying capacity of piles and down dra forces on piles due to negative skin friction. CO6 Determine the load carrying capacity of piles and caissons. CO7 Determine the load carrying capacity of piers and caissons. CO8 Determine the load carrying capacity of piers and caissons. CO9 Evaluate the mechanical properties of geo synthetics used for soil reinforcement. CO3 Identify the merits and demerits of different earth retaining systems. CO4 Select the most technically appropriate type of retaining wall for the application from a thorough knowledge of available systems. CO5 Design of retaining structures using appropriate design methods, factors of safety, earth pressure diagrams and field verification methods. CO6 Understand various ground contaminations, pollutio transport phenomena. CO7 Understand various ground contamination transport phenomena. CO8 Develop various models for contamination transport co4 Out Comes PO1 PO2 PO3 PO4 PO5 CO12 – 1 – CO2 11 – 31 CO3 11 12 1 CO4 2 – 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO9 Out Comes PO1 PO2 PO3 PO4 PO5 CO12 – 1 – CO2 11 – 31 CO3 1 1 2 1 CO4 2 – 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO9 CO9 CO9 Out Oncomes PO1 PO2 PO3 PO4 PO5 CO1 1 1 1 1 1 CO2 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 CO6 1 – 2 3 CO3 1 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 CO6 1 – 2 3 CO3 1 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 CO6 1 – 2 3 CO3 1 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 CO6 1 – 2 3 CO3 1 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 CO6 1 – 2 3 CO5 2 CO5 2 CO1 1 1 1 1 CO2 1 – 2 2 3 CO3 1 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 CO6 1 – 2 3 CO5 2 CO1 1 1 1 1 CO5 1 – 2 CO5 2 CO1 1 1 1 1 CO5 1 – 2 C		CO5	
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forces on piles due to negative skin friction. CO4 Determine the load carrying capacity of laterally loaded piles. CO5 Determine the load carrying capacity of piers and caissons. CO1 CO1 Quantify the lateral earth pressures associated with different earth systems. CO2 CO2 Evaluate the mechanical properties of geo synthetics used for soil reinforcement. CO3 Identify the merits and demerits of different earth retaining systems. CO4 CO4 Select the most technically appropriate type of retaining wall for the application from a thorough knowledge of available systems. CO5 Design of retaining structures using appropriate design methods, factors of safety, earth pressure diagrams and field verification methods. CO6 Understand various ground contaminations, pollutio transport phenomena. CO7 CO8 CO9 CO9 PO9 PO9 PO9 PO9 PO9 PO9 PO9 PO9 PO9 P		CO2	Determine the load carrying capacity of pile groups.
Loaded piles. CO5		CO3	Evaluate the pull-out capacity of piles and down drag forces on piles due to negative skin friction.
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synthetics used for soil reinforcement. CO3 Identify the merits and demerits of different earth retaining systems. CO4 CO4 Select the most technically appropriate type of retaining wall for the application from a thorough knowledge of available systems. CO5 Design of retaining structures using appropriate design methods, factors of safety, earth pressure diagrams and field verification methods. CO1 Understand various ground contaminations, pollutio transport phenomena. CO2 CO2 CO2 CO2 CO3 Develop various models for contamination transport contamination transport per possible principles to get the information about the transport through the unsaturated soil. CO3 Develop various models for contamination transport contamination transport per possible principles. CO4 Out Comes PO1 PO2 PO3 PO4 PO5 CO1 2 - 1 - CO2 11 - 3 1 CO3 1 1 1 2 1 CO4 2 - 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO5 EARTH AND ROCKFILL DAMS CO1 Ol Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO2 CO2 CO3 CO3 CO3 CO4 CO4 CO5 CO4 CO5 CO5 EARTH AND ROCKFILL DAMS CO3 CO5 CO4 CO5 CO6 CO6 CO7 CO6 CO7 CO7 CO7 CO7	c) EARTH RETAINING STRUCTURES	CO1	
retaining systems. CO4	¥	CO2	
retaining wall for the application from a thorough knowledge of available systems. CO5 Design of retaining structures using appropriate design methods, factors of safety, earth pressure diagrams and field verification methods. d) GEOENVIRONMENTAL ENGINEERING CO1 Understand various ground contaminations, pollutio transport phenomena. CO2 CO3 Develop Pollutant data Apply principles to get the information about the transport through the unsaturated soil. CO3 Develop various models for contamination transport CO2 11 – 3 1 CO3 11121 CO4 2 – 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO5 EARTH AND ROCKFILL DAMS CO1 OI Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO2 CO3 TO4 Course Outcomes with Outcomes: Course Out Compol PO2 PO3 PO4 PO5 CO1 1 1 1 1 1 CO2 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 3 CO3 1 2 2 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 2 CO4 – 1 – 3 3 CO5 2 1 1 2 2 CO6 1 – 2 CO4 –		CO3	
design methods, factors of safety, earth pressure diagrams and field verification methods. d) GEOENVIRONMENTAL ENGINEERING CO1 Understand various ground contaminations, pollution transport phenomena. CO2 CO3 CO3 Develop various models for contamination transport on the unsaturated soil. CO4 Out Comes PO1 PO2 PO3 PO4 PO5 CO1 2 - 1 - CO2 1 1 - 3 1 CO3 1 1 1 2 1 CO4 2 - 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO5 EARTH AND ROCKFILL DAMS CO1 OI Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO2 CO3 CO3 CO3 CO3 CO3 CO4 CO5 CO5 CO5 CO6 CO7 CO7 CO8 CO8 CO8 CO9 CO9 CO9 CO9 CO9		CO4	
transport phenomena. CO2 CO3 CO3 CO4 CO3 CO4 CO4 CO5 CO4 CO5 CO5 CO5 CO5	-	CO5	design methods, factors of safety, earth pressure
information about the transport through the unsaturated soil. CO3 Develop various models for contamination transport CO4 Out Comes PO1 PO2 PO3 PO4 PO5 CO1 2 1 CO2 11 - 3 1 CO3 1 1 1 2 1 CO4 2 - 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO5 EARTH AND ROCKFILL DAMS CO1 Ol Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO2 Course Outcomes with Outcomes: Course Out Compol PO2 PO3 PO4 PO5 CO1 1 1 1 1 1 1 CO2 1 2 3 3 CO3 1 2 2 2 2 CO4 1 3 3 CO5 2 1 1 2 2 CO6 1 2 3.	d) GEOENVIRONMENTAL ENGINEERING	CO1	Understand various ground contaminations, pollution transport phenomena.
CO4 Out Comes PO1 PO2 PO3 PO4 PO5 CO1 2 1 CO2 1 1 3 1 CO3 1 1 1 2 1 CO4 2 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO5 EARTH AND ROCKFILL DAMS O1 Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO2 CO2 CO3 1 2 2 2 CO4 1 3 3 CO5 2 1 1 2 2 CO6 1 2 3.		CO2	information about the transport through the
CO2 1 1 - 3 1 CO3 1 1 1 2 1 CO4 2 - 2 2 1 1. Slightly 2. Moderately 3. Substantially Detailed. CO5 EARTH AND ROCKFILL DAMS CO1 OI Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO2 CO2 CO2 CO2 CO3 CO3 CO3 CO3		CO3	Develop various models for contamination transport
CO1 OI Understand the basic concepts of earth-fill dams and rock-fill dams and identify the site topography and foundations conditions CO2 CO2 CO2 CO2 CO3		CO4	CO2 1 1 - 3 1 CO3 1 1 1 2 1 CO4 2 - 2 2 1 1.
and rock-fill dams and identify the site topography and foundations conditions CO2 Course Outcomes with Outcomes: Course Out Compol PO2 PO3 PO4 PO5 CO1 1 1 1 1 1 1 CO2 1 2 2 3 CO3 1 2 2 2 2 CO4 1 3 3 CO5 2 1 1 2 2 CO6 1 2 3.		CO5	
CO2 Course Outcomes with Outcomes: Course Out CompO1 PO2 PO3 PO4 PO5 CO1 1 1 1 1 1 1 CO2 1 2 3 CO3 1 2 2 2 2 CO4 1 3 3 CO5 2 1 1 2 2 CO6 1 2 3.	EARTH AND ROCKFILL DAMS	CO1	
CO3 conditions Identify basic design requirements and		CO2	Course Outcomes with Outcomes: Course Out Come PO1 PO2 PO3 PO4 PO5 CO1 1 1 1 1 1 1 CO2 1 2 2 3 CO3 1 2 2 2 2 CO4 1 3 3 CO5 2 1 1 2 2 CO6 1 2 3.
		CO3	conditions Identify basic design requirements and

		causes of failures of dams, distinguish foundation types and the different fill materials.
	CO4	. Estimate seepage through dam sections, foundations and select core and shell materials.
	CO5	Understand and design the methods to control seepage through different units of dams.
a) URBAN HYDROLOGY	CO1	CO1 Basic concepts of Urban Hydrological cycle and effect of urbanization on .
*	CO2	Program Outcomes: Course Outcomes PO1 PO2 PO3 PO4 PO5 CO1 3 3 3 - 2 CO2 3 3 3 - 2 CO3 - 3 3 1 2 CO4 - 1 3 - 2 CO5 3 3 3 - 2 1. Slightly 2. Moderately 3. Detailed.
	CO3	. CO3 Knowledge about the methods of quantity estimation of storm water.
	CO4	Analyze the Infrastructure for storm water management.
×	· CO5	Explain about the Study the process of urbanization and its influence on urban hydrological processes and urban water supply system including, storm water modelling. Mapping of Course Outcomes.

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Program Outcomes

(Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 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.
- 6. 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.

7. Environment and sustainability: Understand the impact of the professional



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engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. 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 Educational Objectives (PEOs)

- 1. To make them ready for entrepreneurship and pursue higher education
- To develop the ability to think logically and understand real time problems solving them with latest technologies

Program Specific Outcomes (PSOs)

 Able to solve practical problems with new technologies, programming languages and open source platforms.

Make them ready to work and communicate effectively with professionals in various fields and pursue lifelong professional development in computing.



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CSE (AIML) Courses Outcomes

Course Name		Course Outcomes
	CO1	understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
	CO2	ask and answer general questions on familiar topics and introduce oneself/others
Subject: COMMUNICATIVE ENGLISH (HS1101)	CO3	employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
	CO4	recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
	CO5	form sentences using proper grammatical structures and correct word forms
	COI	utilize mean value theorems to real life problems
	CO2	solve the differential equations related to various engineering fields
Subject: MATHEMATICS-I	CO3	familiarize with functions of several variables which is useful in optimization
(BS1101)	CO4	apply double integration techniques in evaluating areas bounded by region
	CO5	students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems
Subject: APPLIED CHEMISTRY (BS1102)	CO1	Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.
	CO2	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.
	CO3	Synthesize nano materials for modern advances of engineering technology. Summarize the preparation of



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-	F	semiconductors; analyze the applications of liquid crystal and superconductors.
	CO4	Analyze the principles of different analytical instruments and their applications. Design models for energy by different natural sources.
	CO5	Obtain the knowledge of computational chemistry and molecular machines
	CO1	To write algorithms and to draw flowcharts for solving problems
	CO2	To convert flowcharts/algorithms to C Programs, compile and debug programs
Subject: PROGRAMMING	CO3	To use different operators, data types and write programs that use two-way/ multi-way selection
FOR PROBLEM SOLVING USING C (ES1101)	CO4	To select the best loop construct for a given problem
USING C (ESTIVI)	CO5	To design and implement programs to analyze the different pointer applications
	CO6	To decompose a problem into functions and to develop modular reusable code
	CO7	To apply File I/O operations
	CO1	Assemble and disassemble components of a PC
Subject: COMPUTER ENGINEERING	CO2	Construct a fully functional virtual machine, Summarize various Linux operating system commands,
WORKSHOP (ES1102)	CO3	Recognize characters & extract text from scanned image Create audio files and podcasts
Subject: APPLIED CHEMISTRY LAB (BS1103)	COI	The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.
Subject: PROGRAMMING FOR PROBLEM SOLVING USING C LAB (ES1103)	CO1	Gains Knowledge on various concepts of a C language.



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	CO2 Able to draw flowcharts and write algorithms.	
*	CO3 Able design and development of C problem solvi	ng skills.
	CO4 Able to design and develop modular programmin	g skills.
	CO5 Able to trace and debug a program	

B.Tech 2 nd Semester				
Course Name		Course Outcomes		
Subject: MATHEMATICS - II (BS1201)	CO1	develop the use of matrix algebra techniques that is needed by engineers for practical applications		
	CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel		
7.	CO3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms		
	CO4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals		
	CO5	apply numerical integral techniques to different Engineering problems		
44	CO6	apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations		
Subject: APPLIED PHYSICS (BS1202)	COI	Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)		
	CO2	Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2).		



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		Apply the fiber optic concepts in various fields (L3).
*	CO3	Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).
	CO4	Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices
	CO5	Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).
Subject: DIGITAL LOGIC DESIGN (ES1201)	CO1	An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
	CO2	An ability to understand the different switching algebra theorems and apply them for logic functions.
	CO3	An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
	CO4	Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.
	CO5	Students will be able to design various sequential circuit starting from flip-flop to registers and counter
Subject: PYTHON PROGRAMMING (ES1202)	CO1	Develop essential programming skills in computer programming concepts like data types, containers
Thousand,	CO2	Apply the basics of programming in the Python languag
	CO3	Solve coding tasks related conditional execution, loops



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	CO4	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
Subject: DATA STRUCTURES (CS1201)	CO1	Summarize the properties, interfaces, and behaviors of basic abstract data types
,	CO2	Discuss the computational efficiency of the principal algorithms for sorting & searching
	CO3	Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
	CO4	Demonstrate different methods for traversing trees
Subject: PYTHON	CO1	Write, Test and Debug Python Programs
PROGRAMMING LAB	CO2	Use Conditionals and Loops for Python Programs
(ES1203)	CO3	Use functions and represent Compound data using Lists, Tuples and Dictionaries
	CO4	Use various applications using python
Subject: DATA	COI	Use basic data structures such as arrays and linked list.
STRUCTURES LAB (CS1202)	CO2	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
	CO3	Use various searching and sorting algorithms.
Subject: CONSTITUTION OF INDIA (MC1201)	CO1	Understand historical background of the constitution making and its importance for building a democratic India.
	CO2	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary
	CO3	Understand the value of the fundamental rights and duties for becoming good citizen of India
	CO4	Analyze the decentralization of power between central state and local self-government.
	CO5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commissio and UPSC for sustaining democracy.
		 Know the sources, features and principles of Indian Constitution.
		Learn about Union Government, State government and its administration.
		3. Get acquainted with Local administration and



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Pachayati Raj.
 Be aware of basic concepts and developments of Human Rights.
Gain knowledge on roles and functioning of Election Commission

	B. T	ech 3 rd Semester
Course Name		Course Outcomes
Subject: MATHEMATICS - III	CO1	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO2	Estimate the work done against a field, circulation and flux using vector calculus
	CO3	Apply the Laplace transform for solving differential equations
9	CO4	Find or compute the Fourier series of periodic signals
	CO5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms
	CO6	Identify solution methods for partial differential equations that model physical processes
Subject: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	COI	Demonstrate skills in solving mathematical problems
	CO2	Comprehend mathematical principles and logic
	CO3	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software
	CO4	Manipulate and analyze data numerically and/or graphically using appropriate Software
	CO5	Communicate effectively mathematical ideas/results verbally or in writing
Subject: INTRODUCTION TO ARTIFICIAL	COI	Enumerate the history and foundations of Artificial Intelligence
	CO2	Apply the basic principles of AI in problem solving
INTELLIGENCE AND MACHINE LEARNING	CO3	Choose the appropriate representation of Knowledge
MACHINE BEAUTION	CO4	Enumerate the Perspectives and Issues in Machine Learning



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	CO5	Identify issues in Decision Tree Learning
Subject: OBJECT ORIENTED PROGRAMMING WITH JAVA	CO1	Able to realize the concept of Object Oriented Programming & Java Programming Constructs
PROGRAMMING WITH SAFA	CO2	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords
	CO3	Apply the concept of exception handling and Input/ Output operations
	CO4	Able to design the applications of Java & Java applet
	CO5	Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
Subject: DATABASE MANAGEMENT SYSTEMS	CO1	Describe a relational database and object-oriented database
1]#	CO2	Create, maintain and manipulate a relational database using SQL
	CO3	Describe ER model and normalization for database design
	CO4	Examine issues in data storage and query processing and can formulate appropriate solutions
	CO5	Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
Subject: INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING LAB	COI	Apply the basic principles of AI in problem solving using LISP/PROLOG
	CO2	Implement different algorithms using LISP/PROLOG
	CO3	Develop an Expert System using JESS/PROLOG
Subject: OBJECT ORIENTED PROGRAMMING WITH JAVA LAB	COI	Evaluate default value of all primitive data type, Operations, Expressions, Control-flow, Strings
	CO2	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism



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	CO3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
	CO4	Construct Threads, Event Handling, implement packages developing applets
Subject: DATABASE MANAGEMENT SYSTEMS LAB	CO1	Utilize SQL to execute queries for creating database and performing data manipulation operations
	CO2	Examine integrity constraints to build efficient databases
	CO3	Apply Queries using Advanced Concepts of SQL
	CO4	Build PL/SQL programs including stored procedures, functions, cursors and triggers
Subject: MOBILE APP DEVELOPMENT	CO1	Identify various concepts of mobile programming that make it unique from programming for other platforms
	CO2	Critique mobile applications on their design pros and cons
	CO3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces,
	CO4	Program mobile applications for the Android operating system that use basic and advanced phone features and
	CO5	Deploy applications to the Android marketplace for distribution
Subject: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE	CO1	Understand the significance of Indian Traditional Knowledge
	CO2	Classify the Indian Traditional Knowledge
	CO3	Compare Modern Science with Indian Traditional Knowledge system.
	CO4	Analyze the role of Government in protecting the Traditional Knowledge
	CO5	Understand the impact of Philosophical tradition on Indian Knowledge System.

	B.Tech 4th Semester	
Course Name	Course Outcomes	

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Subject: PROBABILITY AND STATISTICS	COI	Classify the concepts of data science and its importance
	CO2	Interpret the association of characteristics and through correlation and regression tools
	CO3	Make use of the concepts of probability and their applications
* 1	CO4	Apply discrete and continuous probability distributions
	CO5	Design the components of a classical hypothesis test
	CO6	Infer the statistical inferential methods based on small and large sampling tests
Subject: COMPUTER	CO1	Develop a detailed understanding of computer systems
ORGANIZATION	CO2	Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations
	CO3	Develop a detailed understanding of architecture and functionality of central processing unit
	CO4	Exemplify in a better way the I/O and memory organization
	CO5	Illustrate concepts of parallel processing, pipelining and inter processor communication
Subject: DATA	CO1	Summarize the architecture of data warehouse
WAREHOUSING AND MINING	CO2	Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data
	CO3	Construct a decision tree and resolve the problem of model over fitting
1.0	CO4	Compare Apriori and FP-growth association rule mining algorithms for frequent item set generation
	CO5	Apply suitable clustering algorithm for the given data set
Subject: FORMAL LANGUAGES AND AUTOMATA THEORY	COI	Classify machines by their power to recognize languages
	CO2	Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy
	CO3	Employ finite state machines to solve problems in computing
	CO4	Illustrate deterministic and non-deterministic machines



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	CO5	Quote the hierarchy of problems arising in the computer science
Subject: MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTANCY	CO1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product
PINANCIAL ACCOUNTANCE	CO2	The knowledge of understanding of the Input-Output- Cost relationships and estimation of the least cost combination of inputs
it.	CO3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledg of different Business Units
	CO4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
	CO5	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
Subject: R PROGRAMMING LAB	CO1	Implement basic concepts of R programming, and its different module that includes conditional, looping, lists, Strings, Functions, Frames, Arrays, and File 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.
7	CO4	Extend the functionality of R by using add-on packages
	CO5	Use R Graphics and Tables to visualize results of various statistical operations on data
Subject: DATA MINING USING	CO1	Apply preprocessing techniques on real world datasets
PYTHON LAB	CO2	Apply apriori algorithm to generate frequent item sets.
	CO3	Apply Classification and clustering algorithms on different datasets.
Subject: WEB APPLICATION	COI	Develop Single Page Applications
DEVELOPMENT LAB	CO2	Develop NodeJS & ReactJS Reusable Service
	CO3	Store the data in MySQL .
	CO4	Get acquainted with the latest web application

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		development trends in the IT industry
Subject: NATURAL LANGUAGE PROCESSING WITH PYTHON	COI	Explore natural language processing (NLP) libraries in Python
	CO2	Learn various techniques for implementing NLP including parsing & text processing
	CO3	Understand how to use NLP for text feature engineering

	B.T	ech 5 th Semester
Course Name		Course Outcomes
Subject: COMPILER DESIGN	CO1	Demonstrate phases in the design of compiler
	CO2	Organize Syntax Analysis, Top Down and LL(1) grammars
	CO3	Design Bottom Up Parsing and Construction of LR parsers
· a	-CO4	Analyze synthesized, inherited attributes and syntax directed translation schemes
	CO5	Determine algorithms to generate code for a target machine
Subject: OPERATING SYSTEMS	CO1	Describe various generations of Operating System and functions of Operating System
	CO2	Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance
	CO3	Solve Inter Process Communication problems using Mathematical Equations by various methods
	CO4	Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques
	CO5	Outline File Systems in Operating System like UNIX/Linux and Windows
Subject: MACHINE LEARNING	CO1	Explain the fundamental usage of the concept Machine Learning system
	CO2	Demonstrate on various regression Technique
	CO3	Analyze the Ensemble Learning Methods



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	.CO4	Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning.
	CO5	Discuss the Neural Network Models and Fundamentals concepts of Deep Learning
Subject: OPTIMIZATION IN OPERATIONS RESEARCH	CO1	State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.
	CO2	Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.
	CO3	Apply and Solve transportation and assignment problem by using Linear programming Simplex method.
X.	CO4	Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solutions
	CO5	Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
Subject: SOFTWARE ENGINEERING(Professional	-CO1	Ability to transform an Object-Oriented Design into high quality, executable code
Elective-I)	CO2	Skills to design, implement, and execute test cases at the Unit and Integration level
	CO3	Compare conventional and agile software methods
Subject: COMPUTER VISION (Professional Elective-I)	CO1	Identify basic concepts, terminology, theories, models and methods in the field of computer vision,
74	CO2	Describe known principles of feature detection and matching,
	CO3	Describe basic methods of computer vision related to image stitching, photography like high dynamic range imaging and blur removal.
	CO4	Suggest a design of a computer vision system for a 3D Reconstruction, Albedos, image based rendering views and depths.
Subject: DATA VISUALIZATION	CO1	Understand basics of Data Visualization
(Professional Elective-I)	-	Implement visualization of distributions



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	CO3	Write programs on visualization of time series, proportions & associations
	CO4	Apply visualization on Trends and uncertainty
	CO5	Explain principles of proportions
Subject: DevOps (Professional Elective-I)	COI	Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility
	CO2	Describe DevOps & DevSecOps methodologies and their key concepts
	CO3	Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models
	CO4	Set up complete private infrastructure using version control systems and CI/CD tools
9	CO5	Acquire the knowledge of maturity model, Maturity Assessment
Subject: OPERATING SYSTEMS & COMPILER DESIGN LAB	CO1	Implement various scheduling, page replacement algorithms and algorithms related to deadlocks
	CO2	Design programs for shared memory management and semaphores
	CO3	Determine predictive parsing table for a CFG
	CO4	Apply Lex and Yacc tools
	CO5	Examine LR parser and generating SLR Parsing table
Subject: MACHINE LEARNING LAB	COI	Implement procedures for the machine learning algorithms
	CO2	Design and Develop Python programs for various Learning algorithms
	CO3	Apply appropriate data sets to the Machine Learning algorithms
	CO4	Develop Machine Learning algorithms to solve real world problems
Subject: CONTINUOUS	CO1	Understand the why, what and how of DevOps adoption



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INTEGRATION AND CONTINUOUS DELIVERY USING DevOps (Skill	CO2	Attain literacy on Devops
Oriented Course III)	CO3	Align capabilities required in the team
	CO4	Create an automated CICD pipeline using a stack of tools
Subject: EMPLOYABILITY SKILLS-I	COI	Understand the corporate etiquette.
it.	CO2	Make presentations effectively with appropriate body language
	CO3	Be composed with positive attitude
	CO4	Understand the core competencies to succeed in professional and personal life
Subject: MACHINE LEARNING(MINOR COURSE)	CO1	Implement procedures for the machine learning algorithms
	CO2	Design and Develop Python programs for various Learning algorithms
	CO3	Apply appropriate data sets to the Machine Learning algorithms
	CO4	Develop Machine Learning algorithms to solve real world problems

	B.Te	ech 6th Semester		
Course Name		Course Outcomes		
Subject: COMPUTER NETWORKS	COI	Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards.		
	CO2	Discuss different transmission media and different switching networks.		
19	CO3	Analyze data link layer services, functions and protocols like HDLC and PPP.		
	CO4	Compare and Classify medium access control protocol like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling Token passing, FDMA, TDMA, CDMA protocols		
	CO5	Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.		

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Subject: DEEP LEARNING	CO1	Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning
	CO2	Discuss the Neural Network training, various random models.
	CO3	Explain the Techniques of Keras, TensorFlow, Theano and CNTK
	CO4	Classify the Concepts of CNN and RNN
	CO5	Implement Interactive Applications of Deep Learning.
Subject: DESIGN AND ANALYSIS OF ALGORITHMS	COI	Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms
	CO2	List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method
	CO3	Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.
	CO4	Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches
	CO5	Demonstrate NP- Completeness theory ,lower bound theory and String Matching
Subject: SOFTWARE PROJECT MANAGEMENT	CO1	Apply the process to be followed in the software development life-cycle models
(Professional Elective-II)	CO2	Apply the concepts of project management & planning
	CO3	Implement the project plans through managing people, communications and change
	CO4	Conduct activities necessary to successfully complete and close the Software projects
	CO5	Implement communication, modeling, and construction & deployment practices in software development
Subject: DISTRIBUTED SYSTEMS (Professional Elective-II)	CO1	Elucidate the foundations and issues of distributed systems
	CO2	Illustrate the various synchronization issues and global state for distributed systems
	CO3	Illustrate the Mutual Exclusion and Deadlock detection algorithms in distributed systems



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	CO4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems
	CO5	Describe the features of peer-to-peer and distributed shared memory systems
Subject: INTERNET OF THINGS (Professional Elective-II)	COI	Review Internet of Things (IoT)
	CO2	Demonstrate various business models relevant to IoT.
	CO3	Construct designs for web connectivity
	- CO4	Organize sources of data acquisition related to IoT, integrate to enterprise systems.
	CO5	Describe IoT with Cloud technologies.
Subject: NETWORK PROGRAMMING (Professional Elective-II)	CO1	Identifying different models and sockets
	CO2	Demonstrate different TCP Echo server functions and I/O models
	CO3	Rationalize IPV4 and IPV6 Socket options
	CO4	Identifying daemon processing and Advanced input and output functions
	CO5	Analyze Broadcasting and multicasting
Subject: MEAN STACK	COI	Build static web pages using HTML 5 elements.
DEVELOPMENT (Job Oriented Course)	CO2	Apply JavaScript to embed programming interface for web pages and also to perform Client side validations
	CO3	Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js
	.CO4	Develop JavaScript applications using typescript and work with document database using MongoDB
	CO5	Utilize Angular JS to design dynamic and responsive web pages.
Subject: COMPUTER NETWORKS LAB	CO1	Know how reliable data communication is achieved through data link layer.
	CO2	Suggest appropriate routing algorithm for the network
	CO3	Provide internet connection to the system and its installation.
	CO4	Work on various network management tools
Subject: ALGORITHMS FOR	COI	Analyze the program execution time



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EFFICIENT CODING LAB		
Subject: DEEP LEARNING WITH TENSORFLOW	CO1	Implement deep neural networks to solve real world problems
	CO2	Choose appropriate pre-trained model to solve real time problem
	CO3	Interpret the results of two different deep learning models
Subject: MEAN STACK TECHNOLOGIES-MODULE I- HTML 5, JAVASCRIPT, NODE.JS, EXPRESS.JS, AND TYPESCRIPT (Skill Oriented Course)	COI	Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles.
	CO2	Utilize JavaScript for developing interactive HTML web pages and validate form data.
	CO3	Build a basic web server using Node.js and also working with Node Package Manager (NPM).
	CO4	Build a web server using Express.js
	CO5	Make use of Typescript to optimize JavaScript code by using the concept of strict type checking.
Subject: BIG DATA : APACHE SPARK (Skill Oriented Course)	CO1	Develop Map Reduce Programs to analyze large dataset Using Hadoop and Spark
	CO2	Write Hive queries to analyze large dataset Outline the Spark Ecosystem and its components
	CO3	Perform the filter, count, distinct, map, flatMap RDD Operations in Spark.
	CO4	Build Queries using Spark SQL
	CO5	Apply Spark joins on Sample Data Sets
	CO6	Make use of sqoop to import and export data from hadoop to database and vice-versa
Subject: EMPLOYABILITY SKILLS-II	COI	Solve various Basic Mathematics problems by following different methods
	CO2	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems
	CO3	Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
	CO4	Analyze, summarize and present information in

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		quantitative forms including table, graphs and formulas
Subject: DEEP LEARNING(MINOR COURSE)	CO1	Implement deep neural networks-to solve real world problems
	CO2	Choose appropriate pre-trained model to solve real time problem
	CO3	Interpret the results of two different deep learning models

B.Tech 7th Semester		
Course Name	Course Outcomes	
Subject: REINFORCEMENT LEARNING (Professional Elective-III)	COI	Understand basic concepts of Reinforcement learning
	CO2	Identifying appropriate learning tasks for Reinforcement learning techniques
	CO3	Understand various methods and applications of reinforcement learning
Subject: SOFT COMPUTING (Professional Elective-III)	CO1	Able to apply fuzzy logic and reasoning to handle uncertainty in engineering problems Make use of genetic algorithms to combinatorial optimization problems
	CO2	Apply artificial intelligence techniques, including search heuristics, knowledge representation, planning and reasoning.
	CO3	Learn and apply the principles of self adopting and self organizing neuro fuzzy inference systems
	CO4	Evaluate and compare solutions by various soft computing approaches for a given problem
Subject: CRYPTOGRAPHY AND NETWORK SECURITY (Professional Elective-III)	CO1	Explain different security threats and countermeasures and foundation course of cryptography mathematics.
	CO2	Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography
	CO3	Revise the basic principles of Public key algorithms and Working operations of some Asymmetric key algorithms such as RSA, ECC and some more
	CO4	Design applications of hash algorithms, digital signatures and key management techniques



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	CO5	Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL, TSL, and IPsec.
Subject: BLOCK CHAIN TECHNOLOGIES (Professional Elective-III)	CO1	Demonstrate the block chain basics, Crypto currency
	CO2	To compare and contrast the use of different private vs. public block chain and use cases
	CO3	Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins
	CO4	Classify Permission Block chain and use cases – Hyper ledger, Corda
	CO5	Make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems and others
Subject: SPEECH PROCESSING (Professional Elective-III)	CO1	Understand the speech production and perception process.
	CO2	Analyze speech signals in time and frequency domain.
	CO3	Design and implement algorithms for processing speech signals.
Subject: ROBOTIC PROCESS AUTOMATION (Professional Elective-IV)	COI	Describe RPA, where it can be applied and how it's implemented
	CO2	Describe the different types of variables, Control Flow and data manipulation techniques.
	CO3	Identify and understand Image, Text and Data Tables Automation.
	CO4	Describe how to handle the User Events and various types of Exceptions and strategies
	CO5	Understand the Deployment of the Robot and to maintain the connection.
Subject: CLOUD COMPUTING (Professional Elective-IV)	COI	Illustrate the key dimensions of the challenge of Cloud Computing
	CO2	Classify the Levels of Virtualization and mechanism of tools.
	CO3	Analyze Cloud infrastructure including Google Cloud and Amazon Cloud.
***	CO4	Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud



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3	CO5	Assess control storage systems and cloud security, the risks involved its impact and develop cloud application
Subject: BIG DATA ANALYTICS (Professional Elective-IV)	CO1	Illustrate big data challenges in different domains including social media, transportation, finance and medicine
	CO2	Use various techniques for mining data stream
	CO3	Design and develop Hadoop
	CO4	Identify the characteristics of datasets and compare the trivial data and big data for various applications
	CO5	Explore the various search methods and visualization techniques
Subject: NOSQL DATABASES (Professional Elective-IV)	CO1	Discuss about Aggregate Data Models
	CO2	Explain about Master-Slave Replication, Peer-to-Peer Replication
	· CO3	Describe the Structure of Data, Scaling, Suitable Use Cases
	CO4	Make use of Complex Transactions Spanning Different Operations
	CO5	Identify Routing, Dispatch and Location-Based Services
Subject: VIDEO ANALYTICS (Professional Elective-IV)	CO1	Design video analytic algorithms for security applications
	CO2	Design video analytic algorithms for business intelligence
	CO3	Design custom made video analytics system for the given target application
Subject: SOCIAL NETWORK ANALYSIS (Professional Elective- V)	CO1	Know basic notation and terminology used in network science
	CO2	Be able to visualize, summarize and compare networks
	CO3	Illustrate basic principles behind network analysis algorithms
	- CO4	Develop practical skills of network analysis in R programming language
	CO5	Be capable of analyzing real work networks



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Subject: RECOMMENDER SYSTEMS (Professional Elective-	CO1	Understand the basic concepts of recommender systems
v)	CO2	Carry out performance evaluation of recommender systems based on various metrics
	CO3	Implement machine-learning and data-mining algorithms in recommender systems data sets.
	CO4	Design and implement a simple recommender system.
Subject: AI CHATBOTS (Professional Elective-V)	COI	Develop an in-depth understanding of conversation design, including on boarding, flows, utterances, entities, and personality.
	CO2	Design, build, test, and iterate a fully-functional, interactive chatbot using a commercial platform.
	CO3	Deploy the finished chatbot for public use and interaction.
Subject: OBJECT ORIENTED ANALYSIS AND DESIGN	CO1	Analyze the nature of complex system and its solutions.
(Professional Elective-V)	CO2	Illustrate & relate the conceptual model of the UML, identify & design the classes and relationships
	CO3	Analyze &Design Class and Object Diagrams that represent Static Aspects of a Software System and apply basic and Advanced Structural Modeling Concepts for designing real time applications
	CO4	Analyze & Design behavioral aspects of a Software System using Use Case, Interaction and Activity Diagrams.
	CO5	Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.
Subject: SEMANTIC WEB (Professional Elective-V)	CO1	Demonstrate social network analysis and measures.
	CO2	Analyze random graph models and navigate social networks dat
	CO3	Apply the network topology and Visualization tools.
	CO4	Analyze the experiment with small world models and clustering model
	CO5	Compare the application driven virtual communities from social network Structure.
Subject: API AND	CO1	Develop a Spring Data JPA application with Spring

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MICROSERVICES (Job Oriented		Boot
Course)	CO2	Implement CRUD operations using Spring Data JPA
	CO3	Implement pagination and sorting mechanism using Spring Data JPA
	CO4	Implement query methods for querying the database using Spring Data JPA
	CO5	Implement a custom repository to customize a querying mechanism using Spring Data JPA
	CO6	Understand update operation using query approaches in Spring Data JPA
	CO7	Implement Spring Transaction using Spring Data JPA
	CO8	Develop RESTful endpoints using Spring REST Processing URI parameters
	CO9	Write RESTful services using Spring REST that consumes and produces data in different formats
	CO10	Handle exceptions and errors in Spring REST endpoints
ia.	CO11	Write Spring based REST clients to consume RESTful services programmatically
	CO12	Create secure RESTful endpoints using Spring Security Document and version the Spring REST endpoints Implement CORS in a Spring REST application
Subject: SECURE CODING TECHNIQUES (Job Oriented Course)	COI	Differentiate the objectives of information security
	CO2	Understand the trend, reasons and impact of the recent Cyber attacks
	CO3	Understand OWASP design principles while designing a web application
	CO4	Understand Threat modelling
	CO5	Importance of security in all phases of SDLC
	CO6	Write secure coding using some of the practices in C/C++/Java and Python programming languages
Subject: UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY	COI	By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping

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NG.		human relationships and human nature in mind. They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). 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. This is only an introductory foundational input. It would be desirable to follow it up by a) faculty-student or mentor-mentee programs throughout their time with the institution b) Higher level courses on human values in every
Subject: MEAN STACK TECHNOLOGIES-MODULE II- ANGULAR JS AND MONGODB (Skill Oriented Course)	CO1	aspect of living. E.g. as a professional Build a component-based application using Angular components and enhance their functionality using
	CO2	Utilize data binding for developing Angular forms and bind them with model data.
	CO3	Apply Angular built-in or custom pipes to format the rendered data.
	CO4	Develop a single page application by using synchronous or asynchronous Angular routing.
. 2)	. CO5	Make use of MongoDB queries to perform CRUD operations on document database.
Subject: REINFORCEMENT	CO1	Understand basic concepts of Reinforcement learning
LEARNING(MINOR COURSE)	CO2	Identifying appropriate learning tasks for Reinforcement learning techniques
	CO3	Understand various methods and applications of reinforcement learning



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Program Outcomes

(Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 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.
- 6. 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.
- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate



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the knowledge of, and need for sustainable development.

- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. 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 Educational Objectives (PEOs)

- 1. To make them ready for entrepreneurship and pursue higher education
- To develop the ability to think logically and understand real time problems solving them with latest technologies

Program Specific Outcomes (PSOs)

- Able to solve practical problems with new technologies, programming languages and open source platforms.
- Make them ready to work and communicate effectively with professionals in various fields and pursue lifelong professional development in computing.

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CSE -Data Science Course Outcomes

Course Name	1	Course Outcomes
Course Name	CO1	Facilitate effectivelisteningskillsfor better comprehensionofacademic lecturesandEnglishspokenbynativespeakers
	CO2	Focusonappropriatereadingstrategiesforcomprehens ionofvariousacademictextsandauthenticmaterials
Subject: Communicative English(HS1101)	·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.
Subject:Mathematics – I (BS1101)	CO1	Utilize mean value theorems to real life problems (L3)
	CO2	Solve the differential equations related to various engineering fields (L3)
	CO3	Familiarize with functions of several variables which is useful in optimization (L3)
	CO4	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems(L5)
	CO5	Apply double integration techniques in evaluating areas bounded by region (L3)
Subject:Applied Chemistry(BS1102)	CO1	Analyzethedifferent types of compositeplasticmaterials and interpretthemechanismofconductioniAnalyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.



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	CO2	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.
	CO3	Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.
à.	CO4	Analyze the principles of different analytical instruments and their applications.
	CO5	Obtain the knowledge of computational chemistry and molecular machines
	CO1	To write algorithms and to draw flowcharts for solving problems
	CO2	To convert flowcharts/algorithms to C Programs, compile and debug programs
Subject:Programming for	CO3	To use different operators, data types and write programs that use two-way/ multi-way selection.
Problem Solving using C (ES1101)	CO4	To select the best loop construct for a given problem
(ESTIVI)	CO5	To decompose a problem into functions and to develop modular reusable code
	CO6	To apply File I/O operations
	CO7	To design and implement programs to analyze the different pointer applications
Subject: Computer Engineering Workshop (ES1102)	COI	Assembleand disassemblecomponents of a PC
	CO2	Construct a fully functional virtual machine, Summarize various Linux operating system commands,.
	CO3	Recognize characters & extract text from scanned images, Create audio files and podcasts

Subject: Programming for Problem Solving using C	CO1	To write algorithms and to draw flowcharts for solving problems
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Lab (ES1103)	CO2	To convert flowcharts/algorithms to C Programs, compile and debug programs
	CO3	To use different operators, data types and write programs that use two-way/ multi-way selection
	CO4	To select the best loop construct for a given problem
	CO5	To design and implement programs to analyze the different pointer applications
	C06	To decompose a problem into functions and to develop modular reusable code
	CO7	To apply File I/O operations

B.Tech2 nd Sem			
Course Name	Course Outcomes		
MATHEMATICS - II (BS1201)	CO1	 develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6). 	
	CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel (L3).	
	CO3	. evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5).	
	CO4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3).	
	CO5	apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3).	
APPLIED PHYSICS (BS1202)	COI	 Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2). 	
	CO2	Explain various types of emission of radiation (L2), Identify the role of laser in engineering applications	



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		(L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).
	CO3	. Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).
	CO4	. Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2). Apply the concept of magnetism to magnetic devices (L3).
	CO5	Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissner's effect (L2). Explain Meissner's effect, BCS theory & Josephson effect in superconductors (L2).
DIGITAL LOGIC DESIGN (ES1201)	CO1	An ability to define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
	CO2	An ability to understand the different switching algebra theorems and apply them for logic functions.
	CO3	. An ability to define the Karnaugh map for a few variables and perform an algorithmic reduction of logic functions.
	CO4	Students will be able to design various logic gates starting from simple ordinary gates to complex programmable logic devices & arrays.



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	CO5	Students will be able to design various sequential circuit starting from flip-flop to registers and counters.
PYTHON PROGRAMMING (ES1202)	CO1	Develop essential programming skills in computer programming concepts like data types, containers .
15.	CO2	Apply the basics of programming in the Python language.
	CO3	Solve coding tasks related conditional execution, loops
	CO4	Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming.
DATA STRUCTURES (CS1201)	CO1	 Summarize the properties, interfaces, and behaviors of basic abstract data types.
	CO2	Discuss the computational efficiency of the principal algorithms for sorting & searching.
	CO3	Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs.
	CO4	Demonstrate different methods for traversing trees.
PYTHON PROGRAMMING LAB	COI	Write, Test and Debug Python Programs .
	CO2	Use Conditionals and Loops for Python Programs.
	CO3	Use functions and represent Compound data using Lists Tuples and Dictionaries.
	CO4	Use various applications using python.
DATA STRUCTURES LAB	001	. Use basic data structures such as arrays and linked list
(CS1202)	CO1	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths
	соз	Use various searching and sorting algorithms.
		,

Visilars



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(MC1201)		making and its importance for building a democratic India.
	CO2	Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
	CO3	. Understand the value of the fundamental rights and duties for becoming good citizen of India.
	CO4	. Analyze the decentralization of power between central, state and local self-government.
	and Union Get a Be av 5. Ga	Apply the knowledge in strengthening of constitutional institutions like CAG, Election Commission JPSC for sustaining democracy. 1. Know the sources, res and principles of Indian Constitution. 2. Learn about a Government, State government and its administration. 3. equainted with Local administration and Panchayati Raj. 4 ware of basic concepts and developments of Human Rights in knowledge on roles and functioning of Election mission

B. Tech 3 rd Sem		
Course Name		Course Outcomes
MATHEMATICS - III	CO1	 Interpret the physical meaning of different operators such as gradient, curl and divergence (L5).
	CO2	Estimate the work done against a field, circulation and flux using vector calculus (L5).
	CO3	Apply the Laplace transform for solving differential equations (L3).
ia I	CO4	. Find or compute the Fourier series of periodic signals (L3).
	CO5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non-periodic waveforms (L3).
	CO1	Demonstrate skills in solving mathematical problems.



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MATHEMATICAL FOUNDATIONS OF		Comprehend mathematical principles and logic.
COMPUTER SCIENCE	CO3	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software.
	CO4	Manipulate and analyze data numerically and/or graphically using appropriate Software.
	CO5	Communicate effectively mathematical ideas/results verbally or in writing.
FUNDAMENTALS OF DATA SCIENCE	CO1	Apply principles of NumPy and Pandas to the analysis of data
	CO2	Make use of various file formats in loading and storage of data.
	CO3	Identify and apply the need and importance of pre- processing techniques.
	CO4	Show the results and present them in a pictorial format.
	COI	Describe a relational database and object-oriented database
DATABASE MANAGEMENT SYSTEMS	CO2	Create, maintain and manipulate a relational database using SQL.
	CO3	Describe ER model and normalization for database design.
	CO4	Examine issues in data storage and query processing and car formulate appropriate solutions.
4	CO5	Examine issues in data storage and query processing and can formulate appropriate solutions
	CO1	Perform various operations on NumPy.
FUNDAMENTALS OF DATA SCIENCE(LAB)	CO2	Importing data from different file formats using pandas.
	CO3	. Draw different types of charts using matplotlib.

	Evaluate default value of all primitive data type, Operations, Expressions, Control-flow, Strings
4	PASULON

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OBJECT ORIENTED PROGRAMMING WITH JAVA LAB	CO2	. Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism.
	.CO3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
DATABASE MANAGEMENT SYSTEMS LAB	COI	Utilize SQL to execute queries for creating database and performing data manipulation operations.
	CO2	Examine integrity constraints to build efficient databases.
	CO3	Apply Queries using Advanced Concepts of SQL.
	CO4	Build PL/SQL programs including stored procedures, functions, cursors and triggers.
(4)		
	CO1	Identify various concepts of mobile programming that make it unique from programming for other platforms .
MOBILE APP	CO2	Critique mobile applications on their design pros and cons
DEVELOPMENT	CO3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
	CO4	. Program mobile applications for the Android operating system that use basic and advanced phone features and.
	CO5	Deploy applications to the Android marketplace for distribution.
	COI	Understand the significance of Indian Traditional Knowledge.
ESSENCE OF INDIAN	CO2	Classify the Indian Traditional Knowledge.
TRADITIONAL KNOWLEDGE	CO3	. Compare Modern Science with Indian Traditional Knowledge system.
	CO4	Analyze the role of Government in protecting the Traditional Knowledge.
	CO5	Understand the impact of Philosophical tradition on Indian Knowledge System.

B.Tech4thSem		
Course Name	Course Outcomes	

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PROBABILITY AND STATISTICS	CO1	. Classify the concepts of data science and its importance .
	CO2	Interpret the association of characteristics and through correlation and regression tools.
	CO3	. Make use of the concepts of probability and their applications.
	CO4	Apply discrete and continuous probability distributions.
*	CO5	Infer the statistical inferential methods based on small and large sampling tests.
COMPUTER ORGANIZATION	CO1	.• Develop a detailed understanding of computer .
	CO2	Cite different number systems, binary addition and subtraction, standard, floating-point, and micro operations.
	CO3	Develop a detailed understanding of architecture and functionality of central processing unit.
	CO4	Exemplify in a better way the I/O and memory organization.
	CO5	Illustrate concepts of parallel processing, pipelining and inter processor communication.
DATA WAREHOUSING AND MINING	CO1	Summarize the architecture of data warehouse.
	CO2	Apply different preprocessing methods, Similarity, Dissimilarity measures for any given raw data.
	CO3	Construct a decision tree and resolve the problem of model over fitting.
	CO4	Compare Apriorism and FP-growth association rule mining algorithms for frequent item set generation.
	CO5	Apply suitable clustering algorithm for the given data set.
so treferino es necessos traceras	COI	Classify machines by their power to recognize languages.
FORMAL LANGUAGES AND AUTOMATA THEORY	CO2	Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy.
	CO3	Employ finite state machines to solve problems in computing.
	CO4	Illustrate deterministic and non-deterministic machines.
	CO5	Quote the hierarchy of problems arising in the computer science.



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MANAGERIAL ECONOMICS AND FINANCIAL	CO1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
ACCOUNTANCY	CO2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
	CO3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
2	CO4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
	CO5	. The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
R PROGRAMMING LAB	CO1	Implement basic concepts of R programming, and its different module that includes conditional, looping, lists, Strings, Functions, Frames, Arrays, and File programming.
P.	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 results of various statistical operations on data.
DATA MINING USING PYTHON LAB	CO1	. Apply preprocessing techniques on real world
	CO2	. Apply apriorism algorithm to generate frequent itemset
	соз	Apply Classification and clustering algorithms on different datasets.
	COI	Develop Single Page Applications
WEB APPLICATION DEVELOPMENT LAB	CO2	Develop NodeJS & ReactJS Reusable Service • Store the data in MySQL.

MS Clove



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	CO3	Get acquainted with the latest web application development trends in the IT industry
		19
MONGO DB	CO1	. Installing and configuring mongo DB in windows
	CO2	Perform all database operations using MongoDB.
	CO3	Develop applications by integrating mongo DB with java/PHP.

	FAF	B.Tech5 th Sem		
Course Name		Course Outcomes		
COMPILER DESIGN	CO1	Demonstrate phases in the design of compiler.		
	CO2	Organize Syntax Analysis, Top Down and LL(1) grammars.		
	CO3	Design Bottom Up Parsing and Construction of LR parsers		
	CO4	Analyze synthesized, inherited attributes and syntax directed translation schemes.		
	CO5	Determine algorithms to generate code for a target machine.		
OPERATING SYSTEMS	COI	Describe various generations of Operating System and functions of Operating System.		
	CO2	. Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance.		
	CO3	Solve Inter Process Communication problems using Mathematical Equations by various methods.		
	CO4	Compare various Memory Management Schemes especially paging and Segmentation in Operating System		



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Systems in Operating System like and Windows. Fundamental usage of the concept Machine tem. on various regression Technique. Ensemble Learning Methods • Illustrate the echniques and Dimensionality Reduction achine Learning. Neural Network Models and Fundamentals Deep Learning. Fundamental usage of the concept Machine tem.
tem. on various regression Technique. Ensemble Learning Methods • Illustrate the echniques and Dimensionality Reduction achine Learning. Neural Network Models and Fundamentals Deep Learning. fundamental usage of the concept Machine tem. mulate the optimization problem, without and
Ensemble Learning Methods • Illustrate the echniques and Dimensionality Reduction achine Learning. Neural Network Models and Fundamentals Deep Learning. Fundamental usage of the concept Machine term. mulate the optimization problem, without and
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ints, by using design variables from an design problem. optimal solution.
cal optimization techniques to minimize or multi-variable objective function, without or ints, and arrive at an optimal solution.
olve transportation and assignment problem by programming Simplex method
ent and non-gradient methods to nonlinear problems and use interior or exterior penalty the constraints to derive the optimal solutions
I apply Dynamic programming technique to trol, production planning, engineering design to reach a final optimal solution from the al solution.
nsform an Object-Oriented Design into high autable code.
ign, implement, and execute test cases at the egration level.
nventional and agile software methods.
tra kec les Inte

PRSUPA



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OBJECT ORIENTED ANALYSIS AND DESIGN (Professional Elective-I)	CO1	Analyze the nature of complex system and its solutions.
	CO2	Illustrate & relate the conceptual model of the UML, identify & design the classes and relationships.
	CO3	Analyze &Design Class and Object Diagrams that represent Static Aspects of a Software System and apply basic and Advanced Structural Modeling Concepts for designing real time applications.
	CO4	Analyze & Design behavioral aspects of a Software System using Use Case, Interaction and Activity Diagrams.
	CO5	Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.
DevOps (Professional Elective-I)	CO1	Enumerate the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility.
	CO2	. Describe DevOps & Dev SecOps methodologies and their key concepts.
	CO3	Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models.
	CO4	Set up complete private infrastructure using version control systems and CI/CD tools.
	CO5	Acquire the knowledge of maturity model, Maturity Assessment.
1	CO1	Review Internet of Things (IoT).
INTERNET OF THINGS		
(Professional Elective-I)	CO2	Demonstrate various business models relevant to IoT.
	CO3	Construct designs for web connectivity.
	CO4	Organize sources of data acquisition related to IoT, integrate to enterprise systems.
OPERATING SYSTEMS &	CO5	Describe IoT with Cloud technologies.
COMPILER DESIGN LAB	COI	Implement various scheduling, page replacement algorithms and algorithms related to deadlocks.
	CO2	Design programs for shared memory management and



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		semaphores.
	CO3	Determine predictive parsing table for a CFG.
	CO4	Apply Lex and Yuck tools
X.	CO5	Examine LR parser and generating SLR Parsing table.
	CO5	Describe IoT with Cloud technologies.

MACHINE LEARNING LAB	COI	Implement procedures for the machine learning algorithms
	CO2	. Design and Develop Python programs for various Learning algorithms.
*	CO3	Apply appropriate data sets to the Machine Learning algorithms.
	CO4	Develop Machine Learning algorithms to solve real world problems.
CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY USING DevOps	COI	Understand the why, what and how of DevOps adoption.
	CO2	Attain literacy on DeVos.
	CO3	Align capabilities required in the team.
	CO4	. Create an automated CICD pipeline using a stack of tools.
HELICAL INSIGHT (Skill Oriented Course III)	CO1	develop data analysis on top of your data and embed it .
	CO2	support better business decision-making.
	CO3	implement their own custom business processes very easily.
EMPLOYABILITY SKILLS-I	COI	. Understand the corporate etiquette.
a a	CO2	. Make presentations effectively with appropriate body language.
	CO3	. Be composed with positive attitude.
DATA WAREHOUSING AND	COI	Design a data mart or data warehouse for any organization



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DATA MINING(Minor course)	CO2	Extract knowledge using data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques.
	CO3	Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification for realistic data.
	CO4	Implement and Analyze on knowledge flow application on data sets and Apply the suitable visualization techniques to output analytical results.

	1	B.Tech6 th Sem		
Course Name		Course Outcomes		
COMPUTER NETWORKS	CO1	Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards.		
	CO2	Discuss different transmission media and different switching networks.		
¥	CO3	Analyze data link layer services, functions and protocols like HDLC and PPP.		
	CO4	. Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols		
	CO5	Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.		
BIG DATA ANALYTICS	CO1	Illustrate big data challenges in different domains including social media, transportation, finance and medicine t		
	CO2	Use various techniques for mining data stream.		



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*	CO3	Design and develop Hadoop.
	CO4	Identify the characteristics of datasets and compare the trivial data and big data for various applications.
	CO5	 Explore the various search methods and visualization techniques.
DESIGN AND ANALYSIS OF ALGORITHMS	COI	Analyze the performance of a given algorithm, denote it time complexity using the asymptotic notation for recursive and non-recursive algorithms.
	CO2	 List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method.
	CO3	Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.
*	CO4	Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches.
	CO5	Demonstrate NP- Completeness theory ,lower bound theory and String Matching.
DEEP LEARNING (Professional Elective-II)	CO1	Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning.
	CO2	Discuss the Neural Network training, various random models.
	CO3	Explain the Techniques of Kera's, TensorFlow, Theano and CNTK.
	CO4	Classify the Concepts of CNN and RNN.
	CO5	Implement Interactive Applications of Deep Learning
SOFTWARE PROJECT MANAGEMENT	CO1	Apply the process to be followed in the software development life-cycle models.
(Professional Elective-II)	CO2	Apply the concepts of project management & planning.
	CO3	Implement the project plans through managing people, communications and change.
	CO4	Conduct activities necessary to successfully complete and close the Software projects.
	CO5	Implement communication, modeling, and construction & deployment practices in software development.



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DISTRIBUTED SYSTEMS (Professional Elective-II)	COI	Elucidate the foundations and issues of distributed systems.
	CO2	Illustrate the various synchronization issues and global state for distributed systems.
	CO3	Illustrate the Mutual Exclusion and Dead lock detection algorithms in distributed systems.
	CO4	systems Describe the agreement protocols and fault tolerance mechanisms in distributed systems.
,	CO5	Describe the features of peer-to-peer and distributed shared memory systems.
DATA WRANGLING IN	CO1	Identify and execute the basic data format.
DATA SCIENCE (Professional Elective-II)	CO2	. Perform the computations with Excel and pdf files.
(Froiessional Elective-II)	CO3	Understand the concepts of data cleanup.
	CO4	Explore and analyze the Image and video data.
	CO5	Understand the concepts web scraping.
ETL PRINCIPLES	CO1	Understand the basic principles of ETL.
(Professional Elective-II)s	CO2	Understand various processes like extraction, cleaning, conforming etc.
		*
MEAN STACK	CO1	Build static web pages using HTML 5 elements.
DEVELOPMENT (Job Oriented Course)	CO2	 Apply JavaScript to embed programming interface for web pages and also to perform Client side validations.
	CO3	Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js.
	CO4	Develop JavaScript applications using typescript and wor with document database using MongoDB.
	CO5	Utilize Angular JS to design dynamic and responsive web pages.
COMPUTER NETWORKS	CO1	end of the course student will be able to .
LAB	CO2	Know how reliable data communication is achieved through data link layer.



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	CO3	Suggest appropriate routing algorithm for the network.
	CO4	Provide internet connection to the system and its installation.
	CO5	Work on various network management tools.
DEEP LEARNING WITH TENSORFLOW	CO1	Implement deep neural networks to solve real world problems .
	CO2	Choose appropriate pre-trained model to solve real time problem.
	CO3	Interpret the results of two different deep learning models.
ETL DESIGN	CO1	Develop various applications for ETL with Spark.
PROCEDURES-SPARK (Skill Oriented Course)	001	
EMPLOYABILITY SKILLS-II	CO1	. Solve various Basic Mathematics problems by following different methods .
	CO2	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems.
	CO3	Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as wel as personal life.
	CO4	Analyze, summarize and present information in quantitative forms including table, graphs and formulas.
DATA SCIENCE APPLICATIONS	COI	Apply principles of NumPy and Pandas to the analysis of data.
±1	CO2	Make use of various file formats in loading and storage of data.
	CO3	Identify and apply the need and importance of pre- processing techniques.
		Show the results and present them in a pictorial format.



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		B.Tech7 th Sem
Course Name		Course Outcomes
Reinforcement Learning (Professional Elective-III)	CO1	Understand basic concepts of Reinforcement learning
	CO2	Identifying appropriate learning tasks for Reinforcement learning techniques.
	CO3	Understand various methods and applications of reinforcement learning.
Nature Inspired Computing Techniques (Professional	CO1	Understand the strengths, weaknesses and appropriateness of nature-inspired algorithms
Elective-III)	CO2	Apply nature-inspired algorithms to optimization, desig and learning problems.
Social Media Analytics (Professional Elective-III)	CO1	Understand social media categories and types of social media analytics.
	CO1	
		Charlia the impact of social media analytics
		integration with and affects other areas of business.
*		
Block Chain Technologies	COI	
Block Chain Technologies (Professional Elective-III)		integration with and affects other areas of business.
일었다. 하일 하기 있다면 하는 것 같아요. 그렇게 하게 하게 하는 것이 없는 것 같아. 그리고 하는 것 같아요. 그리고 하는 것 같아. 그리고 하는 것 같아. 그리고 하는 것 같아. 그리고 하는 것 같아.	COI	Demonstrate the block chain basics, Crypto currency. To compare and contrast the use of different private vs.



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		ledger, Corda.
	CO5	Make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems and other.
SnowFlake Cloud Analytics	COI	Load & transform data in Snowflake.
(Professional Elective-IV)	CO2	scale virtual warehouses for performance and concurrency.
	CO3	share data and work with semi-structured data.
	CO4	gain a thorough knowledge of query constructs, DDL & DML operations, managing and monitoring Snowflake accounts and Snowflake's continuous data protection methods.
Cloud Computing (Professional Elective-IV)	CO1	Illustrate the key dimensions of the challenge of Cloud Computing .
	CO2	Classify the Levels of Virtualization and mechanism of tools.
(*)	CO3	Analyze Cloud infrastructure including Google Cloud an Amazon Cloud.
	CO4	Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud
	CO5	Assess control storage systems and cloud security, the risks involved its impact and develop cloud application.
Information Retrieval Systems (Professional Elective-IV)	CO1	Identify basic theories in information retrieval.
	CO2	.Classify the analysis tools as they apply to information retrieval systems.
	CO3	Illustrate the problems solved in currentIR systems.
	CO4	.Discuss the advantages of current IR systems
		Translatethelatesttechnologies for linking, describing and searching the web.
NOSQL Databases	CO1	Discuss about Aggregate Data Models .
(Professional Elective-IV)	CO2	Explain about Master-Slave Replication, Peer-to-Peer Replication.
	CO3	Describe the Structure of Data, Scaling, Suitable Use Cases.
	CO4	Make use of Complex Transactions Spanning Different Operations.
Social Network Analysis	CO1	Knowbasic



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(Professional Elective-V)	CO2	Beabletovisualize, summarizeandcomparenetwork,
	CO3	Illustratebasicprinciplesbehind networkanalysisalgorithms.
	CO4	Developpracticalskillsonetwork analysis in Rprogramming language.
Recommender Systems (Professional Elective-V)	CO1	Understand the basic concepts of recommender systems .
	CO2	Carry out performance evaluation of recommender systems based on various metrics.
	CO3	Implement machine-learning and data-mining algorithms in recommender systems data sets.
	CO4	Design and implement a simple recommender system.

AI Chatbots (Professional Elective-V)	CO1	Develop an in-depth understanding of conversation design, including onboarding, flows, utterances, entities, and personality.
	CO2	Design, build, test, and iterate a fully-functional, interactive chatbot using a commercial platform.
	CO3	Deploy the finished chatbot for public use and interaction.
Data Visualization	COI	Understand basics of Data Visualization
(Professional Elective-V)	CO2	Implement visualization of distributions.
3	CO3	Write programs on visualization of time series, proportions & associations.
	CO4	Apply visualization on Trends and uncertainty.
	CO5	Explain principles of proportions.
API and Microservices (Job	COI	Develop a Spring Data JPA application with Spring Boo
Oriented Course)	CO2	Implement CRUD operations using Spring Data JPA.
3	CO3	Implement pagination and sorting mechanism using Spring Data JPA.
	CO4	Implement query methods for querying the database using Spring Data JPA.
	CO5	Understand update operation using query approaches in Spring Data JPA.



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	CO6	Write RESTful services using Spring REST that consumes and produces data in different formats.
	CO7	Write Spring based REST clients to consume RESTful services programmatically.
Secure Coding Techniques	COI	Differentiate the objectives of information security
(Job Oriented Course)	CO2	Understand the trend, reasons and impact of the recent Cyber attacks.
	CO3	Understand OWASP design principles while designing web application.
	CO4	Understand Threat modelling.
	CO5	Importance of security in all phases of SDLC.
Universal Human Values 2: Understanding Harmony	CO1	By the end of the course, 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.
	CO3	while keeping human relationships and human nature in mind.
	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.
MEAN Stack Technologies- Module II-Angular JS and MongoDB (Skill Oriented	COI	Build a component-based application using Angular components and enhance their functionality using directives.
Course)	CO2	Utilize data binding for developing Angular forms and bind them with model data.
	CO3	Apply Angular built-in or custom pipes to format the rendered data.
	CO4	Develop a single page application by using synchronous or asynchronous Angular routing
37	CO5	Make use of MongoDB queries to perform CRUD operations on document database.
Data Wrangling in Data	COI	Identify and execute the basic data format.

PRINCIPALE SECTION TO SECURITY TO SECURITY



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Science(Minor)	CO2	Perform the computations with Excel and pdf files
	CO3	Understand the concepts of data cleanup.
	CO4	Explore and analyze the Image and video data.
	CO5	Understand the concepts web scraping.



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Program Outcomes

(Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 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.
- 6. 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.
- Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate



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the knowledge of, and need for sustainable development.

- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. 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 Educational Objectives (PEOs)

- 1. To make them ready for entrepreneurship and pursue higher education
- To develop the ability to think logically and understand real time problems solving them with latest technologies

Program Specific Outcomes (PSOs)

- Able to solve practical problems with new technologies, programming languages and open source platforms.
- Make them ready to work and communicate effectively with professionals in various fields and pursue lifelong professional development in computing.



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CSE Courses Outcomes

		B.tech 1st Sem	
Course Name	Course Outcomes		
Subject: COMMUNICATIVE ENGLISH	CO1	Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information	
	CO2	ask and answer general questions on familiar topics and introduce oneself/others	
	CO3	Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information	
(b)	CO4	Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs	
	CO5	Form sentences using proper grammatical structures and correct word forms	
	CO1	Utilize mean value theorems to real life problems	
	CO2	Solve the differential equations related to various engineering fields	
Subject: MATHEMATICS-I	CO3	Familiarize with functions of several variables which is useful in optimization	
	CO4	Apply double integration techniques in evaluating areas bounded by region	
	CO5	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional and 3-dimensional coordinate systems	
Subject: APPLIED PHYSICS	CO1	Explain the need of coherent sources and the conditions for sustained interference (L2). Identify the applications of interference in engineering (L3). Analyze the differences between interference and diffraction with applications (L4). Illustrate the concept of polarization of light and its applications (L2). Classify ordinary refracted light and extraordinary refracted rays by their states of polarization (L2)	
	CO2	Explain various types of emission of radiation (L2). Identify the role of laser in engineering applications (L3). Describe the construction and working principles of various types of lasers (L1). Explain the working principle	



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	1	of optical fibers (L2). Classify optical fibers based on refractive index profile and mode of propagation (L2). Identify the applications of optical fibers in medical, communication and other fields (L2). Apply the fiber optic concepts in various fields (L3).
	CO3	Describe the dual nature of matter (L1). Explain the significance of wave function (L2). Identify the role of Schrodinger's time independent wave equation in studying particle in onedimensional infinite potential well (L3). Identify the role of classical and quantum free electron theory in the study of electrical conductivity (L3). Classify the energy bands of solids (L2).
	CO4	Explain the concept of dielectric constant and polarization in dielectric materials (L2). Summarize various types of polarization of dielectrics (L2). Interpret Lorentz field and Claussius-Mosotti relation in dielectrics (L2). Classify the magnetic materials based on susceptibility and their temperature dependence (L2). Explain the applications of dielectric and magnetic materials (L2), Apply the concept of magnetism to magnetic devices (L3)
	CO5	Outline the properties of charge carriers in semiconductors (L2). Identify the type of semiconductor using Hall effect (L2). Identify applications of semiconductors in electronic devices (L2). Classify superconductors based on Meissonier's effect (L2). Explain Meissonier's effect, BCS theory & Josephson effect in superconductors (L2).
Subject: PROGRAMMING FOR PROBLEM SOLVING USING C	CO1	To write algorithms and to draw flowcharts for solving problems
	CO2	To convert flowcharts/algorithms to C Programs, compile and debug programs
	CO3	To use different operators, data types and write programs that use two-way/ multi-way selection
	CO4	To select the best loop construct for a given problem
	CO5	To design and implement programs to analyze the different pointer applications
	CO6	To decompose a problem into functions and to develop modular reusable code
	CO7	To apply File I/O operations
Subject: COMPUTER	COI	Assemble and disassemble components of a PC



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ENGINEERING WORKSHOP	CO2	Construct a fully functional virtual machine, Summarize various Linux operating system commands,
	CO3	Recognize characters & extract text from scanned images, Create audio files and podcasts
Subject: PROGRAMMING FOR PROBLEM SOLVING USING C LAB	COI	Gains Knowledge on various concepts of a C language.
	CO2	Able to draw flowcharts and write algorithms.
	CO3	Able design and development of C problem solving skills.
	CO4	Able to design and develop modular programming skills.
	CO5	Able to trace and debug a program

	В	tech 2 nd Sem
Course Name	Course Outcomes	
Subject: MATHEMATICS-II	CO1	develop the use of matrix algebra techniques that is needed by engineers for practical applications
	CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel
	CO3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms
	CO4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals
	CO5	apply numerical integral techniques to different Engineering problems
	CO6	apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations
Subject: APPLIED CHEMISTRY	CO1	Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers
	CO2	Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study



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		methods to control corrosion
**	CO3	Synthesize nonmaterial's for modern advances of engineering technology. Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.
	CO4	Analyze the principles of different analytical instruments and their applications. Design models for energy by different natural sources
	CO5	Obtain the knowledge of computational chemistry and molecular machines
Subject: COMPUTER ORGANIZATION	CO1	Demonstrate and understanding of the design of the functional units of a digital computer system.
	CO2	Relate Postulates of Boolean algebra and minimize combinational functions
	CO3	Recognize and manipulate representations of numbers stored in digital computers
	CO4	Build the logic families and realization of logic gates.
	CO5	Design and analyze combinational and sequential circuits
	CO6	Recall the internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main components
	CO7	Solve elementary problems by assembly language programming
Subject: PYTHON PROGRAMMING	CO1	Develop essential programming skills in computer programming concepts like data types, containers
	CO2	Apply the basics of programming in the Python languag
9	CO3	Solve coding tasks related conditional execution, loops
	CO4	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
Subject: DATA STRUCTURES	CO1	Summarize the properties, interfaces, and behaviors of basic abstract data types
	CO2	Discuss the computational efficiency of the principal algorithms for sorting & searching
	CO3	Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
	CO4	Demonstrate different methods for traversing trees



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Subject: APPLIED CHEMISTRY LAB	CO1	The students entering into the professional course have practically very little exposure to lab classes.
	CO2	The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis.
	CO3	Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments.
	CO4	They thus acquire some experimental skills.
Subject: PYTHON PROGRAMMING LAB	COI	Develop essential programming skills in computer programming concepts like data types, containers
	CO2	Apply the basics of programming in the Python language
	CO3	Solve coding tasks related conditional execution, loops
	CO4	Solve coding tasks related to the fundamental notions and techniques used in object-oriented programming
Subject: DATA STRUCTURES LAB	COI	Use basic data structures such as arrays and linked list.
	CO2	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
	CO3	Use various searching and sorting algorithms.

		B.tech 3 rd Sem
Course Name	Course Outcomes	
Subject: MATHEMATICS - III	CO1	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO2	Estimate the work done against a field, circulation and flux using vector calculus
	CO3	Apply the Laplace transform for solving differential equations
70	CO4	Find or compute the Fourier series of periodic signals



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	CO5	Know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non- periodic waveforms
	CO6	Identify solution methods for partial differential equations that model physical processes
Subject: OBJECT ORIENTED PROGRAMMING THROUGH C++	CO1	Classify object oriented programming and procedural programming
	CO2	Apply C++ features such as composition of objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling
	CO3	Build C++ classes using appropriate encapsulation and design principles
	CO4	Apply object oriented or non-object oriented techniques to solve bigger computing problems
Subject: OPERATING SYSTEMS	CO1	Describe various generations of Operating System and functions of Operating System
	CO2	Describe the concept of program, process and thread and analyze various CPU Scheduling Algorithms and compare their performance
	CO3	Solve Inter Process Communication problems using Mathematical Equations by various methods
	CO4	Compare various Memory Management Schemes especially paging and Segmentation in Operating System and apply various Page Replacement Techniques
	CO5	Outline File Systems in Operating System like UNIX/Linux and Windows
Subject: SOFTWARE ENGINEERING	COI	Ability to transform an Object-Oriented Design into high quality, executable code
	CO2	Skills to design, implement, and execute test cases at the Unit and Integration level
	CO3	Compare conventional and agile software methods
Subject: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	CO1	Demonstrate skills in solving mathematical problems
	CO2	Comprehend mathematical principles and logic
	CO3	Demonstrate knowledge of mathematical modeling and proficiency in using mathematical software



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	C04	Manipulate and analyze data numerically and/or graphically using appropriate Software
	CO5	Communicate effectively mathematical ideas/results verbally or in writing
Subject: OBJECT ORIENTED PROGRAMMING THROUGH C++ LAB	COI	Apply the various OOPs concepts with the help of programs.
Subject: OPERATING SYSTEM LAB	CO1	To use Unix utilities and perform basic shell control of the utilities .
	CO2	To use the Unix file system and file access control
	CO3	To use of an operating system to develop software
	CO4	Students will be able to use Linux environment efficiently
	CO5	Solve problems using bash for shell scripting
Subject: SOFTWARE ENGINEERING LAB	CO1	By the end of this lab the student is able to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project
	CO2	prepare SRS document, design document, test cases and software configuration management and risk management related document.
	CO3	develop function oriented and object oriented software design using tools like rational rose.
	CO4	use modern engineering tools necessary for software project management, estimations, time management and software reuse
	CO5	generate test cases for software testing
Subject: APPLICATIONS OF PYTHON-NumPy	CO1	Explain how data is collected, managed and stored for processing
	CO2	Understand the workings of various numerical techniques, different descriptive measures of Statistics, correlation and regression to solve the engineering problems
	CO3	Understand how to apply some linear algebra operations to n-dimensional arrays

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	CO4	Use NumPy perform common data wrangling and computational tasks in Python.
Subject: WEB APPLICATION DEVELOPMENT USING FULL STACK	CO1	Analyze a web page and identify its elements and attributes.
	CO2	Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet
	CO3	Implement MVC and responsive design to scale well across PC, tablet and Mobile Phone
	CO4	Create web pages using HTML and Cascading Style Sheets.
Subject: CONSTITUTION OF INDIA	COI	Understand historical background of the constitution making and its importance for building a democratic India.
	CO2	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary.
	CO3	Understand the value of the fundamental rights and duties for becoming good citizen of India
	CO4	Analyze the decentralization of power between central, state and local self government.
	CO5	Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
		 Know the sources, features and principles of Indian Constitution.
		Learn about Union Government, State government and its administration.
		Get acquainted with Local administration and Pachayati Raj.
9		 Be aware of basic concepts and developments of Human Rights.
		 Gain knowledge on roles and functioning of Election Commission

B.tech 4th Sem		
Course Name	Course Outcomes	
Subject: PROBABILITY AND	CO1	Classify the concepts of data science and its importance



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STATISTICS	CO2	Interpret the association of characteristics and through correlation and regression tools
	CO3	Make use of the concepts of probability and their applications
	CO4	Apply discrete and continuous probability distributions
	CO5	Design the components of a classical hypothesis test
¥.	CO6	Infer the statistical inferential methods based on small and large sampling tests
Subject: DATABASE	CO1	Describe a relational database and object-oriented database
MANAGEMENT SYSTEMS	CO2	Create, maintain and manipulate a relational database using SQL
	CO3	Describe ER model and normalization for database design
	CO4	Examine issues in data storage and query processing and can formulate appropriate solutions
	CO5	Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
Subject: FORMAL	CO1	Classify machines by their power to recognize languages.
LANGUAGES AND AUTOMATA THEORY	CO2	Summarize language classes & grammars relationship among them with the help of Chomsky hierarchy
	CO3	Employ finite state machines to solve problems in computing
	CO4	Illustrate deterministic and non-deterministic machines
	CO5	Quote the hierarchy of problems arising in the computer science
Subject: JAVA PROGRAMMING	COI	Able to realize the concept of Object Oriented Programming & Java Programming Constructs
PROGRAMMING	CO2	Able to describe the basic concepts of Java such as operators, classes, objects, inheritance, packages, Enumeration and various keywords.
	CO3	Apply the concept of exception handling and Input/ Output operations
	CO4	Able to design the applications of Java & Java applet



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	CO5	Able to Analyze & Design the concept of Event Handling and Abstract Window Toolkit
Subject: MANAGERIAL ECONOMICS AND	CO1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticity's for a product
FINANCIAL ACCOUNTANCY	CO2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs
	CO3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units
*	CO4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis
	CO5	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making
Subject: DATABASE MANAGEMENT SYSTEMS LAB	CO1	Utilize SQL to execute queries for creating database and performing data manipulation operations
9	CO2	Examine integrity constraints to build efficient databases
	CO3	Apply Queries using Advanced Concepts of SQL
	CO4	Build PL/SQL programs including stored procedures, functions, cursors and triggers
Subject: R PROGRAMMING LAB	CO1	Access online resources for R and import new function packages into the R workspace
9	CO2	Import, review, manipulate and summarize data-sets in R
	CO3	Explore data-sets to create testable hypotheses and identify appropriate statistical tests
	CO4	Perform appropriate statistical tests using R
	CO5	Create and edit visualizations with R
Subject: JAVA PROGRAMMING LAB	CO1	Evaluate default value of all primitive data type, Operations, Expressions, Control flow, Strings
	CO2	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
	CO3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism



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	CO4	Construct Threads, Event Handling, implement packages developing applets
Subject: APPLICATIONS OF PYTHON-Pandas	CO1	Use Pandas to create and manipulate data structures like Series and Data Frames.
,	CO2	Work with arrays, queries, and data frames
	CO3	Query Data Frame structures for cleaning and processing and manipulating files
	CO4	Understand best practices for creating basic charts
Subject: WEB APPLICATION DEVELOPMENT USING FULL STACK	CO1	develop of the major Web application tier- Client side development
	CO2	participate in the active development of cross-browser applications through JavaScript
	CO3	Develop JavaScript applications that transition between states

		B.tech 5th Sem	
Course Name	Course Outcomes		
Subject: COMPUTER NETWORKS	CO1	Demonstrate different network models for networking links OSI, TCP/IP, B-ISDN, N-BISDN and get knowledge about various communication techniques, methods and protocol standards.	
	CO2	Discuss different transmission media and different switching networks.	
	CO3	Analyze data link layer services, functions and protocols like HDLC and PPP.	
	CO4	Compare and Classify medium access control protocols like ALOHA, CSMA, CSMA/CD, CSMA/CA, Polling, Token passing, FDMA, TDMA, CDMA protocols	
	CO5	Determine application layer services and client server protocols working with the client server paradigms like WWW, HTTP, FTP, e-mail and SNMP etc.	
Subject: DESIGN AND ANALYSIS OF ALGORITHMS	COI	Analyze the performance of a given algorithm, denote its time complexity using the asymptotic notation for recursive and non-recursive algorithms	
	CO2	List and describe various algorithmic approaches and Solve problems using divide and conquer &greedy Method	



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	CO3	Synthesize efficient algorithms dynamic programming approaches to solve in common engineering design situations.
	CO4	Organize important algorithmic design paradigms and methods of analysis: backtracking, branch and bound algorithmic approaches
	CO5	Demonstrate NP- Completeness theory ,lower bound theory and String Matching
Subject: DATA WAREHOUSING AND DATA MINING	CO1	Illustrate the importance of Data Warehousing, Data Mining and its functionalities and Design schema for real time data warehousing applications.
DATA MINING	CO2	Demonstrate on various Data Preprocessing Techniques viz. data cleaning, data integration, data transformation and data reduction and Process raw data to make it suitable for various data mining algorithms.
4	CO3	Choose appropriate classification technique to perform classification, model building and evaluation.
	CO4	Make use of association rule mining techniques viz. Apriori and FP Growth algorithms and analyze on frequent item sets generation.
	CO5	Identify and apply various clustering algorithm (with open source tools), interpret, evaluate and report the result.
Subject: OPTIMIZATION IN OPERATIONS RESEARCH	CO1	State and formulate the optimization problem, without and with constraints, by using design variables from an engineering design problem.
	CO2	Apply classical optimization techniques to minimize or maximize a multi-variable objective function, without or with constraints, and arrive at an optimal solution.
	CO3	Apply and Solve transportation and assignment problem busing Linear programming Simplex method.
03	CO4	Apply gradient and non-gradient methods to nonlinear optimization problems and use interior or exterior penalty functions for the constraints to derive the optimal solution
	CO5	Formulate and apply Dynamic programming technique to inventory control, production planning, engineering design problems etc. to reach a final optimal solution from the current optimal solution.
Subject: ARTIFICIAL INTELLIGENCE	CO1	Understand the fundamental concepts in Artificial Intelligence



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	CO2	Analyze the applications of search strategies and problem reductions
	соз	Apply the mathematical logic concepts.
	CO4	Develop the Knowledge representations in Artificial Intelligence.
	CO5	Explain the Fuzzy logic systems.
Subject: SOFTWARE PROJECT MANAGEMENT	CO1	Apply the process to be followed in the software development life-cycle models
Management of Sec. 10	CO2	Apply the concepts of project management & planning
	CO3	Implement the project plans through managing people, communications and change
	CO4	Conduct activities necessary to successfully complete and close the Software projects
	CO5	Implement communication, modeling, and construction & deployment practices in software development
Subject: DISTRIBUTED SYSTEMS	CO1	Elucidate the foundations and issues of distributed systems
-	CO2	Illustrate the various synchronization issues and global state for distributed systems
	CO3	Illustrate the Mutual Exclusion and Deadlock detection algorithms in distributed systems
	CO4	Describe the agreement protocols and fault tolerance mechanisms in distributed systems
	CO5	Describe the features of peer-to-peer and distributed shared memory systems
Subject: ADVANCED UNIX PROGRAMMING	CO1	Gain good knowledge on Unix commands and awareness of shell programming
	CO2	Know about different system calls for files and directories
	CO3	Ability to know the working of processes and signals
	CO4	Application of client server program for IPC
	CO5	Knowledge about socket programming
Subject: DATA WAREHOUSING	CO1	Design a data mart or data warehouse for any organization
AND DATA MINING LAB	CO2	Extract knowledge using data mining techniques and enlist various algorithms used in information analysis of Data Mining Techniques



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	CO3	Demonstrate the working of algorithms for data mining tasks such as association rule mining, classification for realistic data
	CO4	Implement and Analyze on knowledge flow application on data sets and Apply the suitable visualization techniques to output analytical results
Subject: COMPUTER NETWORKS	CO1	Know how reliable data communication is achieved through data link layer.
	CO2	Suggest appropriate routing algorithm for the network.
	CO3	Provide internet connection to the system and its installation.
Ti di	CO4	Work on various network management tools
Subject: ANIMATION COURSE:	CO1	learn various tools of digital 2-D animation
ANIMATION DESIGN	CO2	understand production pipeline to create 2-D animation.
	CO3	apply the tools to create 2D animation for films and videos
	CO4	understand different styles and treatment of content in 3D model creation
	CO5	apply tools to create effective 3D modeling texturing and lighting
Subject: CONTINUOUS INTEGRATION AND CONTINUOUS DELIVERY USING DevOps	COI	Understand the why, what and how of DevOps adoption
	CO2	Attain literacy on Devops
DELIVERY OSHVO DEVOPS	CO3	Align capabilities required in the team
	CO4	Create an automated CICD pipeline using a stack of tools
Subject: EMPLOYABILITY SKILLS-I	CO1	Understand the corporate etiquette.
	CO2	Make presentations effectively with appropriate body language
	CO3	Be composed with positive attitude
	CO4	Understand the core competencies to succeed in professional and personal life
Subject: DATABASE	COI	Describe a relational database and object-oriented database
MANAGEMENT SYSTEMS	CO2	Create, maintain and manipulate a relational database using SQL
	CO3	Describe ER model and normalization for database design



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	CO4	Examine issues in data storage and query processing and can formulate appropriate solutions
	COS	Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage
	CO6	Examine integrity constraints to build efficient databases
#	CO7	Apply Queries using Advanced Concepts of SQL
	CO8	Build PL/SQL programs including stored procedures, functions, cursors and triggers

	I	3.tech 6 th Sem	
Course Name		Course Outcomes	
Subject: MACHINE LEARNING	COI	Explain the fundamental usage of the concept Machine Learning system	
	CO2	Demonstrate on various regression Technique	
	CO3	Analyze the Ensemble Learning Methods.	
	CO4	Illustrate the Clustering Techniques and Dimensionality Reduction Models in Machine Learning	
	CO5	Discuss the Neural Network Models and Fundamentals concepts of Deep Learning	
Subject: COMPILER	COI	Demonstrate phases in the design of compiler	
DESIGN	CO2	Organize Syntax Analysis, Top Down and LL(1) grammars	
	CO3	Design Bottom Up Parsing and Construction of LR parsers	
	CO4	Analyze synthesized, inherited attributes and syntax directed translation schemes	
	CO5	Determine algorithms to generate code for a target machine	
Subject: CRYPTOGRAPHY AND NETWORK SECURITY	CO1	Explain different security threats and countermeasures and foundation course of cryptography mathematics	
	CO2	Classify the basic principles of symmetric key algorithms and operations of some symmetric key algorithms and asymmetric key cryptography-	
	CO3	Revise the basic principles of Public key algorithms ar Working operations of some Asymmetric key algorithm	

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		such as RSA, ECC and some more
*	CO4	Design applications of hash algorithms, digital signatures and key management techniques.
	CO5	Determine the knowledge of Application layer, Transport layer and Network layer security Protocols such as PGP, S/MIME, SSL,TSL, and IPsec.
Subject: MOBILE COMPUTING	CO1	Develop a strong grounding in the fundamentals of mobile Networks
	CO2	Apply knowledge in MAC, Network, and Transport Layer protocols of Wireless Network
	CO3	Comprehend, design, and develop a lightweight network stack
	CO4	Analyze the Mobile Network Layer system working
	CO5	Explain about the WAP Model
Subject: BIG DATA ANALYTICS	COI	Illustrate big data challenges in different domains including social media, transportation, finance and medicine
	CO2	Use various techniques for mining data stream
	CO3	Design and develop Hadoop
	CO4	Identify the characteristics of datasets and compare the trivial data and big data for various applications
	CO5	Explore the various search methods and visualization techniques
Subject: OBJECT	CO1	Analyze the nature of complex system and its solutions.
ORIENTED ANALYSIS AND DESIGN	CO2	Illustrate & relate the conceptual model of the UML, identify & design the classes and relationships
	CO3	Analyze &Design Class and Object Diagrams that represent Static Aspects of a Software System and apply basic and Advanced Structural Modeling Concepts for designing real time applications.
	CO4	Analyze & Design behavioral aspects of a Software System using Use Case, Interaction and Activity Diagrams.
	CO5	Analyze & Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems.
Subject: NETWORK	CO1	Identifying different models and sockets



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PROGRAMMING		360
	CO2	Demonstrate different TCP Echo server functions and I/O models
	CO3	Rationalize IPV4 and IPV6 Socket options
	CO4	Identifying daemon processing and Advanced input and output functions
	CO5	Analyze Broadcasting and multicasting
Subject: MEAN STACK	COI	Build static web pages using HTML 5 elements.
DEVELOPMENT	CO2	Apply JavaScript to embed programming interface for web pages and also to perform Client side validations.
	CO3	Build a basic web server using Node.js, work with Node Package Manager (NPM) and recognize the need for Express.js.
	CO4	Develop JavaScript applications using typescript and work with document database using MongoDB
	CO5	Utilize Angular JS to design dynamic and responsive web pages.
Subject: MACHINE LEARNING USING PYTHON LAB	CO1	Implement procedures for the machine learning algorithms
	CO2	Design and Develop Python programs for various Learning algorithms
	CO3	Apply appropriate data sets to the Machine Learning algorithms
	CO4	Develop Machine Learning algorithms to solve real world problems
Subject: COMPILER DESIGN LAB	CO1	Design simple lexical analyzers
	CO2	Determine predictive parsing table for a CFG
	CO3	Apply Lex and Yacc tools
	CO4	Examine LR parser and generating SLR Parsing table
ali .	CO5	Relate Intermediate code generation for subset C language
Subject: CRYPTOGRAPHY NETWORK SECURITY LAB	CO1	Apply the knowledge of symmetric cryptography to implement encryption and decryption using Ceaser Cipher, Substitution Cipher, Hill Cipher
	CO2	Demonstrate the different algorithms like DES, Blowfish, and Rijndael, encrypt the text "Hello world"



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		using Blowfish Algorithm.
	CO3	Analyze and implement public key algorithms like RSA, Diffie-Hellman Key Exchange mechanism, the message digest of a text using the SHA-1 algorithm
Subject: BIG DATA: SPARK	COI	Develop Map Reduce Programs to analyze large dataset Using Hadoop and Spark
	CO2	Write Hive queries to analyze large dataset Outline the Spark Ecosystem and its components
	CO3	Perform the filter, count, distinct, map, flat Map RDD Operations in Spark.
	CO4	Build Queries using Spark SQL
	CO5	Apply Spark joins on Sample Data Sets
*	CO6	Make use of sqoop to import and export data from hadoop to database and vice-versa
Subject: MEAN STACK TECHNOLOGIES-MODULE I (HTML 5, JAVASCRIPT, EXPRESS.JS, NODE.JS AND	CO1	Develop professional web pages of an application using HTML elements like lists, navigations, tables, various form elements, embedded media which includes images, audio, video and CSS Styles.
TYPESCRIPT)	CO2	Utilize JavaScript for developing interactive HTML web pages and validate form data.
	CO3	Build a basic web server using Node.js and also working with Node Package Manager
	CO4	Build a web server using Express.js
	CO5	Make use of Typescript to optimize JavaScript code by using the concept of strict type checking.
Subject: EMPLOYABILITY SKILLS-II	CO1	Solve various Basic Mathematics problems by following different methods
	CO2	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems
	CO3	Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
E-	CO4	Analyze, summarize and present information in quantitative forms including table, graphs and formulas
Subject: DATA STRUCTURES AND ALGORITHMS	CO1	Use basic data structures such as arrays and linked list.

PASSUAL



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	CO2	Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
	CO3	Use various searching and sorting algorithms.
Subject: CLOUD COMPUTING	CO1	Illustrate the key dimensions of the challenge of Cloud Computing
2.6	CO2	Classify the Levels of Virtualization and mechanism of tools
	CO3	Analyze Cloud infrastructure including Google Cloud and Amazon Cloud.
	CO4	Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud
	CO5	Assess control storage systems and cloud security, the risks involved its impact and develop cloud application
Subject: NEURAL NETWORKS AND SOFT COMPUTING	CO1	Understand the concepts of Artificial intelligence and soft computing techniques
	CO2	Analyze the concepts of Neural Networks and select the Learning Networks in modeling real world systems
	CO3	Implement the concepts of Fuzzy reasoning and concepts of Genetic algorithm and its applications to soft computing
	CO4	Classify Biologically inspired algorithm such as neural networks, genetic algorithms, ant colony optimization, and bee colony optimization.
	CO5	Design hybrid system incorporating neural network, genetic algorithms, fuzzy systems.

Course Name	Course Outcomes	
Subject: AD-HOC AND SENSOR NETWORKS	-CO1	Evaluate the principles and characteristics of mobile at hoc networks (MANETs) and what distinguishes them from infrastructure-based networks.
	CO2	Determine the principles and characteristics of wireless sensor networks.



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	CO3	Discuss the challenges in designing MAC, routing and transport protocols for wireless ad-hoc sensor networks.
	CO4	Illustrate the various sensor network Platforms, tools and applications.
	CO5	Demonstrate the issues and challenges in security provisioning and also familiar with the mechanisms for implementing security and trust mechanisms in MANETs and WSNs.
Subject: CYBER	CO1	Explain the Cybercrime Fundamentals
SECURITY & FORENSICS	CO2	Describe the types of attacks on networks
	CO3	Analyze various tools available for Cybercrime Investigation
	CO4	Explain the Computer Forensics and Investigation Fundamentals and tools
	CO5	Analyze the legal perspectives of Cybercrime
Subject: DEEP LEARNING TECHNIQUES	CO1	Demonstrate the fundamental concepts learning techniques of Artificial Intelligence, Machine Learning and Deep Learning.
	CO2	Discuss the Neural Network training, various random models.
	CO3	Explain the Techniques of Keras, TensorFlow, Theano and CNTK
	CO4	Classify the Concepts of CNN and RNN
*	CO5	Implement Interactive Applications of Deep Learning.
Subject: SOCIAL	CO1	Demonstrate social network analysis and measures.
NETWORKS & SEMANTIC WEB	CO2	Analyze random graph models and navigate social networks data
	CO3	Apply the network topology and Visualization tools.
×	CO4	Analyze the experiment with small world models and clustering models.
	CO5	Compare the application driven virtual communities from social network Structure.
Subject: COMPUTER VISION	COI	Identify basic concepts, terminology, theories, models and methods in the field of computer vision,
	CO2	Describe known principles of feature detection and matching,



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	CO3	Describe basic methods of computer vision related to image stitching, photography like high dynamic range imaging and blur removal.
6	CO4	Suggest a design of a computer vision system for a 3D Reconstruction, Albedos, image based rendering views and depths.
Subject: BLOCK-CHAIN	CO1	Demonstrate the block chain basics, Crypto currency
TECHNOLOGIES	CO2	To compare and contrast the use of different private vs. public block chain and use cases
	CO3	Design an innovative Bit coin Block chain and scripts, Block chain Science on varies coins
9	CO4	Classify Permission Block chain and use cases - Hyper ledger, Corda
	CO5	Make Use of Block-chain in E-Governance, Land Registration, Medical Information Systems and others
Subject: WIRELESS NETWORK SECURITY	CO1	Explain the Threats in networks and provide Authentication to real time problems.
	CO2	Identify and investigate in-depth both early and contemporary threats to wireless networks security
	°CO3	Ability to analyze and determine for any organization the database security requirements and appropriate solutions
	CO4	Determined IP Security Issues and solve real time problems.
	CO5	Build wireless Development Strategies in real time issues
Subject: ETHICAL HACKING	CO1	Explain the concepts related to hacking, ports and protocols, pen testing and virtualization
	CO2	Determine the applicable foot printing techniques and scanning methods
	CO3	Explain the process of system hacking and Explain the concepts Trojans, backdoors, worms and virus and it's countermeasures
56	CO4	Demonstrate systematic understanding of the concepts of Sniffing and Social Engineering and it's attacks
	CO5	Determine the applicable methods of cryptography, stenography and Vulnerability Assessment
Subject: API AND	CO1	Develop a Spring Data JPA application with Spring



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MICROSERVICES		Boot
	CO2	Implement CRUD operations using Spring Data JPA
	CO3	Implement pagination and sorting mechanism using Spring Data JPA
	CO4	Implement query methods for querying the database using Spring Data JPA
10.	CO5	Implement a custom repository to customize a querying mechanism using Spring Data JPA
	CO6	Understand update operation using query approaches in Spring Data JPA
	CO7	Implement Spring Transaction using Spring Data JPA
	CO8	Develop RESTful endpoints using Spring REST Processing URI parameters
	CO9	Write RESTful services using Spring REST that consumes and produces data in different formats
	CO10	Handle exceptions and errors in Spring REST endpoints
	CO11	Write Spring based REST clients to consume RESTful services programmatically
	CO12	Create secure RESTful endpoints using Spring Security Document and version the Spring REST endpoints Implement CORS in a Spring REST application
Subject: SECURE CODING	CO1	Differentiate the objectives of information security
TECHNIQUES	CO2	Understand the trend, reasons and impact of the recent Cyber attacks
	CO3	Understand OWASP design principles while designing a web application
	CO4	Understand Threat modelling
	CO5	Importance of security in all phases of SDLC
	CO6	Write secure coding using some of the practices in C/C++/Java and Python programming languages
Subject: UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMON	COI	By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind. They

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		would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). 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. This is only an introductory foundational input. It would be desirable to follow it up by a) faculty-student or mentor-mentee programs throughout their time with the institution b) Higher level courses on human values in every aspect of living. E.g. as a professional
Subject: PYTHON: DEEP LEARNING	CO1	Demonstrate the basic concepts fundamental learning techniques and layers.
	CO2	Discuss the Neural Network training, various random models,
	CO3	Apply various optimization algorithms to comprehend different activation
	CO4	functions to understand hyper parameter tuning
	CO5	Build a convolutional neural network, and understand its application to build a
	CO6	recurrent neural network, and understand its usage to comprehend auto encoders to briefly explain transfer learning
Subject: MEAN STACK TECHNOLOGIES-MODULE II- ANGULAR JS, MONGODB	CO1	Build a component-based application using Angular components and enhance their functionality using directives
	CO2	Utilize data binding for developing Angular forms and bind them with model data.
	CO3	Apply Angular built-in or custom pipes to format the rendered data.
*	CO4	Develop a single page application by using synchronous or asynchronous Angular routing.
	CO5	Make use of MongoDB queries to perform CRUD operations on document database.
Subject: SOFTWARE ENGINEERING	CO1	Ability to transform an Object-Oriented Design into high quality, executable code
¥-	CO2	Skills to design, implement, and execute test cases at the Unit and Integration level
	CO3	Compare conventional and agile software methods



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	CO4	Prepare SRS document, design document, test cases and software configuration management and risk management related document.
(4)	CO5	Develop function oriented and object oriented software design using tools like rational rose.
	CO6	Use modern engineering tools necessary for software project management, estimations, time management and software reuse
	CO7	Generate test cases for software testing
Subject: COMPUTATIONAL THINKING	CO1	Describe the skills that are involved in computational thinking
	CO2	Demonstrate the concepts of Boolean Logic and Software Development.
	CO3	Analyze the concepts of algorithmic thinking as modeling and abstraction as encapsulation.
	CO4	Illustrate the distinctive nature of data organization, White box and Black box testing
.2	CO5	Student will be aware of a range of applications of computational thinking in different disciplines, Authentication and authorization.
Subject: OBJECT ORIENTED PROGRAMMING THROUGH JAVA	CO1	Evaluate default value of all primitive data type, Operations, Expressions, Control- flow, Strings
	CO2	Determine Class, Objects, Methods, Inheritance, Exception, Runtime Polymorphism, User defined Exception handling mechanism
*	CO3	Illustrating simple inheritance, multi-level inheritance, Exception handling mechanism
	CO4	Construct Threads, Event Handling, implement packages, developing applets
Subject: DATA ANALYTICS USING PYTHON	CO1	Understand various file formats in loading and storage of data.
	CO2	Understand NumPy and Pandas
Subject: ARTIFICIAL INTELLIGENCE	CO1	Understand the fundamental concepts in Artificial Intelligence
	CO2	Analyze the applications of search strategies and problem reductions
	CO3	Apply the mathematical logic concepts.

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	CO4	Develop the Knowledge representations in Artificial Intelligence.
	CO5	Explain the Fuzzy logic systems.
Subject: UNIX AND SHELL PROGRAMMING	CO1	Gain good knowledge on Unix commands and awareness of shell programming
	CO2	Know about different system calls for files and directories
	.CO3	Ability to know the working of processes and signals
	CO4	Application of client server program for IPC
	CO5	Knowledge about socket programming
Subject: CLOUD COMPUTING	CO1	Illustrate the key dimensions of the challenge of Cloud Computing
	CO2	Classify the Levels of Virtualization and mechanism of tools.
	CO3	Analyze Cloud infrastructure including Google Cloud and Amazon Cloud
	CO4	Create Combinatorial Auctions for cloud resource and design scheduling algorithms for computing cloud
	CO5	Assess control storage systems and cloud security, the risks involved its impact and develop cloud application

	В	.tech 8 th Sem	
Course Name	Course Outcomes		
Subject: MATHEMATICS FOR MACHINE LEARNING (AI & ML)	CO1	understand the basic notions of machine learning and of the related basic mathematical tools;	
	CO2	comprehend the basic concepts and techniques of convex optimization	
	CO3	have a good knowledge of the statistical and computational properties of some well known machine learning algorithms;	
*	CO4	implement machine learning algorithms on synthetic and real data sets using mathematical concepts like linear algebra, probability and calculus	
Subject: TEXT MINING	CO1	Student will be aware of fundamental concepts of text	



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AND TIME SERIES		mining, unsupervised information extraction.
ANALYSIS (AI & ML)	CO2	Student will be aware of text clustering algorithms like feature selection, distance-based clustering and latent semantic indexing.
	CO3	Student will be aware of Text classification algorithm and text mining techniques.
¥	CO4	Student should aware of all the characteristics of time series and measures of dependencies.
	CO5	Student will be able to understand the ARIMA Models
Subject: NATURAL	CO1	Demonstrate a given text with basic Language features
LANGUAGE PROCESSING (AI & ML)	CO2	To design an innovative application using NLP components
	CO3	Explain a rule based system to tackle morphology/syntax of a language
,	CO4	To design a tag set to be used for statistical processing for real-time applications
	CO5	To compare and contrast the use of different statistical approaches for different types of NLP applications.
Subject: REINFORCEMENT LEARNING (AI & ML)	COI	Learn how to define RL problems like Tic-Tac-Toe, Multi-arm.
	CO2	Student will be able to understand the finite markov decision processes.
	CO3	Student will be to Understand Monte Carlo Methods and how it is work with tabular methods to solve classical control problems
	CO4	Student should aware of Eligibility Traces and Understand how to find with approximate solutions.
	CO5	Explore imitation learning tasks and solutions
	CO6	Recognize current advanced techniques and applications in RL
Subject: INTERNET OF THINGS (Systems Engineering)	CO1	Explain in a concise manner how the general Internet as well as Internet of Things work.
	CO2	Understand constraints and opportunities of wireless and mobile networks for Internet of Things.
<u>e</u>	CO3	Use basic sensing and measurement and tools to determine the real-time performance of network of devices.

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	CO4	Develop prototype models for various applications using IoT technology.
Subject: DATA COMMUNICATIONS AND INFORMATION CODING THEORY	CO1	Understand and explain the basic concepts of information theory, source coding, channel and channel capacity, channel coding and relation among them.
	CO2	Describe the real life applications based on the fundamental theory.
	CO3	Calculate entropy, channel capacity, bit error rate, code rate, steady-state probability and so on
48	CO4	Implement the encoder and decoder of one block code or convolutional code using any program language
Subject: SERVICE ORIENTED ARCHITECTURES	.COI	Get the foundations and concepts of service based computing
	CO2	Advocate the importance and means of technology alignment with business
	CO3	Understanding the basic operational model of web services,
	CO4	Gain the knowledge of key technologies in the service oriented computing arena
	CO5	Apply and practice the learning through a real or illustrative project/case study.
Subject: DESIGN OF SECURE PROTOCOLS	CO1	Get the exposure to various protocols.
	CO2	Gain knowledge on various secure mechanisms through set of protocols.
	CO3	Efficiently design new set of protocols
	CO4	Learn Security issues and overcome means with protocols.
Subject: NETWORK CODING (Systems Engineering)	COI	Explain the client-server paradigm and socket structures.
14	- CO2	Describe the basic concepts of TCP sockets and TCP echo client-server programs.
	CO3	Discuss the UDP sockets and UDP echo client-server programs
	CO4	Explain Socket options and ability to understand IPC
	CO5	Apply the applications of sockets and demonstrate skill to design simple applications like FTP, TELNET etc.
Subject: PRINCIPLES OF CYBER	CO1	Apply cyber security architecture principles



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SECURITY (Information Security)	CO2	Demonstrate the risk management processes and practices.
	CO3	Appraise cyber security incidents to apply appropriate response
*	CO4	Distinguish system and application security threats and vulnerabilities.
	CO5	Identify security tools and hardening techniques
Subject: COMPUTATIONAL NUMBER THEORY	COI	understand with basics of number theory and its applications.
	CO2	demonstrate the arithmetic of finite fields, polynomials.
2	CO3	analyze the elliptic curves, testing and factorization.
	CO4	Student will be able to solve the discrete logarithms and large sparse linear systems.
	CO5	Student will be able to apply the skills for writing programs of cryptography algorithms.
Subject: CRYPTANALYSIS (Information Security)	CO1	Understand the cryptanalysis of classic ciphers, stream ciphers and block ciphers
0.	CO2	Understand the cryptanalysis of public key attacks
Subject: ELLIPTIC CURVE CRYPTOGRAPHY	CO1	Understands Finite Field Arithmetic and Elliptic Curve Arithmetic
	CO2	Survey the attacks and validates the domain parameters and keypairs.
Subject: INTRODUCTION TO	COI	Analyze complex vector space for quantum computing
QUANTUM COMPUTING AND QUANTUM CRYPTOGRAPHY	CO2	Understand QKD algorithms
Subject: PUBLIC KEY INFRASTRUCTURE AND TRUST	CO1	In depth understanding of Public key cryptography and Infrastructure.
MANAGEMENT	CO2	Ability to design and analyze Public Key cryptographic techniques.
	CO3	Ability to solve network security issues in real time applications.
	CO4	Ability to take up doctoral level research work in security.
Subject: INFORMATION SECURITY ANALYSIS AND AUDIT	CO1	Illustrate the fundamental concepts of information security and systems auditing
	CO2	Analyze the latest trend of computer security threats



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		and defense
-	CO3	Identify security weaknesses in information systems, and rectify them with appropriate security mechanisms
	CO4	Explain the security controls in the aspects of physical, logical and operational security control and case studies
DI	CO5	Evaluate the security of information systems
Subject: CLOUD AND IOT SECURITY	CO1	Discuss about Security Requirements in IoT Architecture
	CO2	Explain Random number generation
	CO3	Demonstrate Authorization with Publish / Subscribe schemes
.95	CO4	Identify Lightweight and robust schemes for Privacy protection
	CO5	Explain about IoT cloud security architecture
Subject: WEB SECURITY	CO1	Demonstrate security concepts, security professional roles, and security resources in the context of systems and security development life cycle
	CO2	Justify applicable laws, legal issues and ethical issues regarding computer crime
	CO3	Explain the business need for security, threats, attacks, top ten security vulnerabilities, and secure software development
	CO4	Apply information security policies, standards and practices, the information security blueprint
	CO5	Analyze and describe security requirements for typical web application scenario
Subject: BLOCK CHAIN ARCHITECTURE DESIGN AND USE CASES	CO1	Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding
	CO2	Identify the risks involved in building Block chain applications.
	CO3	Review of legal implications using smart contracts.
	· CO4	Choose the present landscape of Block chain implementations and Understand Crypto currency markets
	CO5	Examine how to profit from trading crypto currencies.



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Subject: DATA VISUALIZATION	CO1	Identify and recognize visual perception and representation of data.
	CO2	Illustrate about projections of different views of objects.
	CO3	Apply various Interaction and visualization techniques.
	CO4	Analyze various groups for visualization
	CO5	Evaluate visualizations
Subject: STATISTICAL	COI	Use the statistical concepts in the field of data science.
FOUNDATIONS FOR DATA SCIENCE	CO2	Employ the techniques and methods related to the area of data science in variety of applications.
	CO3	Apply logical thinking to understand and solve the problem in context.
	CO4	Explore statistical learning methods and their application to modern problems in science, industry, and society
	CO5	Build analytics pipelines for regression problems and classification problems
Subject: MINING MASSIVE DATA SETS	CO1	Discuss research directions in Mining Massive Datasets, such as similarity search, streaming data, clustering, and graph mining.
	CO2	Analyze policy, focusing on methods for mining massive datasets and potential policy and management applications, by synthesizing and summarizing the current state of the art, and facilitating discussion by posing questions, preliminary conclusions, and ideas to explore.
	CO3	Develop a research project relevant to Mining Massive Datasets and produce a report describing the project's background, methods, results, and conclusions.
	CO4	Knowledge of basic computer science principles and skills, at a level sufficient to write a reasonably non- trivial computer program.
	CO5	Good knowledge of Java and Python will be extremely helpful since most assignments will require the use of Spark
Subject: MEDICAL IMAGE DATA PROCESSING	CO1	Student will be able to explain the basic concepts of Medical Imaging Technologies, Systems and Formation Principles.

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	CO2	Student will be able to analyze the Medical Image Storage and Processing.
	CO3	Student will be able to visualize the MRI, NMR and Artifacts.
	CO4	Student should expertise the Segmentation and Classification techniques on Medical Image Data.
	CO5	Student will be able to analyze the Nuclear Imaging like PET, SPECT and 3D Images.

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Program Outcomes

(Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 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.
- 6. 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.
- 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.



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- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.
- 11. 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.
- 12. 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 Educational Objectives (PEOs)

- To enable the graduates to update themselves to the latest technological trends
- To identify, analyze and solve complex problems and issues related to multidisciplinary areas.

Program Specific Outcomes (PSOs)

- Able to apply Programming and Technical Skills to work in the software industry and Core sector.
- Use Modern Tools and Techniques to Design and Develop intelligent systems in VLSI, Digital Electronics for customized solutions

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ECE Courses Outcomes

		B.Tech1stSem
Course Name		Course Outcomes
	COI	understand social or transactional dialogues spoken by native speakers of English and identify the context, topic and pieces of specific information.
	CO2	ask and answer general questions on familiar topics and introduce oneself/others
COMMUNICATIVE ENGLISH	CO3	employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
	CO4	. recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
	CO5	form sentences using proper grammatical structures and correct word forms.SSS
Y.	CO1	Utilize mean value theorems to real life problems (L3)
	CO2	Solve the differential equations related to various engineering fields (L3)
MATHEMATICS-I	CO3	Familiarize with functions of several variables which is useful in optimization
, militarities i	CO4	Apply double integration techniques in evaluating areas bounded by region
*	CO5	Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2 dimensional and 3-dimensional coordinate systems (L5
APPLIED CHEMISTRY	CO1	synthesize nanomaterials for modern advances of engineering technology.
	CO2	Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.
PROGRAMMING FOR	COI	To write algorithms and to draw flowcharts for solvingproblems .
PROBLEM SOLVING USING C		To apply File/Operation's.



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	CO2	
	CO3	To convert flowcharts/algorithms to C Programs, compile anddebugprograms
y	CO4	To use different operators, data types and write programs that use two-way/ multi- way selection
	CO5	To select the best loop construct for agivenproblem
	CO6	To design and implement programs to analyze the differentpointerapplications
	CO1	The student will learn how to visualize 2D & 3D objects.
ENGINEERING DRAWING		*
		P.
APPLIED CHEMISTRY LAB	CO1	The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.
1		(e) 21
PROGRAMMING FOR PROBLEM SOLVING USING C		
PROGRAMMING FOR PROBLEM SOLVING USING	CO1	Gains Knowledge on various concepts of a language debu program
C		Able to draw flowcharts andwritealgorithms.



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CO2	
соз	Able design and development of C problemsolvingskills.
CO4	Able to design and develop modular programmingskills
COS	Able to trace and debug program

B.Tech2 nd Sem		
Course Name		Course Outcomes
MATHEMATICS-II	COI	develop the use of matrix algebra techniques that is needed by engineers for practical applications (L6)
	CO2	solve system of linear algebraic equations using Gauss elimination, Gauss Jordan, Gauss Seidel
	CO3	evaluate the approximate roots of polynomial and transcendental equations by different algorithms (L5)
8	CO4	apply Newton's forward & backward interpolation and Lagrange's formulae for equal and unequal intervals (L3)
	CO5	apply different algorithms for approximating the solutions of ordinary differential equations with initial conditions to its analytical computations (L3)
101	CO6	apply numerical integral techniques to different Engineering problems (L3)
APPLIED PHYSICS	CO1	plain the need of coherent sources and the conditions for sustained interference(L2) — Identify engineering applications of interference(L3) — Analyze the differences between interference and diffraction with applications(L4) — Illustrate the concept of polarization of light and its applications(L2) — Classify ordinary polarized light and extraordinary polarized light(L2)
	CO2	understand the basic concepts of LASER light Sources(L2) ¬ Apply the concepts to learn the types of lasers(L3) ¬ Identifies the Engineering applications of lasers(L2) ¬ Explain the working principle of optical fibers(L2) ¬ Classify optical fibers based on refractive index profile and mode of propagation(L2) ¬ Identify



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		the applications of optical fibers in various fields(L2)
	CO3	Explain the concept of dual nature of matter(L2) ¬ Understand the significance of wave function(L2) ¬ Interpret the concepts of classical and quantum free electron theories(L2) ¬ Explain the importance of K-P model ¬ Classify the materials based on band theory(L2) ¬ Apply the concept of effective mass of electron(L3)
	CO4	Explain the concept of dielectric constant and polarization in dielectric materials(L2) — Summarize various types of polarization of dielectrics(L2) — Interpret Lorentz field and Clausius- Mosti relation in dielectrics(L2) — Classify the magnetic materials based on susceptibility and their temperature dependence (L2) — Explain the applications of dielectric and magnetic materials(L2) — Apply the concept of magnetism to magnetic data storage devices(L3)
	CO5	assify the energy bands of semiconductors(L2) ¬ Interpret the direct and indirect band gap semiconductors(L2) ¬ Identify the type of semiconductor using Hall effect(L2) ¬ Identify applications of semiconductors in electronic devices(L2) ¬ Classify superconductors based on Meissner's effect(L2) ¬ Explain Meissner's effect, BCS theory & Josephson effect in superconductors(L2)
OBJECT ORIENTED PROGRAMMING THROUGH JAVA	CO1	Show competence in the use of the Java programming language in the development of small to medium-sized application programs that demonstrate professionally acceptable coding and performance standard.
	CO2	Illustrate the basic principles of the object-oriented programming
	CO3	Demonstrate an introductory understanding of graphical user interfaces, multithreaded programming, and event- driven programming.
NETWORK ANALYSIS	COI	gain the knowledge on basic networkelements, will analyze the RLC circuits behavior in detailed, analyze the performance of periodicwaveforms, gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g), analyze the filter design concepts in real world applications.
97	CO2	will analyze the RLC circuits behavior in detailed



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	CO3	analyze the performance of periodic waveforms
7	CO4	gain the knowledge in characteristics of two port network parameters (Z,Y,ABCD,h&g
	CO5	analyze the filter design concepts in real world applications.
BASIC ELECTRICAL ENGINEERING	COI	Able to explain the operation of DC generator and analyze the characteristics of DC generator.
	CO2	Able to explain the principle of operation of DC motor and analyze their characteristics. Acquire the skills to analyze the starting and speed control methods of DC motors
	CO3	Ability to analyze the performance and speed – torque characteristics of a3- phase induction motor and understand starting methods of 3- phase induction motor
	CO4	Able to explain the operation of Synchronous Machines
	CO5	Capability to understand the operation of various special machines
BASIC ELECTRICAL ENGINEERING LAB	COI	Determine and predetermine the performance of DC machine sand transformers.
	CO2	Control the DC shunt machines.
	CO3	Compute the performance of 1-phase transformer
	CO4	Perform tests on 3-phase induction motor and alternator to determine their performance characteristics.
77.		

ENVIRONMENTAL SCIENCE	CO1	The student will learn how to visualize 2D & 3D objects
		20

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	1	B.Tech3 rd Sem
Course Name		Course Outcomes
ELECTRONIC DEVICES AND CIRCUITSSS	CO1	Applythebasicconceptsof semiconductor physics. Understandthe formationofp-n
	CO2	. Understandthe formationofp-injunctionhowitcanbeuse asap
	CO3	injunctions diodeindifferentmodes of operation.
	CO4	Knowtheconstruction, working principle of rectifiers with and without filters with expressions and necessary comparisons.
	CO5	Understandtheconstruction, principle of operation of transistors, BJT and FET with the irV-Icharacteristics in different configurations
SWITCHING THEORYAND LOGIC D	CO6	Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions
	CO7	Performtheanalysisofsmallsignallowfrequencytransistoran plifiercircuitsusingBJ Tand FET indifferent configurations Design of encoder, decoder ,multiplex eranddemultip
	CO1	.Classify different number systems and apply to generatevariouscodes
	CO2	Use the concept of Boolean algebra in minimization ofswitchingfunctions
	CO3	Design different types of combinationallogiccircuits
	CO4	Apply knowledge of flip-flops in designing of Registersandcounters
	CO5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
RANDOM VARIABLES AND STOCHASTIC PROCESSES	COI	Mathematically model her and Om phenomena and solve simple probabilistic problems.
	CO2	Identify different types of random variables and compute statistical averages of the Sarandon variables.
	CO3	Analyze the LTI systems with random inputs.



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	CO1	. Differentiate the various classifications of signals and systems
SIGNALS AND SYSTEMS	CO2	Analyze the frequency domain representation of signals using Fourier concepts
	CO3	Classify the systems based on their properties and determine the response of LTISystems. . Know the sampling process and various types of sampling techniques
	CO4	Apply Laplace and z-transforms to analyze signals and Systems (continuous discrete).
	CO5	
	COI	Interpret the physical meaning of different operators such a gradient, curl and divergence (L5)
MATHEMATICS-III	CO2	Estimate the work done against a field, circulation and flux using vector calculus (L5
	CO3	Apply the Laplace transform for solving differential equations (L3
	CO4	Kneadable to apply integral expressions for the forwards an inverse Fourier transform to arrange of non-periodic wave forms (L3)
	CO5	Identify solution methods for partial differential equations that model physical processes (L3).

PYTHON LAB (SKILL ORIENTED COURSE)	CO1	CO1: Know comprehensions, generators in python.
	CO2	Know exception handling inpython
	CO3	Know file I/O
	CO4	Understand various data types like lists, tuples, strings



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CO5	Know the usage of various pre-defined functions on the
2000	above data types

		B.Tech4 th Sem	
Course Name	Course Outcomes		
ELECTRONIC CIRCUIT ANALYSISSSS	COI	Design and analysis of small signal high frequency transistor amplifier using BJT and FET.	
	CO2	Design and analysis of multistage amplifiers using BJT and FET and Differential amplifier using BJT	
	CO3	Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.	
	CO4	Know the classification of the power and tuned amplifiers and their analysis with performance comparison	
	CO5		
DIGITAL IC DESIGN	CO1	Understand the structure of commercially available digital integrated circuit families.	
if .	CO2	Learn the IEEE Standard 1076 Hardware Description Language (VHDL).	
	CO3	Model complex digital systems at several levels of abstractions, behavioral, structural, and rapid system prototyping.	
	CO4	Analyze and design basic digital circuits with combinatorial and sequential logic circuits using VHDL.	
	CO5		
ANALOG COMMUNICATIONS	CO1	Differentiate various Analog modulation and demodulation schemes and their spectral characteristics.	
	CO2	Analyze noise characteristics of various analog modulation methods	
	CO3	Analyze various functional blocks of radiotransmitters and receivers	
	CO4	Design simple analog systems for various modulation techniques.	
		4	
LINEAR CONTROL	CO1	This course introduces the concepts of feedback and its advantages to various control systems	



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SYSTEMS	CO2	The performance metrics to design the control system intime-domain and frequency domain are introduced.
	CO3	Controlsystems for various applications can be designed using time-domain and frequency domain analysis
	CO4	In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.
MANAGEMENT AND ORGANISATIONAL BEHAVIOUR	CO1	After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational structure.
	CO2	Will familiarize with the concepts of functional management that is HR Mand Marketing of new product developments.
	CO3	The learner sable to think in strategically through contemporary management practices.
	CO4	The learner can develop positive attitude through personality development and can equip with motivational theories.
	CO5	. The student can attain the group performance and grievance handling in managing the organizational culture
SOFT SKILLS (SKILL ORIENTED COURSE)	CO1	At the end of the Course, the Student will be able to: CO1 Use language fluently, accurately and appropriately in debates and group discussions CO2 Use their skills of listening comprehension to communicate effectively in cross-cultural contexts. CO3 Learn and use new vocabulary. CO 4 Write resumes, project reports and reviews. CO5 Exhibit interview skills and develop soft skills.
	CO2	Group Discussion-dynamics of group discussion, Lateral thinking, Brain storming.
	CO3	Interview Skills-concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.
	CO4	Meetings-making meeting effective, chairing a meeting, decision making, seeking opinions, interrupting and handling interruptions, clarifications, closure, Negotiation skills.
	CO5	Listening comprehension – Achieving ability to comprehend material delivered at relatively fastspeed;



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		comprehending spoken material in Standard Indian English, British English, and American English.
	CO6	Cross-Cultural Communication / Non-Verbal Communication, Problems of Language, Lack of Language equivalency/ difficulties in using English.
	CO7	Vocabulary building, Creativity in using Advertisements, Case Studies etc.
	CO8	Personality Development: Decision-Making, Problem Solving, Goal Setting, Time Management & Positive Thinking.
	CO9	Resume writing -structure and presentation, planning, defining the career objective
¥	C10	Writing Skills-Letter writing, Email etiquette; Essays for competitive examinations, Analyzing news paper articles. Technical Report Writing/Project Proposals-Types of format

B.Tech5 th Sem			
Course Name	Course Outcomes		
ANALOG ICS AND APPLICATIONS	CO1	Describe the Op-Amp and internal Circuitry: 555 Timer, PLL.	
	CO2	Discuss the Applications of Operational amplifier: 555 Timer, PLL	
	CO3	Design the Active filters using Operational Amplified	
	CO4	Use the Op-Amp in A to D & D to A Converters	
	CO5		
ELECTROMAGNETIC WAVES AND TRANSMISSION LINES	CO1	Determine E and H using various laws and applications of electric & magnetic fields.	
	CO2	Apply the Maxwell equations to analyze the time varying behavior of EM waves.	
	CO3	Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media.	
	CO4	Calculate Brewster angle, critical angle and total internal reflection	
	CO5	Derive and Calculate the expressions for input impedance of transmission lines, reflection coefficient, VSWR etc. using smith chart.	



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DIGITAL COMMUNICATIONS	CO1	Analyze the performance of a Digital Communication System for probability of error and are able to design a digital communication system.
	CO2	Analyze various source coding techniques.
	CO3	. Compute and analyze Block codes, cyclic codes and convolution codes
	CO4	Design a coded communication system.
ANTENNA AND WAVE	COI	Identify basic antenna parameters.
PROPAGATION (PE1)	CO2	Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro-strip antennas
	CO3	Quantify the fields radiated by various types of antennas
	CO4	Design and analyze antenna arrays
	CO5	. Analyze antenna measurements to assess antenna's performance
	CO6	Identify the characteristics of radio wave propagation
ELECTRO		
INSTRUMENTATION	COI	Select the instrument to be used based on the requirements
	CO2	Understand and analyze different signal generators and analyzers.
	CO3	. Understand the design of oscilloscopes for different applications.
	CO4	Design different transducers for measurement of different parameters

COMPUTER ARCHITECTURE & ORGANIZATION	CO1	Students can understand the architecture of modern computer.
	CO2	They can analyze the Performance of a computer using performance equation
		W82lons



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.4.	CO3	Understanding of different instruction types.
	CO4	. Students can calculate the effective address of an operand by addressing modes
	CO5	They can understand how computer stores positive and negative numbers
	CO6	Understand the concepts of I/O Organization and Memory systems.

B.Tech6 th Sem				
Course Name	Course Outcomes			
MICROPROCESSOR AND MICROCONTROLLERSSS	CO1	Understand the architecture of microprocessor/ microcontroller and their operation.		
-	CO2	Demonstrate programming skills in assembly language for processors and Controllers.		
	CO3	Analyze various interfacing techniques and apply them for the design of processor / Controller based systems.		
VLSI DESIGN	COI	Demonstrate a clear understanding of CMOS fabrication flow and technology scaling. 2. Apply the design Rules and draw layout of a given logic circuit. 3. Design basic building blocks in Analog IC design. 4. Analyze the behavior of amplifier circuits with various loads. 5. Design various CMOS logic circuits for design of Combinational logic circuits. 6. Design MOSFET based logic circuits using various logic styles like static and		
		dynamic CMOS. 7. Design various applications using FPGA.		



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	CO2	. Apply the design Rules and draw layout of a given logic circuit
	CO3	Design basic building blocks in Analog IC design
20	CO4	Analyze the behavior of amplifier circuits with various loads.
	CO5	. Design various CMOS logic circuits for design of Combinational logic circuits
	CO6	Design MOSFET based logic circuits using various logic styles like static and dynamic CMOS.
	CO7	Design various applications using FPGA.
DIGITAL SIGNAL PROCESSING	CO1	Apply the difference equations concept in the analysis of Discrete time systems.
	CO2	Use the FFT algorithm for solving the DFT of a given signal.
	CO3	. Design a Digital filter (FIR&IIR) from the given specifications.
	CO4	. Realize the FIR and IIR structures from the designed digital filter.
	CO5	Use the Multidate Processing concepts in various applications (eg: Design of phase shifters, Interfacing of digital systems.
	CO6	Apply the signal processing concepts on DSP Processor
MICROWAVE ENGINEERING	COI	Design different modes in waveguide structures .
	CO2	Calculate S-matrix for various waveguide components and splitting the microwave energy in a desired direction.
	CO3	Distinguish between Microwave tubes and Solid State Devices, calculation of efficiency of devices.
	CO4	. Measure various microwave parameters using a Microwave test bench
		2
MOBILE & CELLULAR COMMUNICATION	CO1	Identify the limitations of conventional mobile telephon systems; understand the concepts of cellular systems.
	CO2	Understand the frequency management, channel assignment strategies and antennas in cellular systems
	CO3	Understand the frequency management, channel

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		assignment strategies and antennas in cellular systems
EMBEDDED SYSTEMS	CO1	. Understand the basic concepts of an embedded system and able to know an embedded system design approach to perform a specific function.
	CO2	The hardware components required for an embedded system and the design approach of an embedded hardware.
	CO3	The various embedded firmware design approaches on embedded environment.
	CO4	. Understand how to integrate hardware and firmware of an embedded system using real time operating system.
CMOS ANALOG IC DESIGN	COI	Design MOSFET based analog integrated circuits.
	CO2	Analyze analog circuits at least to the first order
	CO3	Appreciate the trade-offs involved in analog integrated circuit design.
	CO4	. Understand and appreciate the importance of noise and distortion in analog circuits
	CO5	Analyze complex engineering problems critically in the domain of analog IC design for conducting research
ARM BASED/ AURDINO BASED PROGRAMMING	COI	Comprehend Microcontroller-Transducers Interface techniques .
-55-70-11	CO2	Establish Serial Communication link with Arduino
	CO3	Analyze basics of SPI interface
4	CO4	Interface Stepper Motor with Arduino
	CO5	Analyze Accelerometer interface techniques

	B.Tech7thSem
Course Name	Course Outcomes



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OPTICAL COMMUNICATIONS	CO1	Choose necessary components required in modern optical communications systems.
	CO2	. Design and build optical fiber experiments in the laboratory, and learn how to calculate electromagnetic modes in waveguides, the amount of light lost going through an optical system, dispersion of optical fibers.
	CO3	Use different types of photo detectors and optical test equipment to analyze optical fiber and light wave systems.
	CO4	Choose the optical cables for better communication with minimum losses
	CO5	Design, build, and demonstrate optical fiber experiments in the laboratory.
DIGITAL IMAGE PROCESSING	CO1	Perform image manipulations and different digital image processing techniques .
PROCESSING	CO2	Perform basic operations like – Enhancement, segmentation, compression, Image transforms and restoration techniques on image
	CO3	transforms and restoration techniques on image. 3. Analyze pseudo and full color image processing techniques.
	CO4	Apply various morphological operators on images.
LOW POWER VLSI DESIGN	CO1	Capability to recognize advanced issues in VLSI systems, specific to the deep-submicron silicon Technologies
	CO2	. Students able to understand deep submicron CMOS technology and digital CMOS design styles.
:4	CO3	To design chips used for battery-powered systems and high performance circuits.
	CO4	Learn the design of various CMOS dynamic logic circuits.
	.CO5	Learn the design techniques low voltage and low power CMOS circuits for various applications.
	CO6	Learn the different types of memory circuits and their design.
SATELLITE COMMUNICATION	CO1	Understand the concepts, applications and subsystems of Satellite communications.



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	CO2	Derive the expression for G/T ratio and to solve some analytical problems on satellite link design.
	CO3	Understand the various types of multiple access techniques and architecture of earth station design.
	CO4	Understand the concepts of GPS and its architecture.
SOFT COMPUTING TECHNIQUES	CO1	Develop intelligent systems leveraging the paradigm of soft computing techniques.
10011.12	CO2	Implement, evaluate and compare solutions by various soft computing approaches for finding the optimal solutions.
	CO3	. Recognize the feasibility of applying a soft computing methodology for a particular problem
	CO4	Design the methodology to solve optimization problems using fuzzy logic, genetic algorithms and neural networks
	CO5	Design hybrid system to revise the principles of soft computing in various application
DIGITAL IC DESIGN	CO1	Understand the concepts of MOS Design
USING CMOS	CO2	Design and analysis of Combinational and Sequential MOS Circuits.
	CO3	Extend the Digital IC Design to Different Applications
	CO4	. Understand the Concepts of Semiconductor Memories, Flash Memory, RAM array organization.
		(4)
RADAR ENGINEERING	CO1	Derive the radar range equation and to solve some analytical problems, the various components of radar receiver and its performance.
	CO2	Understand the different types of radars and its applications.
	CO3	Understand the concept of tracking and different tracking techniques
	CO4	Understand the various components of radar receiver and its performance.
PATTERN RECOGNITION	COI	Study the parametric and linear models for



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& MACHINE LEARNING		classification
	CO2	Design neural network and SVM for classification.
	CO3	Develop machine independent and unsupervised learning techniques.
INTERNET OF THINGS	COI	Understand internet of Things and its hardware and
	COI	software components.
	CO2	Interface I/O devices, sensors & communication modules.
	CO3	Remotely monitor data and control devices.
	CO4	Design real time IoT based applications
*		
BASICS OF SIGNALS AND	CO1	. Understand linear time invariant systems.
SYSTEMS	CO2	Apply the concepts of Fourier series representations to analyze continuous and discrete time periodic signals.
	CO3	. Understand and apply the continuous time Fourier transform, discrete time Fourier transform
	CO4	Apply the concepts of Laplace transform, and z- Transform to the analysis and description of LTI continuous and discrete-time systems
ELECTRONIC MEASUREMENTS AND	CO1	. Select the instrument to be used based on the requirements.
INSTRUMENTATION	CO2	. Understand and analyze different signal generators and analyzers
	CO3	Understand the design of oscilloscopes for different applications.
	CO4	Design different transducers for measurement of different parameters.
PRINCIPLES OF SIGNAL PROCESSING	CO1	Use the FFT algorithm for solving the DFT of a given signal.
TROCESSES	CO2	Design a Digital filter (FIR&IIR) from the given specifications.

PHELON



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	CO3	Realize the FIR and IIR structures from the designed digital filter.
	CO4	Use the Multidate Processing concepts in various applications.
	CO5	Apply the Adaptive signal processing concepts to various signal processing applications.
INDUSTRIAL	CO1	. Understand the concept of DC amplifiers.
ELECTRONICS	CO2	Analyze and design different voltage regulators for real time applications.
	CO3	Describe the basis of SCR and Thyristor.
	CO4	Determine the performance of DIAC and TRIAC.
	CO5	Develop real time application using electronics.
CONSUMER ELECTRONICS	CO1	Understand the various type of microphones and loud speakers.
	CO2	. To identify the various digital and analog signal.
	CO3	 Describe the basis of television and composite video signal.
	CO4	 Describe the various kind of color TV standards and system.
	CO5	. Understand the various type of consumer goods.
FUNDAMENTALS OF MICROPROCESSORS AND	CO1	. Understand the architecture of microprocessor/microcontroller and their operation.
MICROCONTROLLERS	CO2	Demonstrate programming skills in assembly language for processors and controllers.
	CO3	Analyze various interfacing techniques and apply them for the design of processor/Controller based systems.
TRANSDUCERS AND SENSORS	CO1	. Use concepts in common methods for converting a physical parameter into an electrical quantity
	CO2	Classify and explain with examples of transducers, including those for measurement of temperature, strain motion, position and light.
*	CO3	Choose proper sensor comparing different standards and guidelines to make sensitive measurements of



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		physical parameters like pressure, flow, acceleration, etc
	CO4	. Predict correctly the expected performance of various sensors.
	CO5	Locate different type of sensors used in real life applications and paraphrase their importance.
	CO6	Set up testing strategies to evaluate performance characteristics of different types of sensors and transducers.
	CO7	develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.
IOT AND APPLICATIONS	CO1	Understand internet of Things and its hardware and software components.
	CO2	 Interface I/O devices, sensors & communication modules.
	CO3	Remotely monitor data and control devices.
	CO4	. Design real time IoT based applications
SOFT COMPUTING TECHNIQUES	CO1	Develop intelligent systems leveraging the paradigm of soft computing techniques.
1 Dellin Quant	CO2	Implement, evaluate and compare solutions by various soft computing approaches for finding the optimal solutions.
	CO3	. Recognize the feasibility of applying a soft computing methodology for a particular problem.
	CO4	 Design the methodology to solve optimization problems using fuzzy logic, genetic algorithms and neural networks.
	CO5	Design hybrid system to revise the principles of soft computing in various application.
IC APPLICATIONS	CO1	Analyze the Differential Amplifier with Discrete components
	CO2	Describe the Op-Amp and internal Circuitry: .555 Timer, PLL.
	CO3	Discuss the Applications of Operational amplifier: 555 Timer, PLL.



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		the state of the s
	CO4	Design the digital application using digital ICs.
	CO5	Use the Op-Amp in A to D & D to A Converters.
PRINCIPLES OF COMMUNICATIONS	CO1	 Analyze the performance of analog modulation schemes in time and frequency domains.
,	CO2	. Analyze the performance of angle modulated signals.
	CO3	Characterize analog signals in time domain as random processes and noise.
	CO4	Determine the performance of analog communication systems in terms of SNR.
	CO5	Analyze pulse amplitude modulation, pulse position modulation, pulse code modulation and TDM systems.
BASIC ELECTRONICS	COI	Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
	CO2	Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
	CO3	. Understand the construction, principle of operation o transistors.
*		si (e.
DATA COMMUNICATIONS	CO1	. Know the Categories and functions of various Data communication .
	CO2	Design and analyze various error detection techniques.
_	CO3	Demonstrate the mechanism of routing the data in network layer.
	CO4	Know the significance of various Flow control and Congestion control Mechanisms.
DIGITAL LOGIC DESIGN	COI	Classify different number systems and apply togeneral various codes.
	CO2	Use the concept of Boolean algebra in minimization of switching functions.
	CO3	Design different types of combination illogic circuits.
	CO4	Apply knowledge of flip-flops in designing of Registers and counters.



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	CO5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
	CO6	 Produce innovative designs by modifying the traditional design techniques.
REMOTE SENSING ANDGIS	CO1	. Retrieve the information content of remotely sensed data .
12	CO2	. Analyze the energy interactions in the atmosphere and earth surface features.
	CO3	Interpret the images for preparation of thematic maps.
	CO4	Apply problem specific remote sensing data for engineering applications.
	CO5	Analyze spatial and attribute data for solving spatial problems.
*	CO6	Create GIS and cartographic outputs for presentation.
	В.Т	ech 8th Sem
BIO MEDICAL INSTRUMENTATION	COI	Apply principles and concepts of electronics to analyze input and output signals in medical electronics 2
	CO2	Apply principles and concepts of electronics to design filters for de-noising of medical measurements.
	CO3	Recognize different types of transducers, ongoing progress in improving their design, and their application in medical measurements.
	CO4	Apply principles and concepts of sensing and engineering to (i) design diagnostic devices for detection of markers in biofluids, and (ii) be able to evaluate quality of diagnostic devices.
	COS	Apply engineering tools to evaluate parameters needed for point-of-care health screening and mobile-health, and design of appropriate point-of-care diagnostic devices.
Data Acquisition Systems	CO1	Be able to identity a data acquisition system.
52	CO2	Be able to prescribe a sensor type to measure a specific environmental change.
8	CO3	. Be able to determine what type of amplifier is needed for a specific sensor output.



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	CO4	. Be familiar with different forms of signal conditioning.
9.	CO5	Be familiar with different methods of Analog-to- Digital conversion.
	CO6	Be able to identify the type of interface used to get a digital signal into a microprocessor.
ADAPTIVE CONTROL SYSTEMS	CO1	Design identifiers and adaptive controllers for linear systems.
0101220	CO2	. Design Adaptive feedback linearizing control systems for nonlinear systems.
	CO3	: Apply the concept of different types of optimal control for solving problems.
	CO4	Apply the concept of calculus of variation and principa of optimality for solving problems
	CO5	Apply the concept of Linear Quadratic method for solving problems CO.
	CO6	Apply the concept of adaptive control technique for solving problems.
BIO-MEDICAL INSTRUMENTATION	CO1	Apply principles and concepts of electronics to analyze input and output signals in medical electronics
	- CO2	Apply principles and concepts of electronics to design filters for de-noising of medical measurements.
	CO3	. Recognize different types of transducers, ongoing progress in improving their design, and their application in medical measurements.
	CO4	 Apply principles and concepts of engineering to quantify and model measurements of bio potentials.
	CO5	Apply principles and concepts of sensing and engineering to (i) design diagnostic devices for detection of markers in bio fluids, and (ii) be able to evaluate quality of diagnostic devices.
34 34 S	CO6	. Apply engineering tools to evaluate parameters needed for point-of-care health screening and mobile- health, and design of appropriate point-of-care diagnostic devices.
DIGITAL CONTROL SYSTEMS	CO1	 Design a pure, two-pole system that satisfies specified performance specifications like percent overshoot, peak time, settling time, and DC gain.
	CO2	Calculate the z-plane location of a pair of dominant



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		poles given time-domain performance information like percent overshoot, settling time, and peak time.
	CO3	Create discrete equivalents from given continuous-time systems.
	· CO4	 Able to Construct a discrete-time difference equation containing input variables and output variables at particular time instances from a system's discrete-time transfer function.
	CO5	Numerically compute the value of any system variable (e.g., state variable or output variable) at any discrete, time instant given initial conditions and input waveforms.
PROCESS CONTROL INSTRUMENTATION	CO1	Understand the popular process automation technologies.
	CO2	Design and development of different PLC programming for simple process applications.
	CO3	Understand the different security design approaches, Engineering and operator interface issues for designing Distributed control system.
	CO4	Know the latest communication technologies like HART and Field bus protocol. Mapping of Course Outcome with Programme Outcomes:
	Y	*
TRANSDUCERS AND SENSORS	CO1	Use concepts in common methods for converting a physical parameter into an electrical quantity.
	CO2	Classify and explain with examples of transducers, including those for measurement of temperature, strain, motion, position and light.
	CO3	Choose proper sensor comparing different standards and guidelines to make sensitive measurements of physical parameters like pressure, flow, acceleration, etc
	CO4	 Predict correctly the expected performance of various sensors.
	CO5	 Locate different type of sensors used in real life applications and paraphrase their importance.
	CO6	Set up testing strategies to evaluate performance



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		characteristics of different types of sensors and transducers.
	CO7	develop professional skills in acquiring and applying the knowledge outside the classroom through design of a real-life instrumentation system.
MEMS	CO1	Understand the basic overview of MEMS and Microsystems with broad category of MEMS& Micro system applications.
	CO2	Understanding the working principles of Microsystems.
	CO3	Understand the Scaling Laws in Miniaturization and Materials for MEMS and Microsystems.
	CO4	Understand the Micro system Fabrication Process and Analyze the different Micro manufacturing process and Applications.
	CO5	Study and Analyze the different types of RF switches, Various Switching Mechanism and their applications.
Intelligent and Smart Instrumentation	COI	To develop the design methodologies for measurement and instrumentation of real world problems.
	CO2	To be study the concepts of intelligent sensor devices, their performance characteristics and signal and system dynamics.
	CO3	To address the issues in dealing signal conditioning operations such as calibration, linearization and compensation.
	CO4	To use artificial intelligence in sensor signal processing to solve real world problems.
	CO5	To deal with interfacing protocols in wireless networking platform.
VLSI TECHNOLOGY AND DESIGN	CO1	. Understand the basics of MOS transistors and also the characteristics of MOS transistors.
	CO2	. Learn about the MOS fabrication process and short channel effects.
	CO3	Learn about the basic rules in layout designing.
	CO4	Analyze various combinational logic networks and sequential systems.

PREUDIN



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		40
CMOS ANALOG IC	CO1	Design MOSFET based analog integrated circuits.
DESIGN	CO2	Analyze analog circuits at least to the first order.
3	CO3	Appreciate the trade-offs involved in analog integrated circuit design.
	-CO4	Understand and appreciate the importance of noise and distortion in analog circuits.
CMOS DIGITAL IC DESIGN	CO1	Demonstrate advanced knowledge in Static and dynamic characteristics of CMOS, Alternative CMOS Logics, Estimation of Delay and Power, Adders Design.
	CO2	Classify different semiconductor memories.
8	CO3	Analyze, design and implement combinational and sequential MOS logic circuits.
	CO4	Solve engineering problems for feasible and optimal solutions in the core area of digital ICs.
DESIGN OF TESTABILITY	CO1	. apply the concepts in testing which can help them design a better yield in IC design.
	CO2	tackle the problems associated with testing of semiconductor circuits at earlier design levels so as to significantly reduce the testing costs.
	CO3	. analyses the various test generation methods for static & dynamic CMOS circuits.
50	CO4	identify the design for testability methods for combinational & sequential CMOS circuits.
*	CO5	recognize the BIST techniques for improving testability.
8	COI	. apply the concepts in testing which can help them design a better yield in IC design.
	CO2	tackle the problems associated with testing of semiconductor circuits at earlier design levels so as to significantly reduce the testing costs.
	CO3	. analyses the various test generation methods for stati



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	& dynamic CMOS circuits.
CO4	identify the design for testability methods for combinational & sequential CMOS circuits.
CO5	recognize the BIST techniques for improving testability.



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Program Outcomes (Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. 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.

- 11. 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, tomanage projects and in multidisciplinary environments.
- 12. 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 Educational Objectives (PEOs)

- 1. To prepare successful career in industry and motivation for higher education.
- 2. To inculcate the graduate professionalism, ethics and effective communication skills.

Program Specific Outcomes (PSOs)

- 1. Design and simulate diverse problems associated in the field of Electrical and Electronics Engineering
- 2. Ability to understand the recent technological developments in Electrical & Electronics Engineering

B.Tech – II Year II Semester					
Course Code	Course Name		Course Outcomes		
	26	CO1	Develop essential programming skills in computer programming concepts like data types, containers		
R2022021	PYTHON PROGRAMMING	CO2	Apply the basics of programming in the Python language Solve coding tasks related conditional execution, loops		
		CO3	Solve coding tasks related to the fundamental notions and techniques used in object- oriented programming		
R2022022 DIGITAL ELECTRONI		CO1	Classify different number systems and apply to generate various codes.		
		CO2	Use the concept of Boolean algebra in minimization of switching functions		
	DIGITAL ELECTRONICS	CO3	Design different types of combinational logic circuits.		
		CO4	Apply knowledge of flip-flops in designing of Registers and counters		
		CO5	The operation and design methodology for synchronous sequential circuits and algorithmic state machines.		
		COI	Identify the different components of thermal power plants		

POWER SYSTEMS - I	CO2	Identify the different components of nuclear Power plants.	
	CO3	Identify the different components of air and gas insulated substations.	
		CO4	Identify single core and three core cables with different insulating materials.

	CO5	Analyse the different economic factors of power generation and tariffs.
	CO1	Explain the operation and performance of three phase induction motor.
	CO2	Analyze the torque-speed relation, performance of induction motor and induction generator.
INDUCTION AND SYNCHRONOUS MACHINES	CO3	Implement the starting of single phase induction motors.
	CO4	Develop winding design and predetermine the regulation of synchronous generators.
	CO5	Explain hunting phenomenon, implement methods of staring and correction of power factor with synchronous motor.
41.	CO1	The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product.
	CO2	The knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.
MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS	CO3	The pupil is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.
	CO4	The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis.
	COS	The Learner can able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.
PYTHON PROGRAMMING LAB	COI	Write, Test and Debug Python Programs
	CO2	Use Conditionals and Loops for Python Programs
	CO3	Use functions and represent Compound data using Lists, Tuples
	CO4	Dictionaries Use various applications using python
	MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS PYTHON PROGRAMMING	INDUCTION AND SYNCHRONOUS MACHINES CO3 CO4 CO5 MANAGERIAL ECONOMICS FINANCIAL ANALYSIS CO4 CO5 CO5 CO1 CO2 CO2 CO2 CO3 CO2 CO3 CO4 CO3 CO4 CO5 CO4 CO5

R2022026		COI	Assess the performance of single phase and three phase induction motors.
		CO2	Control the speed of three phase induction motor.
	INDUCTION AND SYNCHRONOUS MACHINES LAB	CO3	Predetermine the regulation of three-phase alternator by various methods.
		CO4	Find the Xd/Xq ratio of alternator and asses the performance of three-phase synchronous motor.
	ic)	CO5	Determine the performance of single phase AC series motor.
	DIGITAL ELECTRONICS LAB	CO1	Learn the basics of gates, filp-flops and counters.
		CO2	Construct basic combinational circuits and verify their functionalities.
R2022027		CO3	Apply the design procedures to design basic sequential circuits.
		CO4	To understand the basic digital circuits and to verify their operation.
		CO5	Apply Boolean laws to simplify the digital circuits.
	SKILL ORIENTED COURSE IOT	CO1	Apply various technologies of Internet of Things to real time applications.
R2022028		CO2	Apply various communication technologies used in the Internet of Things.
	APPLICATIONS OF ELECTRICAL ENGINEERING	CO3	Connect the devices using web and internet in the IoT environment.
		CO4	Implement IoT to study Smart Home, Smart city, etc.

	В.	Гесh – III Y	Year I Semester
Course Code	Course Name		Course Outcomes
		CO1	Calculate parameters of transmission lines for different circuit configurations.
) (F) (F) (F) (F) (F) (F) (F) (F) (F) (F	CO2	Determine the performance of short, medium and long transmission lines.
R2031021	POWER SYSTEMS-II	CO3	Analyse the effect of travelling waves on transmission lines.
	##:	CO4	Analyse the various voltage control methods and effect of corona.
		CO5	Calculate sag/tension of transmission lines and performance of line insulators.
	POWER ELECTRONICS	CO1	Illustrate the static and dynamic characteristics of SCR, Power-MOSFET and Power-IGBT.
		CO2	Analyse the operation of phase-controlled rectifiers.
R2031022		соз	Analyse the operation of three-phase full-wave converters, AC Voltage Controllers and Cycloconverters.
		CO4	Examine the operation and design of different types of DC-DC converters.
		CO5	Analyse the operation of PWM inverters for voltage control and harmonic mitigation.
	CONTROL SYSTEMS	COI	Derive the transfer function of physical systems and determination of overall transfer function using block diagram algebra and signal flow graphs.
R2031023		CO2	Determine time response specifications of second order systems and absolute and relative stability of LTI systems using Routh's stability criterion and roo locus method.
10001000		CO3	Analyze the stability of LTI systems using frequency response methods.
		CO4	Design Lag, Lead, Lag-Lead compensators to improve system performance using Bode diagrams.

		CO5	Represent physical systems as state models and determine the response. Understand the concepts of controllability and observability.
		CO1	Identify various illumination methods produced by different illuminating sources.
		CO2	Identify a suitable motor for electric drives and industrial applications
R203102B	UTILIZATION OF ELECTRICAL ENERGY	CO3	Identify most appropriate heating and welding techniques for suitable applications.
		CO4	Distinguish various traction system and determine the tractive effort and specific energy consumption.
		CO5	Validate the necessity and usage of different energy storage schemes for different applications and comparisons.
	CONTROL SYSTEMS LABORATORY	CO1	Analyze the performance and working Magnetic amplifier, D.C and A.C. servo motors and synchros.
		CO2	Design P,PI,PD and PID controllers, Design lag, lead and lag-lead compensators & Evaluate temperature control of an oven using PID controller.
R2031024		CO3	Determine the transfer function of D.C Motor, Analyze the performance of D.C and A.C Servo Motor & Test the controllability and observability.
		CO4	Judge the stability in time and frequency domain.
		CO5	To examine different logic gates and Boolean expressions using PLC.
		CO1	Analyse characteristics of various power electronic devices and design firing circuits for SCR.
	POWER	CO2	Analyse the performance of single-phase dual, three-phase full-wave bridge converters and dual converter with both resistive and inductive loads.
R2031025	ELECTRONICS LABORATORY	CO3	Examine the operation of Single-phase AC voltage regulator and Cycloconverter with resistive and inductive loads.
		CO4	Differentiate the working and control of Buck converter and Boost converter.

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	×	CO1	Follow strategies in minimizing time consumption in problem solving Apply shortcut methods to solve problems
		CO2	Confidently solve any mathematical problems and utilize these mathematical skills both in their professional as well as personal life.
R2031026	SOFT SKILL COURSE EMPLOYABILITY SKILLS	CO3	Analyze, summarize and present information in quantitative forms including table, graphs and formulas
		CO4	Understand the core competencies to succeed in professional and personal life
CO5	Learn and demonstrate a set of practical skills such as time management, self-management, handling conflicts, team leadership, etc.		
	×	CO1	Understanding of the natural resources.
	ENVIRONMENTAL SCIENCE	CO2	Understanding of the ecosystem and its diversity.
R2031027		CO3	Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities.
		CO4	Understanding of the environmental impact of developmental activities.
		CO5	Awareness on the social issues, environmental legislation and global treaties.
	4"		
	В.Т	ech – III	Year II Semester
Course Code	Course Name		Course Outcomes
R2032021	MICROPROCESSORS AND	CO1	Know the concepts of the Microprocessor capability in general and explore the evaluation of microprocessors.
NEVJEVE1	MICROCONTROLLERS	CO2	Analyse the instruction sets - addressing modes - minimum and maximum modes operations of 8086 Microprocessors

		CO3	Analyse the Microcontroller and interfacing capability
		CO4	Describe the architecture and interfacing of 8051 controller
	v	CO5	Know the concepts of PIC micro controller and its programming.
		CO1	Know the construction and working of various types of analog instruments.
		CO2	Describe the construction and working of wattmeter and power factor meters
R2032022	ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	CO3	Know the construction and working various bridges for the measurement resistance - inductance and capacitance
	norno, and a second	CO4	Know the operational concepts of various transducers
		CO5	Know the construction and operation digital meters
	POWER SYSTEM ANALYSIS	COI	Draw impedance diagram for a power system network and calculate per unit quantities.
		CO2	Apply the load flow solution to a power system using different methods.
R2032023		CO3	Form Zbus for a power system networks and analyse the effect of symmetrical faults.
		CO4	Find the sequence components for power system Components and analyse its effects of unsymmetrical faults.
		CO5	Analyse the stability concepts of a power system.
	SWITCHGEAR AND PROTECTION	CO1	Illustrate the principles of arc interruption for application to high voltage circuit breakers of air - oil - vacuum - SF6 gas type.
R203202D		CO2	Analyse the working principle and operation of different types of electromagnetic protective relays.
:+		CO3	Acquire knowledge of protective schemes for generator and transformers for different fault conditions.

	9-	CO4	Classify various types of protective schemes used for feeders and bus bar protection and Types of static relays.
		CO5	Analyse the operation of different types of over voltages protective schemes required for insulation co-ordination and types of neutral grounding.
		COI	Know about the phantom loading. & Learn the calibration process.
	ELECTRICAL	CO2	Measure the electrical parameters voltage - current - power - energy and electrical characteristics of resistance - inductance and capacitance.
R2032024	MEASUREMENTS AND INSRUMENTATION	CO3	Gain the skill knowledge of various brides and their applications.
	LABORATORY	CO4	Learn the usage of CT's - PT's for measurement purpose.
	CO5	Know the characteristics of transducers. & Measure the strains - frequency and phase difference	
	MICRO PROCESSORS AND MICRO CONTROLLERS LAB	CO1	Write assembly language program using 8086 microprocessor based on arithmetic - logical - number systems and shift operations.
		CO2	Write assembly language programs for numeric operations and array handling problems.
R2032025		CO3	Write a assembly program on string operations. & Interface 8086 with I/O and other devices.
		CO4	Do parallel and serial communication using 8051 & PIC 18 micro controllers.
COS	CO5	Program microprocessors and microcontrollers for real world applications.	
	POWER SYSTEMS AND SIMULATION LAB	CO1	Estimate the sequence impedances of 3-phase Transformer and Alternators.
		CO2	Evaluate the performance of transmission lines.
R2032026		CO3	Analyse and simulate power flow methods in power systems.
		CO4	Analyse and simulate the performance of PI controller for load frequency control.

	٤)	CO5	Analyse and simulate stability studies of power systems.
	3)	CO1	Illustrate and comprehend the basics of Machine Learning with Python
		CO2	Demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions
R2032027	SKILL ADVANCED COURSE MACHINE LEARNING WITH PYTHON	CO3	Demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms
	WITHFILLION	CO4	Evaluate the concepts of binning, pipeline Interfaces with examples
		CO5	Apply the sentiment analysis for various case studies
	RESEARCH METHODOLOGY	CO1	Understand objectives and characteristics of a research problem
		CO2	Analyze research related information and to follow research ethics.
R2032028		CO3	Understand the types of intellectual property rights.
		CO4	Learn about the scope of IPR.
		CO5	Understand the new developments in IPR.
	В.	Γech – Γ	V Year I Semester
Course Code	Course Name		Course Outcomes
		COI	Illustrate the concept of databases, database management systems, database languages, database structures and their work
R204102E	DATA BASE MANAGEMENT SYSTEMS	CO2	Apply ER modeling and Relational modeling for designing simple databases.
		CO3	Summarize the concepts related to relational mode and SQL and Write database queries using relational algebra and structured query language.

		CO4	Design and develop databases from the real world by applying the concepts of Normalization.
		CO5	Outline the issues associated with Transaction Management and Recovery, Tree Structured Indexing
	9	CO1	Know the concept of electric vehicles and hybrid electric vehicles.
		CO2	Familiar with different configuration of hybrid electric vehicles.
R204102F	HYBRID ELECTRIC VEHICLES	CO3	Choose an effective motor for EV and HEV application
		CO4	Understand the power converters used in hybrid electric vehicles
		CO5	Know different batteries and other energy storage systems.
	POWER SYSTEM OPERATION AND CONTROL	CO1	Compute optimal load scheduling of Generators.
R204102I		CO2	Formulate hydrothermal scheduling and unit commitment problem
		CO3	Analyse effect of Load Frequency Control for single area systems
		CO4	Analyse effect of Load Frequency Control for two area systems
		CO5	Describe the effect of reactive power control for transmission lines.
	UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY	CO1	Identify and analyze an ethical issue in the subject matter under investigation or in a relevant field
		CO2	Identify the multiple ethical interests at stake in a real- world situation or practice
R2041011		CO3	Articulate what makes a particular course of action ethically defensible
		CO4	Assess their own ethical values and the social context of problems

	-	CO5	Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, the objective presentation of data, and the treatment of human subjects.
	SKILL ADVANCED COURSE MACHINE LEARNING WITH PYTHON LAB	CO1	Illustrate and comprehend the basics of Machine Learning with Python
		CO2	Demonstrate the algorithms of Supervised Learning and be able to differentiate linear and logistic regressions
R204102Q		CO3	Demonstrate the algorithms of Unsupervised Learning and be able to understand the clustering algorithms
		CO4	Evaluate the concepts of binning, pipeline Interfaces with examples
		CO5	Apply the sentiment analysis for various case studies

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Program Outcomes

(Engineering)

Engineering Graduates will be able to:

- Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 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.
- 3. 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.
- 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.
- 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.
- 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.
- 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.
- Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. Communication: Communicate effectively on complex engineering PRINCIPAL/DIRECT VIKAS GROUP OF INSTIT activities with the engineering community and with society at large, such as, NUNNA 521 21: being able to comprehend and write effective reports and deMijayawada Rural, NTR Di documentation, make effective presentations, and give and receive clear

instructions.

- 11. 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.
- 12. 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 Educational Objectives (PEOs)

- To attain technical skills to analyze and solve complex problems and issues related to Mechanical Engineering
- To motivate the students to adapt to the new technological trends in Mechanical Engineering to address the societal needs

Program Specific Outcomes (PSOs)

- Apply the principles of Thermal and Engineering Design for Analysis and Development of Mechanical Systems
- Able to model, simulate, analyze and optimize mechanical systems / processes through application of software

B.TECH MECHANICAL ENGINEERING (R20)

Course Code	Course Name	Course Outcomes
		I-I
· N		Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
R201104	Engineering	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
	Drawing	Understand and draw projection of solids in various positions in first quadrant.
		Explain principles behind development of surfaces.
		Prepare isometric and perspective sections of simple solids.
		I-II
		The student should be able to draw free body diagrams for FBDs for particles and rigid bodies in plane and space and problems to solve the unknown forces, orientations and geometric parameters.
R201210	Engineering Mechanics	The student should be able to determine centroid for lines, areas and center of gravity for volumes and their composites.
		The student should be able to determine area and mass movement of inertia for composite sections
36		The student should be able to analyze motion of particles and rigid bodies and apply the principles of motion, work energy and impulse – momentum.
		After undergoing the course the student is expected to learn Basic concepts of thermodynamics
		After undergoing the course the student is expected to learn Laws of thermodynamics
R201254	Thermodynamics	After undergoing the course the student is expected to learn Concept of entropy
3		After undergoing the course the student is expected to learn Property evaluation of vapors and their depiction in tables and charts
		After undergoing the course the student is expected to learn Evaluation of properties of perfect gas mixtures
		Identify workshop tools and their operational capabilities.
R2012032	Workshop Practice	Practice on manufacturing of components using workshop trades including fitting, carpentry, and foundry and welding.
		Apply fitting operations in various applications.
3		Apply basic electrical engineering knowledge for House Wiring Practice

Course Code	Course Name		Course Outcomes
Couc			II-I
	VECTOR CALCULUS	CO1	The student will be able to interpret the physical meaning of different operators such as gradient, curl and divergence
		CO2	The student will be able to estimate the work done against a field, circulation and flux using vector calculus and apply the Laplace transform for solving differential equations
R2021011	FOURIER TRANSFORMS	CO3	The student will be able to find or compute the Fourier series of periodic signals
	and PDE (M-	CO4	The student will be able to know and be able to apply integral expressions for the forwards and inverse Fourier transform to a range of non- periodic waveforms
		CO5	The student will be able to identify solution methods for partial differential equations that model physical processes
	MECHANICS OF SOLIDS	COI	Model & Analyze the behavior of basic structura members subjected to various loading and support conditions based on principles of equilibrium.
		CO2	Understand the apply the concept of stress and strain to analyze and design structural members and machine parts under axial, shear and bending loads, moment and torsional moment.
R2021031		CO3	Students will learn all the methods to analyze beams, columns, frames for normal, shear, and torsion stresses and to solve deflection problems in preparation for the design of such structura components. Students are able to analyze beams and draw correct and complete shear and bending moment diagrams for beams.
		CO4	Students attain a deeper understanding of the loads stresses, and strains acting on a structure and thei relations in the elastic behavior
		CO5	Design and analysis of Industrial components like pressure vessels.
		CO1	The basic concepts of fluid properties.
	FLUID	CO2	The mechanics of fluids in static and dynamic conditions.
R2021032	MECHANICS & HYDRAULIC	CO3	Boundary layer theory, flow separation and dimensional analysis.
()6	MACHINES	CO4	Hydrodynamic forces of jet on vanes in different positions.
		CO5	Working Principles and performance evaluation of hydraulic pump and turbines.
		COI	Able to design the patterns and core boxes for metal casting processes
R2021033	PRODUCTION TECHNOLOGY	CO2	Able to design the gating system for different metallic components
7		CO3	Know the different types of manufacturing processes
		CO4	Be able to use forging, extrusion processes PROCUPALIE



		CO5	Learn about the different types of welding processes used for special fabrication.
¥ .	C01	The student should be able to Contrive a mechanism for a given plane motion with single degree of freedom.	
		C02	The student should be able to Suggest and analyze a mechanism for a given straight line motion and automobile steering motion.
R2021034	KINEMATICS OF MACHINERY	C03	The student should be able to Analyze the motion (velocity and acceleration) of a plane mechanism.
		C04	The student should be able to Suggest and analyze mechanisms for a prescribed intermittent motion like opening and closing of IC engine valves etc.
(#)		C05	The student should be able to Select a power transmission system for a given application and analyze motion of different transmission systems
R2021035 DRAWING		C01	Student gets exposed on working of sheet metal with help of development of surfaces.
	AIDED ENGINEERING	C02	Student understands how to know the hidden details of machine components with the help of sections and interpenetrations of solids.
	PRACTICE	C03	Student shall exposed to modeling commands for generating 2D and 3D objects using computer aided drafting tools which are useful to create machine elements for computer aided analysis.
	FLUID MECHANICS & HYDRAULIC MACHINERY LAB	C01	The student will be able to identify importance of various fluid properties at rest and in transit.
R2021036		C02	The student will be able to derive and apply general governing equations for various fluid flows.
		C03	The student will be able to evaluate the performance characteristics of hydraulic turbines and pumps.
	PRODUCTION	C01	To apply some of the manufactures process directly in the industry for preparation of complicated jobs.
R2021037	TECHNOLOGY LAB	C02	At the end of the lab learn preparation of various jobs using various manufacturing process
	LAB	C03	The student will be trained to implement similar features in preparation of jobs can be extended to implement in the preparation of complicated jobs
	DRAFTING AND	C01	Learned basic concept to drawing, edit, dimension, hatching etc. to develop 2&3D Modeling.
R2021038	MODELING LAB	C02	Able to make 3D modeling, Assembling, modification & manipulation along with detailing.
		C03	Able to prepare surface modeling and sheet metal operations through various exercises
		C01	After completion of the course, students will be able to Understand the concept of Traditional knowledge and its importance
R2021039	ESSENCE OF INDIAN	C02	After completion of the course, students will be able to Know the need and importance of protecting traditional knowledge
R2021039	TRADITIONAL KNOWLEDGE	C03	After completion of the course, students will be able to Know the various enactments related to the protection of traditional knowledge
		C04	After completion of the course, students will be able to Understand the concepts of Intellectual property to protect the traditional knowledge

Course Code	Course Name		Course Outcomes
Couc			П-П .
	MATERIALS SCIENCE & 2031 METALLURGY	C01	Understand the crystalline structure of different metals and study the stability of phases in different alloy systems.
R2022031		C02	Study the behavior of ferrous and non ferrous metals and alloys and their application in different domains
		C03	Able to understand the effect of heat treatment, addition of alloying elements on properties of ferrous metals.
		C04	Grasp the methods of making of metal powders and applications of powder metallurgy
		C05	Comprehend the properties and applications of ceramic, composites and other advanced methods.
R2022011	COMPLEX VARIABLES AND STATISTICAL METHODS	C01	the course students will be able to apply Cauchy- Riemann equations to complex functions in order to determine whether a given continuous function is analytic
		C02	the course students will be able to find the differentiation and integration of complex functions used in engineering problems
		C03	the course students will be able to make use of the Cauchy residue theorem to evaluate certain integrals
		C04	the course students will be able to apply discrete and continuous probability distributions
		C05	the course students will be able to design the components of a classical hypothesis test and infer the statistical inferential methods based on small and large sampling tests
R2022032	DYNAMICS OF MACHINERY	C01	To compute the frictional losses and transmission in clutches, brakes and dynamometers
		C02	To analyze the forces in four bar and slider crank mechanisms and design a flywheel
		C03	To determine the effect of gyroscopic couple in motor vehicles, ships and aero planes To determine the rotary unbalanced mass in reciprocating equipment
		C04	To determine the unbalanced forces and couples in reciprocating and radial engines
		C05	To determine the natural frequencies of discrete systems undergoing longitudinal, torsional and transverse vibrations.
R2022033	THERMAL ENGINEERING - I	C01	Student must able to Derive the actual cycle from fuel- air cycle and air- standard cycle for all practical applications
		C02	Student must able to Explain working principle and various components of IC engine
		C03	Student must able to Explain combustion phenomenon of CI and SI engines and their impact on engine variables. Analyze the performance of an IC engine based on the performance parameters.
		C04	Student must able to Explain the cycles and systems of a gas turbine and determine the efficiency of gas turbine
		C05	Student must able to Explain the applications and working principle of rockets and jet propulsion PRINCIPA

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7		C01	Design and conduct experiments, analyse, interpret data and synthesize valid conclusions
		C02	Design a system, component, or process, and synthesize solutions to achieve desired needs
	INDUSTRIAL ENGINEERING	C03	Use the techniques, skills, and modern engineering tools necessary for engineering practice
R2022034	AND MANAGEMENT	C04	Use the techniques, skills, and modern engineering tools necessary for engineering practice with appropriate considerations for public health and safety, cultural, societal, and environmental constraints
•		C05	Function effectively within multi-disciplinary teams and understand the fundamental precepts of effective project management
	CO1	Determination of mechanical properties of different materials AND Establish the constitutive relations in metals using destructive methods	
R2022035	MECHANICS OF SOLIDS & METALLURGY	CO2	Understand the behavior of members during twisting and transverse loading and Familiarize with standard test specimens
LAB	CO3	The material properties and testing methods along with crystal structures and deformations, Harden ability of steels by Jominy End Quench Test and Prepare samples for investigating micro structure of different materials.	
		C01	Draw and represent standard dimensions of different mechanical fasteners and joints and Couplings.
		C02	Draw different types of bearings showing different components.
R2022036	MACHINE DRAWING PRACTICE	C03	Assemble components of a machine part and draw the sectional assembly drawing showing the dimensions of all the components of the assembly as per bill of materials
		C04	Select and represent fits and geometrical form of different mating parts in assembly drawings.
		C05	To prepare manufacturing drawings indicating fits, tolerances, surface finish and surface treatment requirements.
		CO1	understand the kinematics and rigid-body dynamics of kinematically driven machine components
	THEORY OF MACHINES LAB	CO2	understand the motion of linked mechanisms in terms of the displacement, velocity and acceleration at any point in a rigid link
		CO3	Students can understand the Gear terminology and able to analyze the spur gear trains.
		C01	student will be able to Solve the different methods for linear, non-linear and differential equations
Water Table Department of Artist	PYTHON PROGRAMMING	C02	student will be able to Learn the PYTHON Programming language
R2022038	LAB	C03	student will be able to Familiar with the strings and matrices in PYTHON
		C04	student will be able to Write the Program scripts and functions in PYTHON to solve the methods

Course Code	Course Name	Course Outcomes			
Cour		D	I-I		
		CO1	Student will be able to Explain the basic concepts of thermal engineering and boilers		
		CO2	Student will be able to Discuss the concepts of steam nozzles and steam turbines.		
R2031031	Thermal Engineering-II	CO3	Student will be able to Gain knowledge about the concepts of reaction turbine and steam condensers.		
		CO4	Student will be able to Discuss the concepts of reciprocating and rotary type of compressors.		
		CO5	Student will be able to Acquire knowledge about the centrifugal and axial flow compressors.		
		CO1	Student will be able to Judge about materials and their properties along with manufacturing considerations.		
40		CO2	Student will be able to Gain knowledge about the strength of machine elements		
R2021031	Design of Machine Members-I	CO3	Student will be able to Apply the knowledge in designing the riveted and welded joints, keys, cotters and knuckle joints.		
		CO4	Student will be able to Apply the knowledge in designing the shafts and shaft couplings.		
		CO5	Student will be able to Apply the knowledge in designing the mechanical springs.		
		COI	Student will be able to Discuss the concepts of machining processes.		
	MACHINING, MACHINE TOOLS & METROLOGY	CO2	Student will be able to Apply the principles of lathe, shaping, slotting and planning machines.		
R2021032		CO3	Student will be able to Apply the principles of drilling, milling and boring processes.		
3		CO4	Student will be able to Analyze the concepts of finishing processes and the system of limits and fits.		
		CO5	Student will be able to Learn the concepts of surface roughness and optical measuring instruments		
		COI	Student will be able to Demonstrate about general purpose machine tools in the machine shop.		
		CO2	Student will be able to Perform various operations on lathe machine.		
R2021034	MACHINE TOOLS LABORATORY	CO3	Student will be able to Perceive different operations on drilling machine.		
		CO4	Student will be able to Experiment with basic operations on shaping machine.		
		CO5	Student will be able to Utilize slotting machine to make keyways.		
		C06	Student will be able to Experiment with the basic operations on milling machine.		
R2021035	Thermal Engineering Lab	COI	Student will be able to Experiment with twe stroke and four stroke compression and spare		

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			ignition engines for various characteristics.
		CO2	Student will be able to Perceive flash point, fire point, calorific value of different fuels using various apparatus.
(*)		CO3	Student will be able to Perform engine friction, heat balance test, volumetric efficiency, load test of petrol and diesel engines.
		C04	Student will be able to Perform speed test, performance test and cooling temperature on petrol and diesel engines.
		C05	Student will be able to Utilize air compressor for its performance test and to determine efficiency.
		C06	Student will be able to Discuss the principles through assembly and disassembly of 2/3 wheelers, 2/4 stroke engines, tractor, heavy duty engines, boilers and their mountings and accessories.
	ADVANCED COMMUNICATION SKILLS LAB	C01	Students will be able to Acquire vocabulary and use it contextually
		C02	Students will be able to Listen and speak effectively
R2021036		C03	Students will be able to Develop proficiency in academic reading and writing
9		C04	Students will be able to Increase possibilities of job prospects
	PROFESSIONAL ETHICS AND HUMAN VALUES	C01	At the end of the course, student will be able to Judge the concepts of human values.
R2021037		C02	At the end of the course, student will be able to Justify knowledge about the principles of engineering ethics.
		C03	At the end of the course, student will be able to Interpret engineering as social experimentation
		C04	At the end of the course, student will be able to Realize engineers' responsibility for safety and risk.
		C05	At the end of the course, student will be able to Learn about the engineers' rights and responsibilities

Course Code	Course Name		Course Outcomes
Coue		П	I-II
		COI	Student will be able to Apply knowledge about mechanism and modes of heat transfer.
		CO2	Student will be able to Understand the concepts of conduction and convective heat transfer.
R2032031	Heat Transfer	CO3	Student will be able to Learn about forced and free convection.
	i meneralissantinge	CO4	Student will be able to Analyze the concepts of heat transfer with phase change and condensation along with heat exchangers.
		CO5	student will be able to Interpret the knowledge about radiation mode of heat transfer
		CO1	Student will be able to Apply knowledge about the design of bearings.
2		CO2	Student will be able to Explain the concepts in designing various engine parts.
R2032032	Design of Machine Members-II	CO3	Student will be able to Utilize the knowledge to design curved beams and power screws.
2000 TOP 2000 TO	Memoers-11	CO4	Student will be able to Justify power transmission systems and to design pulleys and gear drives.
		CO5	Student will be able to Apply the concepts in designing various machine tool elements.
*	2	CO1	student will be able to Discuss basic concepts o artificial intelligence, neural networks and genetic algorithms.
	INTRODUCTION TO ARTIFICIAL INTELLIGENCE & MACHINE	CO2	student will be able to Apply the principles of knowledge representation and reasoning.
R2032033		CO3	student will be able to Learn about bayesian and computational learning and machine learning.
	LEARNING	CO4	student will be able to Utilize various machine learning techniques.
90		CO5	student will be able to Apply the machine learning analytics and deep learning techniques
		CO1	Students are expected to learn the concepts and to Determine the heat transfer rate and coefficient.
		CO2	Students are expected to learn the concepts and to Determine the thermal conductivity, efficiency and effectiveness.
	HEAT TRANSFER	CO3	Students are expected to learn the concepts and to Determine the emissivity and Stefan- Boltzman constant.
R2032034 LAB	LAB	CO4	Students are expected to learn the concepts and to Determine critical heat flux and investigate Lambert's cosine law.
		CO5	Students are expected to learn the concepts and to Experiment with Virtual labs and analyse conduction, HT coefficient
	C06	Students are expected to learn the concepts and to Experiment with Virtual labs and investigate Lambert's laws.	
R2032035	CAE & CAM Lab	CO1	Students are expected to learn the concepts and should be able to Experiment with trusses and beams to determine stress, deflection, natural

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			frequencies, harmonic analysis, HT analysis and buckling analysis.
- 85		CO2	Students are expected to learn the concepts and should be able to Create part programmes using FANUC controller.
		CO3	Students are expected to learn the concepts and should be able to Apply G-codes for automated tool path using CAM software.
		C04	Students are expected to learn the concepts and should be able to Analyze about rapid prototyping machine and to print simple parts.
7		C05	Students are expected to learn the concepts and should be able to Experiment with virtual 3D printing simulation using Vlabs
	Measurements & Metrology lab	C01	student will be able to Demonstrate the calibration experiments with different gauges, transducers, thermocouple and temperature detector.
		C02	Demonstrate the calibration experiments with rotameter, seismic apparatus.
R2032036		C03	Demonstrate the calibration experiments with vernier calipers, micrometer, height and dial gauges.
		C04	Analyze various machine tools for their alignment.
		C05	Measure angular and taper measurements, straightness, surface roughness
R2032037	Artificial Intelligence and Machine Learning Lab	C01	At the end of the course, student will be able to apply the knowledge of artificial intelligence and machine learning models along with image classifiers and automatic facial recognition using various software tools.
	Research Methodology -	C01	Student will be able to Understand objectives and characteristics of a research problem.
R2032038		C02	Student will be able to Analyze research related information and to follow research ethics.
		C03	Student will be able to Understand the types of intellectual property rights.
		C04	Student will be able to Learn about the scope of IPR.
		C05	student will be able to Understand the new developments in IPR.

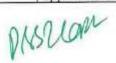
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Course Code	Course Name		Course Outcomes
Code		Г	V-I
	*	CO1	Students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
R2041011	Universal Human Values: Understanding	CO2	They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
	Harmony -	CO3	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.
		CO4	This is only an introductory foundational input. It would be desirable to follow it up by a) faculty-student or mentor-mentee programs throughout their time with the institution b) Higher level courses on human values in every aspect of living. E.g. as a professional
		CO1	Student will be able to Understand the Characteristics of LVDT
12	=	CO2	Student will be able to Measure load, displacement and temperature using analogue and digital sensors.
R204103Y	Mechatronics Lab	CO3	Student will be able to Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts.
		CO4	Student will be able to Simulate and analyze PID controllers for a physical system using MATLAB.
94		CO5	Student will be able to Develop pneumatic and hydraulic circuits using Automaton studio.
		Г	V-II
		CO1	The purpose of Project in Mechanica Engineering is to develop the necessary knowledge, understanding Practica knowedlege
		CO2	Demonstrated the ability to analyze, design and improve practical thermal and/or mechanical systems.
R2042031	Project work	CO3	To understand the mechanical behavior of understanding of designing process by gating data from actual project.
		CO4	Shown the ability to communicate effectively and work well on team based engineering projects
		CO5	Mechanical Engineering plays a vital role in the various field like thermal, production



design etc B.TECH MECHANICAL ENGINEERING (R23)

Course Code	Course Name		Course Outcomes
Code			I-I
-4		C01	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
Daaring	Engineering	C02	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
R231110	Graphics	C03	Understand and draw projection of solids in various positions in first quadrant.
+:		C04	Explain principles behind development of surfaces.
		C05	Prepare isometric and perspective sections of simple solids
		C01	The student should be able to Understand the different manufacturing processes.
D001105	Basic Mechanical	C02	The student should be able to Explain the basics of thermal engineering and its applications.
R231106	Engineering	C03	The student should be able to Describe the working of different mechanical power transmission systems and power plants.
		C04	The student should be able to Describe the basics of robotics and its applications.
	Engineering Workshop	C01	Identify workshop tools and their operational capabilities.
R231105L		C02	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
		C03	Apply fitting operations in various applications.
		C04	Apply basic electrical engineering knowledge for House Wiring Practice
-		1	I-II
	Engineering	C01	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
		C02	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
R231210	Graphics	C03	Understand and draw projection of solids in various positions in first quadrant.
i è	Ì	C04	Explain principles behind development of surfaces.
		C05	Prepare isometric and perspective sections of simple solids
P231206	THE STATE OF PROPERTY.	C01	The student should be able to Understand the different manufacturing processes.
	Basic Mechanical Engineering	C02	The student should be able to Explain the basics of thermal engineering and its applications.



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*		C03	The student should be able to Describe the working of different mechanical power transmission systems and power plants.
		C04	The student should be able to Describe the basics of robotics and its applications.
		C01	Identify workshop tools and their operational capabilities.
R231205L	Engineering	C02	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding.
	Workshop	C03	Apply fitting operations in various applications.
		C04	Apply basic electrical engineering knowledge for House Wiring Practice
	941	C01	the student should be able to Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.
	Engineering Mechanics	C02	the student should be able to Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments
R23120		C03	the student should be able to Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.
+		C04	the student should be able to Apply the principles of work-energy and impulse-momentum to solve the problems of rectilinear and curvilinear motion of a particle.
		C05	the student should be able to Solve the problems involving the translational and rotational motion of rigid bodies.
R23120	Engineering Mechanics Lab	C01	Evaluate the coefficient of friction between two different surfaces and between the inclined plane and the roller.
		C02	Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.
1100120		C03	Determine the Centre of gravity and Moment of Inertia of different configurations.
		C04	Verify the equilibrium conditions of a rigid body under the action of different force systems.



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Pharmacy

Program Outcomes

- POI Pharmacy Knowledge: Possess knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical technology, biotechnology, and administrative pharmacy sciences and manufacturing practices.
- PO2 Problem analysis: Analyze the problems with scientific principles clearly and critically and making decisions during routine practice. Analyze, evaluate and apply information systematically to make defensible decisions.
- PO3 Design and Development of Solutions: Design and development of drugs for complex health problems that meet the specific needs with appropriate consideration for the public health and safety and societal, 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: Learn and apply appropriate skills, selection of resources in modern pharmacy-related computing tools with an understanding of the limitations.
- PO6 The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the pharmacy profession.
- PO7 Environment and sustainability: Understand the impact of the Pharmacy
 profession related aspects and solutions in societal and environmental contexts, and
 demonstrate the knowledge of, and need for sustainable development.
- PO8 Pharmaceutical Ethics: Honour personal values and apply ethical practices in professional Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and taking responsibility.

9. PO9 Individual and Team work: Function effectively as an individual and as a



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member or a leader in diverse professional teams and in multidisciplinary settings.

- 10. PO10 Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
- 11. PO11 Project management & Finance: Demonstrate knowledge and understand pharmaceutical principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environment.
- 12. 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 and scientific change.

Program Educational Objectives (PEOs)

PEO 1: To be competent professional pharmacist who will utilize and practice professional principles of pharmacy in self practice, hospitals, government and non government organizations, academics, research institutions and cooperate sector.

PEO 2: To gain knowledge for supporting pharmaceutical industries, in their economical development, legal and regulatory perspective of drug approvals at national and international levels and will be able to address social and economic challenges of the nation.

PEO 3: To sustain continual professional development through lifelong learning activities and work for development of field that includes creation absorption and adoption of new knowledge, with leadership skills along with ethical responsibilities

Program Specific Outcomes (PSOs)



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PSO 1: Impart theoretical and practical knowledge to the students in the various fields of pharmaceutical sciences like pharmaceutics, pharmaceutical chemistry, pharmacology, pharmacognosy, communicational skills and leadership qualities.

PSO 2: Upgrade practical skills of the students through industrial training and research to meet the challenges of the pharmaceutical field.

PSO 3: Make aware the students with fundamental regulatory aspects of the pharmaceuticals.



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Pharmacy Courses Outcomes

	В	Pharm 1st Sem		
Course Name	Course Outcomes			
**	COI	Explain the gross morphology, structure and functions of various organs of the human body.		
Subject: Human Anatomy	CO2	Memorize integumentary system, Skeletal system an evarious jonts.		
and Physiology – I – Theory (BP101T)	CO3	Discuss about various body fluids and give special emphasis on Lymphatic system.		
»	CO4	Develop various experimental skills related to special senses and nervoussystem.		
	CO5	Summarize the cardiovascular system.		
	CO1	Understand the principles of volumetric and electro chemical analysis		
	CO2	Describe various volumetric and electrochemical titrations		
Subject:Pharmaceutical Analysis–I– Theory(BP102T)	CO3	Identify various basic concepts involved in precipitation, gravimetric and complexometric titration		
	CO4	Illustrate concept behind redox titration		
	CO5	Explain electrochemical methods of analysis, conductomtry,potentiometry,polarography method.		
Subject:Pharmaceutics - I -	CO1	Know the history of profession of pharmacy		
Theory (BP103T)	CO2	Understand the basics of different dosage forms, pharmaceuticalincompatibilitie and pharmaceutical calculations		
	CO3	Identify the Handling the prescription in professional way.		
	CO4	Describe the concept involved in preparation of various liquid dosage forms, and study of pharmaceutical incompatibilities.		
	CO5	Discuss about various semisolid dosage forms.		



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Subject:PharmaceuticalInor	COI	Describe various impurities in pharmaceutical substances.
	CO2	Summarize the general methods of preparation, properties, assay, and medicinal uses of Inorganic compounds.
ganic Chemistry	CO3	Discuss about chemistry of gastrointestinal agents.
	CO4	Understandpoisons and antidotes.
	CO5	Discuss the concept involved in Radio Pharmaceuticals
a Line	CO1	Discuss the theory and their applications of partial fractions in Pharmacy
Subject: RemedialMathematics – Theory(BP106RMT)	CO2	Solvethedifferent typesof problemsby applyingmatrices and determinant.
Subject Code:341172(41)	CO3	Understand important application of calculus in Pharmacy
	CO4	Applying analytical geometry
	CO5	Discuss differential equations, laplace transform.

	В.	Pharm 2 nd Sem
Course Name		Course Outcomes
Human Anatomy and Physiology – II –Theory (BP201T)	COI	Compare gross morphology, structure and functions of various organs of the human body.
	CO2	Identify the various tissues and organs of different systems of human body. Performthehaematological tests like blood celled unts, haemoglobine stimation, bleeding/clotting time ec. and also record blood pressure, heartrate, pulse and respiratory volume.
	CO3	Estimatebleeding/clottingtimeetc.andalsorecordblocdpressure,heartrate, pulse and respiratory volume.
	CO4	Acquainted with



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		coordinatedworkingpatternofdifferentorgansofeachs ystem
	CO5	Understanding the interlinked mechanisms in the maintenance of normalfunctioning(homeostasis) ofthe human body
Subject:PharmaceuticalOr ganicChemistry - I - Theory	CO1	Describe thestructure,nameandthetypeofisomerismoftheorgan iccompound
(BP202T)	CO2	Discuss to writethereaction,namethereactionandorientationofre actions
	CO3	Knowing reactivity/stability of compounds,
	CO4	Identify/confirmtheidentificationof anorganiccompound
	CO5	Discuss about carboxylic acids and aliphatic amines.
Subject: Biochemistry – Theory(BP203T)	CO1	Understandthecatalyticroleofenzymes, the importance of enzymeinhibitors in the design of new drugs, therapeutic and diagnostic applications of enzymes.
	CO2	Studythegeneticorganizationofmammaliangenomea ndfunctionsofDNAin the synthesis of RNAs and proteins.
	CO3	Understnading Geneticorganizationofmammaliangenomeandfuncti onsofDNAin the synthesis of RNAs and proteins.
	CO4	Study about genetic information
	CO5	Describe enzymes.
Subject:Pathophysiology – Theory (BP204T)	CO1	Understand the metabolism of nutrient molecules in physiological and



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		pathological conditions.
	CO2	Demonstrate the etiology and pathogenesis of the diseasesand disorders of CVS, Respiratory and renal systems.
	CO3	Explain the etiology and pathogenesis of the selected disease states.
	CO4	Summarize the signs and symptoms of the diseases and Mention the complicationsof the diseases
4	CO5	Understand the etiology and pathogenesis of infectious and transmitted diseases
Computer Applications in	CO1	Discuss types of application of computers in pharmacy
Pharmacy-Theor	CO2	Understand various types of databases
y (BP205T) Subject Code:	CO3	Make use of the various applications of databases in pharmacy
	CO4	Summaries the bioinformatics
	CO5	Describe data analysis and preclinical development
Environmental science- Theory(BP206)	CO1	Create the awareness about environmental problem among learners.
~	CO2	Understand basic knowledge about the environment and its allied problems.
	CO3	Develop an attitude of concern for the environment
	CO4	Explainlearnertoparticipateinenvironmentprotection and environment improvement.
	CO5	Acquireskillstohelptheconcernedindividualsinidenti yingandsolvingenvironmental problems.



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	В	Pharm 3 rd Sem
Course Name		Course Outcomes
PharmaceuticalOrganic Chemistry-II-Theory	CO1	Discuss about benzene and its derivatives.
(BP301T)	CO2	Explain concept involved in Phenols, Aromatic amines and acids.
	CO3	Describe about fats and Oils.
	CO4	Summerize the polynuclear hydrocarbons.
	CO5	Discuss about cyclo alkanes.
PhysicalPharmaceutics-I	CO1	Understand various Physicochemicalpropertiesofdrugmoleculesinthe designing the dosage form.
-Theory(BP302T)	CO2	Explain about solubility of drugs.
	CO3	Define the surface and interfacial phenomenon.
	CO4	Summerize the concept of complexation and protein binding.
	CO5	Describe the pH, buffers and isotonic solutions.
PharmaceuticalMicrobiology	CO1	Write basics introduction of microbiology, bacteria, culture media and microscopy.
Theory (BP303T)	CO2	Illustrate the identification process of bacteria using staining techniques and biochemical tests, and specialemphasis on sterilization.
	CO3	Summerize all details involved in fungi, viruses along with study of disinfectants and antiseptics.
	CO4	Prepare a detailed skim involved basics of asceptic area, microbiological assay and methods for standardization of antibiotics, vitamins and aminoacids.
	CO5	Describe all detailed study about spoilage and cell culture.
	COI	Explain flow of fluids, size reduction and separation.



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Pharmaceutical Engineering -Theory (BP304T)	CO2	Apply the concept behind heat transfer, evaporation, distillation.
	CO3	Define the process of drying and mixing.
	CO4	Discuss the method of Filtration and centrifugation.
	CO5	Review the Variouspreventivemethodsusedforcorrosioncontrol in Pharmaceutical industries.

B.Pharm 4 th Sem				
Course Name		Course Outcomes		
PharmaceuticalOrganic Chemistry – III –Theory	CO1	Understand the fundamentals of stereochemical aspects.		
(BP401T)	CO2	Explain sterio isomerism in biphenyl compounds and conditions for optical activity.		
	CO3	Identify medicinal uses and other applications of Organic compounds like pyrrole, Furan and thiophene.		
*	CO4	Identify medicinal uses and other applications of Organic compounds like pyrazole, imidazole, oxazole and thiazole.		
	CO5	Elaborate the reactions and synthetic importance of metal hybride reduction, clemmensen reduction ,Oppenauer oxidation and Beckmanns rearrangement.		
Medicinal Chemistry – I –Theory (BP402T)	CO1	Understand the history and development of medicinal chemistry along with physicochemical properties and drug metabolism.		
	CO2	Discuss about the drugs acting on autonomic nervous system.		
	CO3	ExplaintheStructuralActivityRelationship(SAR)ofadit ferentclassofdrugs		
	CO4	Describe the drugs acting on central nervous system like sedatives and hypnotics, antipsychotics and		



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		anticonvulsants.
	CO5	Discuss about drugs acting on CNS and Narcoticdrugs.
PhysicalPharmaceutics –II –	CO1	UnderstandProperties and applications of colloidal dispersions.
Theory(BP403T)	CO2	Interpretation of rheological behavior of fluids and deformation of solids.
	CO3	Discuss the formulation and evaluation of coarse dispersions making use of rheological and electrical properties.
	CO4	Explain micromerities.
	CO5	Make use of principles of kinetics in the stabilization of dosage forms.
Pharmacology–I – Theory(BP404T)	CO1	Define the fundamental concepts of pharmacology and pharmacokinetics.
	CO2	Understand the basics of pharmacodynamics, adverse drug reactions, drug interactions and drug discovery.
	CO3	Identify the role of neurohumoral transmission and drugs acting on peripheral nervous system.
	CO4	Analyze the functions of neurotransmitters and drugs acting on central nervous system
	CO5	Appraise the pharmacology of psychopharmacologica agents, drugs against neurodegenerative disorders and concept of drug addiction, abuse, dependence, tolerance.
Pharmacognosy –I – Theory(BP405T)	CO1	Recall the History, scope and development of pharmacognosy, classification of drugs and analysis of quality of crude drugs.
	CO2	Illustration of cultivation, collection, processing and storage of crude drugs and conservation of medicinal paints.
	CO3	Understand the plant tissue culture.
	CO4	Analyze role of pharmacognosy in allopathy and traditional system of medicine along with study of secondary metabolites like alaka; oids, glycosides,



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	flavonoids ,tannins,etc.
CO5	Explain biological sources, chemical nature and uses of plant products, primary metabolites, marine drugs.

B.Pharm 5 th Sem			
Course Name	Course Outcomes		
Medicinal Chemistry – II –Theory	CO1	Describe the detailed chemistry of antihistaminic drugs and anti neoplastic agents.	
(BP501T)	CO2	Compare the chemistry of anti angina and antihypertensive drugs.	
	CO3	Illustrate all basics involved in anti arrhythmic, antihyperlipidemic, coagulants and anti coagulants and drugs used in congestive heart failure.	
	CO4	Summarize the drugs acting on Endocrine system, see hormones and corticosteroids.	
	CO5	Explain anti diabetic agents and SAR of various local anaesthetics.	
Industrial Pharmacy – Theory (BP502T)	CO1	Illustrate Variouspharmaceuticaldosageformsandtheirmanufact ringtechniques.	
	CO2	Demonstrate in detail the steps involved in formulation of tablets and liquid oral dosage forms.	
	CO3	Summarize in detail about capsules and pellets.	
*	CO4	ExplainFormulation, manufacturing of parenteral dosage forms and Ophthalmic preparations.	
	CO5	Summarize the Formulation and manufacturing of cosmetics, Aerosols, packaging materials science.	
Pharmacology— II - Theory(BP503T)	CO1	Explain the pharmacology of drugs acting on cardiovascular system.	
	CO2	Describe in detail pharmacology of drugs acting on urinary system.	
	CO3	Summarize in detail autacoids and related drugs.	
	CO4	Explain the pharmacology of drugs acting on	



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		endocrine system.
	CO5	Discuss the basic concepts of Bio assay and Bioassay procedures.
Pharmacognosy&Phytochemi stry II - Theory(BP504T)	COI	Explain metabolic pathways in higher plants and procedure for determination of metabolites.
,	CO2	Summarize in detail about various secondary metabolites.
	CO3	Illustrate the process of Isolation, Identification and analysis of Phytoconstituents.
	CO4	Understand the industrial production, estimation and utilization of phytoconstituents.
	CO5	Describe the basics of phytochemistry.
PharmaceuticalJurisprudenc e-Theory (BP505T)	CO1	Describe in detail about Drugs and Cosmetics Act 1940 and its rules 1945.
	CO2	Summarize the Pharmacy Act 1948, medicinal and toilet preparations act 1955, Narcotics and psychotropic substances act 1985.
	CO3	Discuss salient features of drugs and magic remedies act, prevention of cruelty to animals act1960, and National pharmaceutical pricing authority.
	CO4	Understand important acts like medical termination of pregnancy act, Right to information act.
	CO5	Explain basic concepts from Intellectual property rights, pharmaceutical legislation, code of ethics.



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B.Pharm 6th Sem		
Course Name		Course Outcomes
Medicinal Chemistry –III-Theory (BP601T)	CO1	Summarize the classification, mechanism and uses of antibiotics like beta lactam, aminoglycosides and tetracyclines.
	CO2	Explain the mechanism, uses and SAR of drugs like macrolides, antimalarials, quinolines and basic concepts and applications of prodrugs,
*	CO3	Understand the mechanism, uses, SAR and synthesis of anti tubercular, anti infective and antiviral agents.
	CO4	Understand the mechanism, uses, SAR and synthesis of anti fungal, anti protozoal and sulphonamide drugs.
	CO5	Summarize the basics of drug design.
Pharmacology-III -Theory (BP602T)	CO1	Understnd Mechanism of drug action, uses of drug used in treatment of respiratory and gastrointestina tract diseases.
	CO2	Understand the mechanism and uses its relevance in the treatment of different infectious diseases.
	CO3	Comprehend the mechanism and Adverse reactions of drugs used in infections caused by bacteria, fungi, virus.
	CO4	Understand the pharmacology of drugs used in treatment of cancer along with drugs acting on immune system.
	CO5	Explain the principles of toxicology and summarize the basics of chronopharmacology.
Herbal DrugTechnology- Theory-(BP603T)	COI	Summarize Raw material as a source of herbal drugs from cultivation to herbal drug product.
	CO2	Interpret the role of neutraceuticals in the treatment of diseases.
	CO3	Understand importance of herbal cosmetics, excipients and herbal formulations.
	CO4	Explain WHOand ICH guidelinesfor evaluation ofherbal drugs and regulatory requirements.



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	CO5	Describe the Basics of herbal industry and schedule T.
BiopharmaceuticsandPhar macokinetics	CO1	Understand the basics concepts of Biopharmaceutics & Pharmacokinetics
-Theory-(BP604T)	CO2	Make use of plasma data and derive the pharmacokinetic parameters to describe the process of drug metabolism.
	CO3	Summarize the pharmacokinetic parameter and their significance.
	CO4	Understand design and evaluate dosage regimens of the drugs using pharmacokinetic andbiopharmaceutic parametrs
	CO5	Apply non linear kinetics.
PharmaceuticalBiotechnolo gy-	CO1	Understanding theimportane of immobilized enzymes in pharmaceuticalindustries
Theory-(BP605T)	CO2	Explain Genetic engineering applications in relation to production of pharmaceuticalsImportance of monoclonal antibodies in industries
	CO3	Use of microorganisms in fermentation technology
	CO4	Compare the genetic organization of different types of cells and to list detection methods at genomic level, gene transfer methods and mutagens.
	CO5	Comprehend the fermentation methods and synthesis of various biological and blood products.
PharmaceuticalQuality Assurance- Theory-(BP606T)	COI	Understand the cGMP aspects of pharmaceutical industryappreciate the importance of documentation
	CO2	Understand the scope of quality certifications applicable to pharmaceuticalindustries
	CO3	Understand the responsibilities of QA & QC departments
	CO4	appreciate cGMP aspects of pharmaceutical industry and the importance of documentation
	CO5	Apply and evaluate calibration procedures



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	B.Pharm 7th Sem		
Course Name		Course Outcomes	
InstrumentalMethods ofAnalysis-	CO1	Explain Interaction of matter with electromagnetic radiations and its applications in drug analysis	
Theory-(BP701T)	CO2	Understand the principles and instrumentation of Spectroscopic and Flame photometry.	
	CO3	Describe Chromatographic separation and analysis of drugs	
	CO4	Summarize qualitativeandquantitativeanalysisofdrugsusingvarious analytical instruments	
	CO5	Understand the Handling and analysis of sophisticated instruments.	
IndustrialPharmacy-II - Theory-(BP702T)	CO1	Summarize theprocessofpilotplantandscaleupofpharmaceuticald osage forms	
	CO2	Comprehend the principles of toxicology and treatment of various poisonings	
	CO3	Correlation of pharmacology with related medical sciences	
	CO4	Understanding and practice quality management systems	
	CO5	Understanding regulatory authorities.	
PharmacyPractice-Theory- (BP603T)	CO1	Outline differentdrug distributionmethods inhospitals	
	CO2	Appreciate pharmacy store management and inventory controls	
	CO3	Understand Monitor drug therapy of patient through medication chart review and clinical review	
	CO4	Summarize medication history interview and counsel the patients	



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F-	CO5	Comprehend drug management.
Novel DrugDelivery System-Theory-(BP704T)	CO1	Explain Variousapproachesfordevelopmentof noveldrugdelivery systems
	CO2	Describe criteria for selection of drugs and polymers for thedevelopment of novel drug delivery systems, their formulation and evaluation
	CO3	Formulate of various novel drug delivery systems.
	CO4	Formulate targeted drug deliveries
	CO5	Summarize Formulation of ocular drug deliveries.

	В.	Pharm 8 th Sem
Course Name		Course Outcomes
Biostatistics andResearchMethodology-	CO1	Compare operation of MS-Excel, SPSS, Rand MINITAB, DoE
Theory-(BP801T)	CO2	Understand variousstatisticaltechniquestosolvestatisticalproblem s
4	CO3	Illustratequalitativeandquantitativeanalysisofdrugsu singvarious analytical instruments.
	CO4	Applyvariousstatisticaltechniques in clinical trials.
	CO5	Applyvariousstatisticaltechniques in design and analysis of experiments.
Social andPreventivePharmacy- Theory-(BP802T)	COI	Acquire high consciousness/realization of current issue related to health and pharmaceutical problems within country and worldwide
	CO2	Understand the general principles of prevention and control of diseases.
	CO3	Evaluatealternativewaysofsolvingproblemsrelatedto healthandpharmaceutical issues
	CO4	Knowthe different health programmes.
	CO5	Understanding and practice communitive srevices
Theory-	COI	Study the process of drug discovery and



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(BP804T)Pharmaceutical		development
Regulatory Affairs	CO2	Explain the regulatory authorities and agencies
	CO3	Compare the regulatory approval process in Indian and International market
	CO4	Apply clinical trial protocols
	CO5	Describe regulatory concepts.
Theory-(BP803T)- Subject:PharmaceuticalMa rketing	COI	Understanding of basics of marketing concepts.
	CO2	Explain product decisions like classification, labeling, and product management.
	CO3	Understandthe promotion concepts.
	CO4	Analyze marketing channels
	CO5	Understanding pricing and emerging concepts



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AGRICULTURAL Courses Outcomes

	В.	tech 1st Semester
Course Name		Course Outcomes
	CO1	Analyze the intensity variation of light due to polarization interference and diffraction.
	CO2	Familiarize with the basics of crystals and their structures.
Subject: ENGINEERING	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
PHYSICS	C04	Summarize various types of polarization of dielectrics and classify the magnetic materials.
	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
	CO1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
90	CO2	Utilize mean value theorems to real life problems.
Subject: LINEAR ALGEBRA	CO3	Familiarize with functions of several variables which is useful in optimization.
& CALCULUS	CO4	Learn important tools of calculus in higher dimensions.
	CO5	Familiarize with double and triple integrals of functions o several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.
Subject: BASIC ELECTRICAL &	COI	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
ELECTRONICS ENGINEERING	CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residential and commercial buildings. (L4)



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	CO1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
Subject: ENGINEERING	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
GRAPHICS	CO3	Understand and draw projection of solids in various positions in first quadrant.
	CO4	Explain principles behind development of surfaces.
	CO5	Prepare isometric and perspective sections of simple solids
	COI	Understand basics of computers, the concept of algorithm and algorithmic thinking.
	CO2	Analyse a problem and develop an algorithm to solve it.
Subject: INTRODUCTION TO PROGRAMMING	CO3	Implement various algorithms using the C programming language.
	CO4	Understand more advanced features of C language.
	CO5	Develop problem-solving skills and the ability to debug and optimize the code.
41	CO1	Perform Hardware troubleshooting.
	CO2	Understand Hardware components and inter dependencies.
Subject: IT WORKSHOP	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
	CO5	Perform calculations using spreadsheets.
Subject: ENGINEERING PHYSICS LAB	COI	Operate optical instruments like travelling microscope and spectrometer.
	CO2	Estimate the wavelengths of different colours using diffraction grating.
	CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
	CO5	Calculate the band gap of a given semiconductor.



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41	CO6	Identify the type of semiconductor using Hall effect.
	CO1	Measure voltage, current and power in an electrical circuit. (L3)
Subject: ELECTRICAL & ELECTRONICS	CO2	Measure of Resistance using Wheat stone bridge (L4)
ENGINEERING WORKSHOP	CO3	Discover critical field resistance and critical speed of DC shunt generators. (L4)
WORKSHO!	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
	CO1	Read, understand, and trace the execution of programs written in C language.
	CO2	Select the right control structure for solving the problem.
Subject: COMPUTER PROGRAMMING LAB	CO3	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate th applications of arrays, functions, basic concepts of pointers in C.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVIC	CO1	Understand the importance of discipline, character and service motto.
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	CO3	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	CO5	Develop leadership skills and civic responsibilities.

B.Tech 2 nd Semester			
Course Name	Course Outcomes		
Subject: COMMUNICATIVE ENGLISH	COI	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.	
	CO2	Apply grammatical structures to formulate sentences and correct word forms.	
	CO3	Analyze discourse markers to speak clearly on a specific	



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		topic in informal discussions.
	CO4	Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.
Til.	CO5	Create a coherent paragraph, essay, and resume.
Subject: ENGINEERING CHEMISTRY	CO1	Demonstrate the corrosion prevention methods and factors affecting corrosion.
	CO2	Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers.
	CO3	Explain calorific values, octane number, refining of petroleum and cracking of oils.
	CO4	Explain the setting and hardening of cement.
	CO5	Summarize the concepts of colloids, micelle and nano materials.
Subject: DIFFERENTIAL EQUATIONS AND VECTOR	CO1	Solve the differential equations related to various engineering fields.
CALCULUS	CO2	Identify solution methods for partial differential equations that model physical processes.
	CO3	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO4	Estimate the work done against a field, circulation and flux using vector calculus.
Subject: BASIC CIVIL AND MECHANICAL ENGINEERING	CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
	CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
Subject: ENGINEERING MECHANICS	CO1	Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.



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	CO2	Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments.
	CO3	Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.
. 61	CO4	Apply the principles of work-energy and impulse- momentum to solve the problems of rectilinear and curvilinear motion of a particle.
	CO5	Solve the problems involving the translational and rotational motion of rigid bodies.
Subject: COMMUNICATIVE	CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
ENGLISH LAB	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
	CO5	Create effective Course Objectives:
Subject: ENGINEERING CHEMISTRY LAB	CO1	Determine the cell constant and conductance of solutions.
	CO2	Prepare advanced polymer materials.
	CO3	Determine the physical properties like surface tension, adsorption and viscosity.
	CO4	Estimate the Iron and Calcium in cement.
T.	CO5	Calculate the hardness of water.
Subject: ENGINEERING WORKSHOP	CO1	Identify workshop tools and their operational capabilities.
	CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
	CO3	Apply fitting operations in various applications.
	CO4	Apply basic electrical engineering knowledge for House Wiring Practice
Subject: ENGINEERING	COI	Evaluate the coefficient of friction between two



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MECHANICS & BUILDING PRACTICES LAB		different surfaces and between the inclined plane and the roller.
	CO2	Verify Law of Parallelogram of forces and Law of Moment using force polygon and bell crank lever.
	CO3	Determine the Centre of gravity different configurations and
TV2	CO4	Understand the Quality Testing and Assessment Procedures and principles of Non Destructive Test
	CO5	Exposure to safety practices in the construction industry
Subject: HEALTH AND WELLNESS, YOGA AND SPORTS	COI	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels
	CO5	Develop Positive Personality



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CIVIL Courses Outcomes

	В.	tech 1st Semester
Course Name		Course Outcomes
	COI	Analyze the intensity variation of light due to polarization interference and diffraction.
	CO2	Familiarize with the basics of crystals and their structures.
Subject: ENGINEERING	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
PHYSICS	CO4	Summarize various types of polarization of dielectrics and classify the magnetic materials.
	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
*	CO1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
10	CO2	Utilize mean value theorems to real life problems.
Subject: LINEAR ALGEBRA	CO3	Familiarize with functions of several variables which is useful in optimization.
& CALCULUS	CO4	Learn important tools of calculus in higher dimensions.
#:	CO5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.
Subject: BASIC ELECTRICAL &	CO1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
ELECTRONICS ENGINEERING	CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	.CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residential and commercial buildings. (L4)

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	CO1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
Subject: ENGINEERING	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
GRAPHICS	CO3	Understand and draw projection of solids in various positions in first quadrant.
	CO4	Explain principles behind development of surfaces.
	CO5	Prepare isometric and perspective sections of simple solids
E.	COI	Understand basics of computers, the concept of algorithm and algorithmic thinking.
	CO2	Analyse a problem and develop an algorithm to solve it.
Subject: INTRODUCTION TO PROGRAMMING	CO3	Implement various algorithms using the C programming language.
	CO4	Understand more advanced features of C language.
ψ, κ	CO5	Develop problem-solving skills and the ability to debug and optimize the code.
	CO1	Perform Hardware troubleshooting.
	CO2	Understand Hardware components and inter dependencies.
Subject: IT WORKSHOP	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
	CO5	Perform calculations using spreadsheets.
	COI	Operate optical instruments like travelling microscope and spectrometer.
Subject: ENGINEERING PHYSICS LAB	CO2	Estimate the wavelengths of different colors using diffraction grating.
	CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
	CO5	Calculate the band gap of a given semiconductor.



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	'CO6	Identify the type of semiconductor using Hall effect.
	COI	Measure voltage, current and power in an electrical circuit. (L3)
Subject: ELECTRICAL & ELECTRONICS	CO2	Measure of Resistance using Wheat stone bridge (L4)
ENGINEERING WORKSHOP	CO3	Discover critical field resistance and critical speed of DC shunt generators. (L4)
WORKSHOP	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
	COI	Read, understand, and trace the execution of programs written in C language.
	CO2	Select the right control structure for solving the problem.
Subject: COMPUTER PROGRAMMING LAB	CO3	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate th applications of arrays, functions, basic concepts of pointers in C.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVIC	.COI	Understand the importance of discipline, character and service motto.
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	CO3	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	CO5	Develop leadership skills and civic responsibilities.

B.Tech 2nd Semester				
Course Name		Course Outcomes		
Subject: COMMUNICATIVE ENGLISH	CO1	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.		
	CO2	Apply grammatical structures to formulate sentences and correct word forms.		
	CO3	Analyze discourse markers to speak clearly on a specific		



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		topic in informal discussions.
¥.	CO4	Evaluate reading / listening texts and to write summaries based on global comprehension of these texts.
e	CO5	Create a coherent paragraph, essay, and resume.
Subject: ENGINEERING CHEMISTRY	CO1	Demonstrate the corrosion prevention methods and factors affecting corrosion.
	CO2	Explain the preparation, properties, and applications of thermoplastics & thermosetting, elastomers & conducting polymers.
	CO3	Explain calorific values, octane number, refining of petroleum and cracking of oils.
	CO4	Explain the setting and hardening of cement.
	CO5	Summarize the concepts of colloids, micelle and nonmaterial's.
Subject: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	CO1	Solve the differential equations related to various engineering fields.
	CO2	Identify solution methods for partial differential equations that model physical processes.
	CO3	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO4	Estimate the work done against a field, circulation and flux using vector calculus.
Subject: BASIC CIVIL AND MECHANICAL ENGINEERING	COI	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
	CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
Subject: ENGINEERING MECHANICS	CO1	Understand the fundamental concepts in mechanics and determine the frictional forces for bodies in contact.



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149	CO2	Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments.
	CO3	Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.
	CO4	Apply the principles of work-energy and impulse- momentum to solve the problems of rectilinear and curvilinear motion of a particle.
	CO5	Solve the problems involving the translational and rotational motion of rigid bodies.
Subject: COMMUNICATIVE	COI	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
ENGLISH LAB	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
*	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
	CO5	Create effective Course Objectives:
Subject: ENGINEERING CHEMISTRY LAB	CO1	Determine the cell constant and conductance of solutions.
	CO2	Prepare advanced polymer materials.
9	CO3	Determine the physical properties like surface tension, adsorption and viscosity.
	CO4	Estimate the Iron and Calcium in cement.
	CO5	Calculate the hardness of water.
Subject: ENGINEERING WORKSHOP	CO1	Identify workshop tools and their operational capabilities.
	CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
	CO3	Apply fitting operations in various applications.
	CO4	Apply basic electrical engineering knowledge for House Wiring Practice
Subject: ENGINEERING	COI	Evaluate the coefficient of friction between two



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MECHANICS & BUILDING PRACTICES LAB		different surfaces and between the inclined plane and the roller.
	CO2	Verify Law of Parallelogram of forces and Law of Moment using force polygon and bell crank lever.
	CO3	Determine the Centre of gravity different configurations and
	CO4	Understand the Quality Testing and Assessment Procedures and principles of NonDestructive Test
	CO5	Exposure to safety practices in the construction industry
Subject: HEALTH AND WELLNESS, YOGA AND SPORTS	COI	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels
	CO5	Develop Positive Personality



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CSE AIML Courses Outcomes

	B.	tech 1st Semester
Course Name		Course Outcomes
	CO1	Analyze the intensity variation of light due to polarization interference and diffraction.
	CO2	Familiarize with the basics of crystals and their structures.
Subject: ENGINEERING PHYSICS	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
	CO4	Summarize various types of polarization of dielectrics and classify the magnetic materials.
	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
	CO1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
	CO2	Utilize mean value theorems to real life problems.
Subject: LINEAR ALGEBRA	CO3	Familiarize with functions of several variables which is useful in optimization.
& CALCULUS	CO4	Learn important tools of calculus in higher dimensions.
	CO5	Familiarize with double and triple integrals of functions o several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.
Subject: BASIC ELECTRICAL & ELECTRONICS ENGINEERING	CO1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
	CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residential and commercial buildings. (L4)

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Subject: ENGINEERING	CO1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
GRAPHICS	CO3	Understand and draw projection of solids in various positions in first quadrant.
	CO4	Explain principles behind development of surfaces.
146	-CO5	Prepare isometric and perspective sections of simple solids
	CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.
	CO2	Analyse a problem and develop an algorithm to solve it.
Subject: INTRODUCTION TO PROGRAMMING	СОЗ	Implement various algorithms using the C programming language.
•	CO4	Understand more advanced features of C language.
	CO5	Develop problem-solving skills and the ability to debug and optimize the code.
	CO1	Perform Hardware troubleshooting.
	CO2	Understand Hardware components and inter dependencies.
Subject: IT WORKSHOP	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
	.CO5	Perform calculations using spreadsheets.
Subject: ENGINEERING PHYSICS LAB	CO1	Operate optical instruments like travelling microscope and spectrometer.
	CO2	Estimate the wavelengths of different colors using diffraction grating.
	CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
	CO5	Calculate the band gap of a given semiconductor.

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	CO6	Identify the type of semiconductor using Hall effect.
	CO1	Measure voltage, current and power in an electrical circuit. (L3)
Subject: ELECTRICAL &	CO2	Measure of Resistance using Wheat stone bridge (L4)
ELECTRONICS ENGINEERING WORKSHOP	CO3	Discover critical field resistance and critical speed of DC shunt generators. (L4)
WURKSHUF	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
	CO1	Read, understand, and trace the execution of programs written in C language.
	CO2	Select the right control structure for solving the problem.
Subject: COMPUTER PROGRAMMING LAB	CO3	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVIC	CO1	Understand the importance of discipline, character and service motto.
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	CO3	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	CO5	Develop leadership skills and civic responsibilities.

Course Name	Course Outcomes		
Subject: COMMUNICATIVE ENGLISH	COI	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.	
	CO2	Apply grammatical structures to formulate sentences and correct word forms.	
	CO3	Analyze discourse markers to speak clearly on a specific	



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		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, essay, and resume.
Subject: FUNDAMENTAL CHEMISTRY	COI	Compare the materials of construction for battery and electrochemical sensors
	CO2	Explain the preparation, properties, and applications of thermoplastics &thermosetting, elastomers & conducting polymers.
	CO3	Distinguish the principles of spectrometry, solid liquid chromatography in separation of solids and liquid mixtures.
	CO4	Apply the principle of Beer Lambert's Law
	CO5	Illustrate conductometric and pH metric titrations.
Subject: DIFFERENTIAL EQUATIONS AND VECTOR	COI	Solve the differential equations related to various engineering fields.
CALCULUS	CO2	Identify solution methods for partial differential equations that model physical processes.
	CO3	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO4	Estimate the work done against a field, circulation and flux using vector calculus.
Subject: BASIC CIVIL AND MECHANICAL ENGINEERING	CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
	CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
Subject: DATA STRUCTURES	CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.



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	CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
	CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
	CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.
	CO5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.
	CO6	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
Subject: COMMUNICATIVE	CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
ENGLISH LAB	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
	CO5	Create effective Course Objectives:
Subject: FUNDAMENTAL CHEMISTRY LAB	CO1	Determine the cell constant and conductance of solutions.
	CO2	Prepare advanced polymer materials.
i i	CO3	Measure the strength of an acid present in secondary batteries.
	CO4	Analyze the IR spectra of some organic compounds.
	CO5	Compare conductometric and pH metric titrations.
Subject: ENGINEERING WORKSHOP	CO1	Identify workshop tools and their operational capabilities.
	CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry

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		and welding
	CO3	Apply fitting operations in various applications.
	CO4	Apply basic electrical engineering knowledge for House Wiring Practice
Subject: DATA STRUCTURES LAB	CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
	CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
	CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
	CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.
	CO5	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
Subject: HEALTH AND WELLNESS, YOGA AND SPORTS	COI	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels
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DATA SCIENCE Courses Outcomes

National State of the State of	В.	tech 1st Semester
Course Name		Course Outcomes
	COI	Analyze the intensity variation of light due to polarization interference and diffraction.
	CO2	Familiarize with the basics of crystals and their structures.
Subject: ENGINEERING PHYSICS	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
	CO4	Summarize various types of polarization of dielectrics and classify the magnetic materials.
	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
Subject: LINEAR ALGEBRA & CALCULUS	CO1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
	CO2	Utilize mean value theorems to real life problems.
	CO3	Familiarize with functions of several variables which is useful in optimization.
	CO4	Learn important tools of calculus in higher dimensions.
	CO5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.
Subject: BASIC ELECTRICAL &	COI	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
ELECTRONICS ENGINEERING	CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residential and commercial buildings. (L4)



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Subject: ENGINEERING	CO1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
GRAPHICS	CO3	Understand and draw projection of solids in various positions in first quadrant.
0	CO4	Explain principles behind development of surfaces.
	CO5	Prepare isometric and perspective sections of simple solids
	CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.
	CO2	Analyse a problem and develop an algorithm to solve it.
Subject: INTRODUCTION TO PROGRAMMING	CO3	Implement various algorithms using the C programming language.
	CO4	Understand more advanced features of C language.
	CO5	Develop problem-solving skills and the ability to debug and optimize the code.
	CO1	Perform Hardware troubleshooting.
	CO2	Understand Hardware components and inter dependencies.
Subject: IT WORKSHOP	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
	CO5	Perform calculations using spreadsheets.
Subject: ENGINEERING PHYSICS LAB	CO1	Operate optical instruments like travelling microscope and spectrometer.
	CO2	Estimate the wavelengths of different colors using diffraction grating.
	CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
	CO5	Calculate the band gap of a given semiconductor.

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	CO6	Identify the type of semiconductor using Hall effect.
Subject: ELECTRICAL &	CO1	Measure voltage, current and power in an electrical circuit. (L3)
	CO2	Measure of Resistance using Wheat stone bridge (L4)
ELECTRONICS ENGINEERING	соз	Discover critical field resistance and critical speed of DC shunt generators. (L4)
WORKSHOP	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
	CO1	Read, understand, and trace the execution of programs written in C language.
	CO2	Select the right control structure for solving the problem.
Subject: COMPUTER PROGRAMMING LAB	CO3	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVIC	COI	Understand the importance of discipline, character and service motto.
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	CO3	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	'CO5	Develop leadership skills and civic responsibilities.

	B.T	ech 2 nd Semester
Course Name		Course Outcomes
Subject: COMMUNICATIVE ENGLISH	CO1	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
	CO2	Apply grammatical structures to formulate sentences and correct word forms.
	CO3	Analyze discourse markers to speak clearly on a specific



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		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, essay, and resume.
Subject: FUNDAMENTAL CHEMISTRY	COI	Compare the materials of construction for battery and electrochemical sensors
+	CO2	Explain the preparation, properties, and applications of thermoplastics &thermosetting, elastomers & conducting polymers.
	CO3	Distinguish the principles of spectrometry, solid liquid chromatography in separation of solids and liquid mixtures.
	CO4	Apply the principle of Beer Lambert's Law
	CO5	Illustrate conductometric and pH metric titrations.
Subject: DIFFERENTIAL EQUATIONS AND VECTOR	COI	Solve the differential equations related to various engineering fields.
CALCULUS	CO2	Identify solution methods for partial differential equations that model physical processes.
	CO3	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO4	Estimate the work done against a field, circulation and flux using vector calculus.
Subject: BASIC CIVIL AND MECHANICAL ENGINEERING	CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
	CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
Subject: DATA STRUCTURES	CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.



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	CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
	CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
	CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.
8	CO5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.
	CO6	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
Subject: COMMUNICATIVE	CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
ENGLISH LAB	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
	CO5	Create effective Course Objectives:
Subject: FUNDAMENTAL CHEMISTRY LAB	CO1	Determine the cell constant and conductance of solutions.
	CO2	Prepare advanced polymer materials.
e	CO3	Measure the strength of an acid present in secondary batteries.
	CO4	Analyze the IR spectra of some organic compounds.
	CO5	Compare conductometric and pH metric titrations.
Subject: ENGINEERING WORKSHOP	COI	Identify workshop tools and their operational capabilities.
	CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry



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		and welding
	CO3	Apply fitting operations in various applications.
	CO4	Apply basic electrical engineering knowledge for House Wiring Practice
Subject: DATA STRUCTURES LAB	COI	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms.
	CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
	CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
	CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.
	CO5	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
Subject: HEALTH AND WELLNESS, YOGA AND SPORTS	CO1	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels
	CO5	Develop Positive Personality



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CSE Courses Outcomes

B. tech 1st Semester			
Course Name		Course Outcomes,	
	COI	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.	
*	CO2	Apply grammatical structures to formulate sentences and correct word forms.	
Subject: COMMUNICATIVE ENGLISH	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, essay, and resume.	
	CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.	
Subject: COMMUNICATIVE ENGLISH LAB	CO2	Apply communication skills through various language learning activities.	
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.	
	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.	
	CO5	Create effective Course Objectives:	
Subject: LINEAR ALGEBRA & CALCULUS	CO1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.	
	CO2	Utilize mean value theorems to real life problems.	
	CO3	Familiarize with functions of several variables which is useful in optimization.	
	CO4	Learn important tools of calculus in higher dimensions.	
	CO5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.	



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(8)	COI	Compare the materials of construction for battery and electrochemical sensors.
	CO2	Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
Subject: CHEMISTRY	CO3	Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
	CO4	Apply the principle of Band diagrams in the application of conductors and semiconductors
	CO5	Summarize the concepts of Instrumental methods
	COI	Determine the cell constant and conductance of solutions.
	CO2	Prepare advanced polymer Bakelite materials.
Subject: CHEMISTRY LAB	CO3	Measure the strength of an acid present in secondary batteries.
	CO4	Analyses the IR spectra of some organic compounds.
	CO5	Calculate strength of acid in Pb-Acid battery.
Subject: BASIC CIVIL AND MECHANICAL ENGINEERING	CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
	CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
Subject: ENGINEERING WORKSHOP	COI	Identify workshop tools and their operational capabilities
	CO2	Practice on manufacturing of components using worksho trades including fitting, carpentry, foundry and welding.
	CO3	Apply fitting operations in various applications.



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	-CO4	Apply basic electrical engineering knowledge for House Wiring Practice
	CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.
	CO2	Analyse a problem and develop an algorithm to solve it.
Subject: INTRODUCTION TO PROGRAMMING	CO3	Implement various algorithms using the C programming language.
	CO4	Understand more advanced features of C language.
	CO5	Develop problem-solving skills and the ability to debug and optimize the code
8	CO1	Read, understand, and trace the execution of programs written in C language.
	CO2	Select the right control structure for solving the problem.
Subject: COMPUTER PROGRAMMING LAB	CO3	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
Subject: HEALTH AND WELLNESS, YOGA AND SPORT	CO1	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels.
	CO5	Develop Positive Personality

	B.T	ech 2 nd Semester
Course Name		Course Outcomes
Subject: DIFFERENTIAL EQUATIONS AND VECTOR	CO1	Solve the differential equations related to various engineering fields.
CALCULUS	CO2	Identify solution methods for partial differential



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		equations that model physical processes.
	CO3	Interpret the physical meaning of different operators such as gradient, curl and divergence.
	CO4	Estimate the work done against a field, circulation and flux using vector calculus.
Subject: ENGINEERING PHYSICS	CO1	Analyze the intensity variation of light due to polarization, interference and diffraction.
	CO2	Familiarize with the basics of crystals and their structures.
	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
	CO4	Summarize various types of polarization of dielectrics and classify the magnetic materials.
×1	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
Subject: ENGINEERING PHYSICS LAB	CO1	Operate optical instruments like travelling microscope and spectrometer.
	CO2	Estimate the wavelengths of different colours using diffraction grating.
	CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
	CO5	Calculate the band gap of a given semiconductor.
	CO6	Identify the type of semiconductor using Hall effect.
Subject: BASIC ELECTRICAL &	CO1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
ELECTRONICS ENGINEERING	CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residentia and commercial buildings. (L4)
Subject: ELECTRICAL &	COI	Measure voltage, current and power in an electrical

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ELECTRONICS		circuit. (L3)
ENGINEERING	CO2	Measure of Resistance using Wheat stone bridge (L4)
WORKSHOP	CO3	Discover critical field resistance and critical speed of DC shunt generators. (L4)
	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
Subject: IT WORKSHOP	COI	Perform Hardware troubleshooting.
	CO2	Understand Hardware components and inter dependencies.
	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
	CO5	Perform calculations using spreadsheets.
Subject: ENGINEERING GRAPHICS	COI	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
	CO3	Understand and draw projection of solids in various positions in first quadrant.
	CO4	Explain principles behind development of surfaces.
	CO5	Prepare isometric and perspective sections of simple solids.
Subject: DATA STRUCTURES	CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithms
	CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
	CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
	CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues, and apply them appropriately to solve data management challenges.



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	CO5	Devise novel solutions to small scale programming challenges involving data structures such as stacks, queues, Trees.
*.	CO6	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
Subject: DATA STRUCTURES LAB	CO1	Explain the role of linear data structures in organizing and accessing data efficiently in algorithm
	CO2	Design, implement, and apply linked lists for dynamic data storage, demonstrating understanding of memory allocation.
2	CO3	Develop programs using stacks to handle recursive algorithms, manage program states, and solve related problems.
	CO4	Apply queue-based algorithms for efficient task scheduling and breadth-first traversal in graphs and distinguish between deques and priority queues and apply them appropriately to solve data management challenges.
	CO5	Recognize scenarios where hashing is advantageous, and design hash-based solutions for specific problems.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE	CO1	Understand the importance of discipline, character and service motto
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	СОЗ	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	CO5	Develop leadership skills and civic responsibilities.



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ECE Courses Outcomes

	B. 1	tech 1st Semester
Course Name		Course Outcomes
	CO1	Analyze the intensity variation of light due to polarization, interference and diffraction.
	CO2	Familiarize with the basics of crystals and their structures.
Subject: ENGINEERING	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
PHYSICS	CO4	Summarize various types of polarization of dielectrics and classify the magnetic materials.
	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
	CO1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
	CO2	Utilize mean value theorems to real life problems.
Subject: LINEAR ALGEBRA	CO3	Familiarize with functions of several variables which is useful in optimization.
& CALCULUS	CO4	Learn important tools of calculus in higher dimensions.
	CO5	Familiarize with double and triple integrals of functions of several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.
Subject: BASIC ELECTRICAL &	CO1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
ELECTRONICS ENGINEERING	CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residential and commercial buildings. (L4)



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Subject: ENGINEERING	COI	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
GRAPHICS	CO3	Understand and draw projection of solids in various positions in first quadrant.
9	CO4	Explain principles behind development of surfaces.
	,CO5	Prepare isometric and perspective sections of simple solids
	CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.
	CO2	Analyse a problem and develop an algorithm to solve it.
Subject: INTRODUCTION TO PROGRAMMING	CO3	Implement various algorithms using the C programming language.
	CO4	Understand more advanced features of C language.
	CO5	Develop problem-solving skills and the ability to debug and optimize the code.
	COI	Perform Hardware troubleshooting.
*	CO2	Understand Hardware components and inter- dependencies.
Subject: IT WORKSHOP	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
10	CO5	Perform calculations using spreadsheets.
Subject: ENGINEERING PHYSICS LAB	CO1	Operate optical instruments like travelling microscope and spectrometer.
	CO2	Estimate the wavelengths of different colours using diffraction grating.
	CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
	CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
	CO5	Calculate the band gap of a given semiconductor.



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	CO6	Identify the type of semiconductor using Hall effect.
E.	CO1	Measure voltage, current and power in an electrical circuit. (L3)
Subject: ELECTRICAL &	CO2	Measure of Resistance using Wheat stone bridge (L4)
ELECTRONICS ENGINEERING WORKSHOP	CO3	Discover critical field resistance and critical speed of DC shunt generators. (L4)
WORKSHOP	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
1	CO1	Read, understand, and trace the execution of programs written in C language.
	·CO2	Select the right control structure for solving the problem.
Subject: COMPUTER PROGRAMMING LAB	CO3	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate th applications of arrays, functions, basic concepts of pointers in C.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVIC	CO1	Understand the importance of discipline, character and service motto.
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	CO3	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	CO5	Develop leadership skills and civic responsibilities.

B.Tech 2 nd Semester		
Course Name	Course Outcomes	
Subject: COMMUNICATIVE ENGLISH	COI	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
	CO2	Apply grammatical structures to formulate sentences and correct word forms.
	CO3	Analyze discourse markers to speak clearly on a specific



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		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, essay, and resume.
Subject: CHEMISTRY	CO1	Compare the materials of construction for battery and electrochemical sensors.
	CO2	Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
	CO3	Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
*	CO4	Apply the principle of Band diagrams in the application of conductors and semiconductors.
	CO5	Summarize the concepts of Instrumental methods.
Subject: DIFFERENTIAL EQUATIONS AND VECTOR	CO1	Solve the differential equations related to various engineering fields.
CALCULUS	CO2	Identify solution methods for partial differential equations that model physical processes.
3	CO3	Interpret the physical meaning of different operators such as gradient, curl and divergence
	CO4	Estimate the work done against a field, circulation and flux using vector calculus.
Subject: BASIC CIVIL AND MECHANICAL ENGINEERING	CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
	CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
Subject: NETWORK ANALYSIS	COI	Understand basic electrical circuits with nodal and mesh analysis



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	CO2	Analyse the circuit using network simplification theorems.
	CO3	Find Transient response and Steady state response of a network.
	CO4	Analyse electrical networks in the Laplace domain.
	CO5	Compute the parameters of a two-port network.
Subject: COMMUNICATIVE	CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
ENGLISH LAB	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
**	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
	CO5	Create effective Course Objectives:
Subject: CHEMISTRY LAB	CO1	Determine the cell constant and conductance of solutions.
	CO2	Prepare advanced polymer Bakelite materials.
8	CO3	Measure the strength of an acid present in secondary batteries.
	CO4	Analyse the IR spectra of some organic compounds.
	COS	Calculate strength of acid in Pb-Acid battery
Subject: ENGINEERING WORKSHOP	CO1	Identify workshop tools and their operational capabilities.
	CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
	CO3	Apply fitting operations in various applications.
	CO4	Apply basic electrical engineering knowledge for House Wiring Practice
Subject: NETWORK ANALYSIS AND SIMULATION LABORATORY	COI	Verify Kirchoff's laws and network theorems.
	CO2	Measure time constants of RL & RC circuits.
	CO3	Analyze behavior of RLC circuit for different cases



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	CO4	Design resonant circuit for given specifications.
	CO5	Characterize and model the network in terms of all network parameters.
Subject: HEALTH AND WELLNESS, YOGA AND SPORTS	CO1	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels
	CO5	Develop Positive Personality



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EEE Courses Outcomes

	В.	tech 1st Semester
Course Name		Course Outcomes
	CO1	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
	CO2	Apply grammatical structures to formulate sentences and correct word forms.
Subject: COMMUNICATIVE ENGLISH	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.
	COS	Create a coherent paragraph, essay, and resume.
Subject: COMMUNICATIVE ENGLISH LAB	COI	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
	CO2	Apply communication skills through various language learning activities.
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
+	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
¥	CO5	Create effective Course Objectives:
Subject: LINEAR ALGEBRA & CALCULUS	CO1	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
	CO2	Utilize mean value theorems to real life problems.
NA .	CO3	Familiarize with functions of several variables which is useful in optimization.
	CO4	Learn important tools of calculus in higher dimensions.
	CO5	Familiarize with double and triple integrals of functions several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.

PISTEONS



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	CO1	Compare the materials of construction for battery and electrochemical sensors.
	CO2	Explain the preparation, properties, and applications of thermoplastics & thermosetting & elastomers conducting polymers.
Subject: CHEMISTRY	CO3	Explain the principles of spectrometry, slc in separation of solid and liquid mixtures.
	CO4	Apply the principle of Band diagrams in the application of conductors and semiconductors
	CO5	Summarize the concepts of Instrumental methods
	COI	Determine the cell constant and conductance of solutions.
, v.	CO2	Prepare advanced polymer Bakelite materials.
Subject: CHEMISTRY LAB	CO3	Measure the strength of an acid present in secondary batteries.
	CO4	Analyses the IR spectra of some organic compounds.
	CO5	Calculate strength of acid in Pb-Acid battery.
*	CO1	Understand various sub-divisions of Civil Engineering and to appreciate their role in ensuring better society.
	CO2	Know the concepts of surveying and to understand the measurement of distances, angles and levels through surveying.
Subject: BASIC CIVIL AND MECHANICAL	CO3	Realize the importance of Transportation in nation's economy and the engineering measures related to Transportation.
ENGINEERING	CO4	Understand the importance of Water Storage and Conveyance Structures so that the social responsibilities of water conservation will be appreciated.
	CO5	Understand the basic characteristics of Civil Engineering Materials and attain knowledge on prefabricated technology.
Subject: ENGINEERING WORKSHOP	COI	Identify workshop tools and their operational capabilities
	CO2	Practice on manufacturing of components using workshot trades including fitting, carpentry, foundry and welding.
	CO3	Apply fitting operations in various applications.



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	CO4	Apply basic electrical engineering knowledge for House Wiring Practice
	COI	Understand basics of computers, the concept of algorithm and algorithmic thinking.
	CO2	Analyse a problem and develop an algorithm to solve it.
Subject: INTRODUCTION TO PROGRAMMING	CO3	Implement various algorithms using the C programming language.
	CO4	Understand more advanced features of C language.
	CO5	Develop problem-solving skills and the ability to debug and optimize the code
Subject: COMPUTER PROGRAMMING LAB	COI	Read, understand, and trace the execution of programs written in C language.
	CO2	Select the right control structure for solving the problem.
	соз	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
Subject: HEALTH AND WELLNESS, YOGA AND SPORT	COI	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels.
	CO5	Develop Positive Personality

	B.T	ech 2 nd Semester
Course Name		Course Outcomes
Subject: DIFFERENTIAL EQUATIONS AND VECTOR	COI	Solve the differential equations related to various engineering fields.
CALCULUS	CO2	Identify solution methods for partial differential



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		equations that model physical processes.
b	CO3	Interpret the physical meaning of different operators such as gradient, curl and divergence.
	CO4	Estimate the work done against a field, circulation and flux using vector calculus.
Subject: ENGINEERING PHYSICS	CO1	Analyze the intensity variation of light due to polarization, interference and diffraction.
	CO2	Familiarize with the basics of crystals and their structures.
×	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
	CO4	Summarize various types of polarization of dielectrics and classify the magnetic materials.
	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
Subject: ENGINEERING PHYSICS LAB	CO1	Operate optical instruments like travelling microscope and spectrometer.
	CO2	Estimate the wavelengths of different colours using diffraction grating.
	CO3	Plot the intensity of the magnetic field of circular coil carrying current with distance.
8	CO4	Evaluate dielectric constant and magnetic susceptibility for dielectric and magnetic materials respectively.
	CO5	Calculate the band gap of a given semiconductor.
	CO6	Identify the type of semiconductor using Hall effect.
Subject: BASIC ELECTRICAL &	CO1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
ELECTRONICS ENGINEERING	CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residential and commercial buildings. (L4)
Subject: ELECTRICAL &	COI	Measure voltage, current and power in an electrical



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ELECTRONICS		circuit. (L3)
ENGINEERING	CO2	Measure of Resistance using Wheat stone bridge (L4)
WORKSHOP	CO3	Discover critical field resistance and critical speed of DC shunt generators. (L4)
<i>y</i> .	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
Subject: IT WORKSHOP	COI	Perform Hardware troubleshooting.
	CO2	Understand Hardware components and inter dependencies.
	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
	CO5	Perform calculations using spreadsheets.
Subject: ENGINEERING GRAPHICS	CO1	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
14	CO3	Understand and draw projection of solids in various positions in first quadrant.
	CO4	Explain principles behind development of surfaces.
	CO5	Prepare isometric and perspective sections of simple solids.
SUBJECT: ELECTRICAL CIRCUIT ANALYSIS -I	COI	Remembering the basic electrical elements and different fundamental laws.
TE .	CO2	Understand the network reduction techniques, transformations, concept of selfinductance and mutual inductance, phasor diagrams, resonance and network theorems.
	CO3	Apply the concepts to obtain various mathematical and graphical representations.
	CO4	Analyse nodal and mesh networks, series and parallel circuits, steady state response, different circuit topologies (with R, L and C components).
	CO5	Evaluation of Network theorems, electrical, magnetic and single-phase circuits.



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Subject: ELECTRICAL CIRCUITS LAB	COI	Understand the concepts of network theorems, node and mesh networks, series and parallel resonance and Locus diagrams.
	CO2	Apply various theorems to compare practical results obtained with theoretical calculations.
	CO3	Determine self, mutual inductances and coefficient of coupling values, parameters of choke coil.
	CO4	Analyse different circuit characteristics with the help of fundamental laws and various configurations.
	,CO5	Create locus diagrams of RL, RC series circuits and examine series and parallel resonance.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVICE	COI	Understand the importance of discipline, character and service motto
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	CO3	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	CO5	Develop leadership skills and civic responsibilities.



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MECHANICAL Courses Outcomes

	В.	tech 1st Semester
Course Name		Course Outcomes
	CO1	Analyze the intensity variation of light due to polarization interference and diffraction.
K	CO2	Familiarize with the basics of crystals and their structures.
Subject: ENGINEERING PHYSICS	CO3	Explain fundamentals of quantum mechanics and apply it to one dimensional motion of particles.
	,C04	Summarize various types of polarization of dielectrics and classify the magnetic materials.
	CO5	Explain the basic concepts of Quantum Mechanics and the band theory of solids.
	CO6	Identify the type of semiconductor using Hall effect.
Subject: LINEAR ALGEBRA & CALCULUS	COI	Develop and use of matrix algebra techniques that are needed by engineers for practical applications.
	CO2	Utilize mean value theorems to real life problems.
	CO3	Familiarize with functions of several variables which is useful in optimization.
	CO4	Learn important tools of calculus in higher dimensions.
	CO5	Familiarize with double and triple integrals of functions o several variables in two dimensions using Cartesian and polar coordinates and in three dimensions using cylindrical and spherical coordinates.
Subject: BASIC ELECTRICAL & ELECTRONICS ENGINEERING	CO1	Describe fundamental laws, operating principles of motors/generators, MC/MI instruments (L2)
	.CO2	Demonstrate the working of electrical machines, measuring instruments and power generation stations. (L2)
	CO3	Apply mathematical tools and fundamental concepts to derive various equations related to electrical circuits and machines. (L3)
	CO4	Calculate electrical load and electricity bill of residential and commercial buildings. (L4)



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Subject: ENGINEERING GRAPHICS	COI	Understand the principles of engineering drawing, including engineering curves, scales, orthographic and isometric projections.
	CO2	Draw and interpret orthographic projections of points, lines, planes and solids in front, top and side views.
	CO3	Understand and draw projection of solids in various positions in first quadrant.
	CO4	Explain principles behind development of surfaces.
	CO5	Prepare isometric and perspective sections of simple solids
Subject: INTRODUCTION TO PROGRAMMING	CO1	Understand basics of computers, the concept of algorithm and algorithmic thinking.
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	CO3	Implement various algorithms using the C programming language.
\$	CO4	Understand more advanced features of C language.
	CO5	Develop problem-solving skills and the ability to debug and optimize the code.
	CO1	Perform Hardware troubleshooting.
	CO2	Understand Hardware components and inter dependencies.
Subject: IT WORKSHOP	CO3	Safeguard computer systems from viruses/worms.
	CO4	Document/ Presentation preparation.
	CO5	Perform calculations using spreadsheets.
Subject: ENGINEERING PHYSICS LAB	COI	Operate optical instruments like travelling microscope and spectrometer.
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	CO5	Calculate the band gap of a given semiconductor.



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	CO6	Identify the type of semiconductor using Hall effect.
Subject: ELECTRICAL & ELECTRONICS ENGINEERING WORKSHOP	CO1	Measure voltage, current and power in an electrical circuit. (L3)
	CO2	Measure of Resistance using Wheat stone bridge (L4)
	CO3	Discover critical field resistance and critical speed of DC shunt generators. (L4)
	CO4	Investigate the effect of reactive power and power factor in electrical loads. (L5)
Subject: COMPUTER PROGRAMMING LAB	CO1	Read, understand, and trace the execution of programs written in C language.
	CO2	Select the right control structure for solving the problem.
	CO3	Develop C programs which utilize memory efficiently using programming constructs like pointers.
	CO4	Develop, Debug and Execute programs to demonstrate the applications of arrays, functions, basic concepts of pointers in C.
Subject: NSS/NCC/SCOUTS & GUIDES/COMMUNITY SERVIC	COI	Understand the importance of discipline, character and service motto.
	CO2	Solve some societal issues by applying acquired knowledge, facts, and techniques.
	CO3	Explore human relationships by analyzing social problems.
	CO4	Determine to extend their help for the fellow beings and downtrodden people.
	CO5	Develop leadership skills and civic responsibilities.

	B.T	ech 2 nd Semester
Course Name	Course Outcomes	
Subject: COMMUNICATIVE ENGLISH	CO1	Understand the context, topic, and pieces of specific information from social or Transactional dialogues.
	CO2	Apply grammatical structures to formulate sentences and correct word forms.
	CO3	Analyze discourse markers to speak clearly on a specific



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€.	CO2	Analyze different force systems such as concurrent, coplanar and spatial systems and calculate their resultant forces and moments.
	CO3	Calculate the centroids, center of gravity and moment of inertia of different geometrical shapes.
	CO4	Apply the principles of work-energy and impulse- momentum to solve the problems of rectilinear and curvilinear motion of a particle.
	CO5	Solve the problems involving the translational and rotational motion of rigid bodies.
Subject: COMMUNICATIVE ENGLISH LAB	CO1	Understand the different aspects of the English language proficiency with emphasis on LSRW skills.
	CO2	Apply communication skills through various language learning activities
	CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
	CO4	Evaluate and exhibit professionalism in participating in debates and group discussions.
	CO5	Create effective Course Objectives:
Subject: ENGINEERING CHEMISTRY LAB	CO1	Determine the cell constant and conductance of solutions.
	CO2	Prepare advanced polymer materials.
	CO3	Determine the physical properties like surface tension, adsorption and viscosity.
	CO4	Estimate the Iron and Calcium in cement.
	CO5	Calculate the hardness of water.
Subject: ENGINEERING WORKSHOP	COl	Identify workshop tools and their operational capabilities.
	CO2	Practice on manufacturing of components using workshop trades including fitting, carpentry, foundry and welding
	CO3	Apply fitting operations in various applications.
	CO4	Apply basic electrical engineering knowledge for House Wiring Practice
Subject: ENGINEERING	COI	Evaluate the coefficient of friction between two

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MECHANICS LAB		different surfaces and between the inclined plane and the roller.
	CO2	Verify Law of Polygon of forces and Law of Moment using force polygon and bell crank lever.
	CO3	Determine the Centre of gravity and Moment of Inertia of different configurations
	CO4	Verify the equilibrium conditions of a rigid body under the action of different force systems.
Subject: HEALTH AND WELLNESS, YOGA AND SPORTS	CO1	Understand the importance of yoga and sports for Physical fitness and sound health.
	CO2	Demonstrate an understanding of health-related fitness components.
	CO3	Compare and contrast various activities that help enhance their health.
	CO4	Assess current personal fitness levels
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