

## G PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY (Autonomous)

(Approved by AICTE | NAAC Accreditation with 'A' Grade |  
Accredited by NBA (CIV, CSE, ECE & EEE) | Affiliated to JNTUA)  
Nandikotkur Road, Venkayapalli (V), Kurnool - 518452, Andhra Pradesh

### Program Outcomes (PO's):

Engineering Graduates will be able to

- ❖ **PO 1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.
- ❖ **PO 2. 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.
- ❖ **PO 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.
- ❖ **PO 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.
- ❖ **PO 5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- ❖ **PO 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.
- ❖ **PO 7. 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.
- ❖ **PO 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ❖ **PO 9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ❖ **PO 10. Communications:** 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 receive clear instructions.
- ❖ **PO 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.
- ❖ **PO 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.

*E. Jiniya*  
PRINCIPAL



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**DEPARTMENT OF CIVIL ENGINEERING**

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**The following are the Course Outcomes of all the courses for the Academic Year 2018-19 from I-B.Tech to IV B.Tech**

**R18 REGULATION**

**I B. Tech I Sem**

Course Name: **FUNCTIONAL ENGLISH**

#	COURSE OUTCOME
CO1	Have improved communication in listening, speaking, reading and writing skills in general.
CO2	Have developed their oral communication and fluency in group discussions and interviews.
CO3	Have improved awareness of English in science and technology context.
CO4	Have achieved familiarity with a variety of technical reports.
CO5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

Course Name: **MATHEMATICS – I**

#	COURSE OUTCOME
CO1	The students become familiar with the application of differential and integral calculus, ordinary differential equations and vector calculus to engineering problems.
CO2	The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems in engineering applications.
CO3	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
CO4	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
CO5	Utilize mean value theorems to real life problems.

  
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Course Name: **COMPUTER PROGRAMMING**

#	COURSE OUTCOME
CO1	Apply problem solving techniques in designing the solutions for a wide-range of problems
CO2	Choose appropriate control structure depending on the problem to be solved
CO3	Modularize the problem and also solution
CO4	Interpret the importance of functions in programming.
CO5	Analyze and modularize the problem and its solution by using functions.

Course Name: **ENGINEERING PHYSICS**

#	COURSE OUTCOME
CO1	The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
CO2	The important properties of crystals like the presence of long- range order and periodicity, structure determination using X- ray diffraction are focused along with defects in crystals and ultrasonic non-destructive techniques.
CO3	The discrepancies between the classical estimates and laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
CO4	The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
CO5	The properties and device applications of semiconducting and magnetic materials are illustrated.
CO6	The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

Course Name: **ENGINEERING DRAWING**

#	COURSE OUTCOME
CO1	Drawing 2D and 3D diagrams of various object
CO2	Learning conventions of Drawing, which is an Universal Language of Engineers
CO3	Drafting projections of points, planes and solids
CO4	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
CO5	Apply orthographic projection concepts to draw projections of points, lines, planes and solids
CO6	Apply development concepts to draw development of surfaces of simple solids

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

#	COURSE OUTCOME
CO1	Become active participants in the learning process and acquire proficiency in spoken English.
CO2	Speak with clarity and confidence thereby enhance employability skills.
CO3	Analyze discourse markers to speak clearly on a specific topic in informal discussions
CO4	Apply orthographic projection concepts to convert isometric view to orthographic views
CO5	Make use of AutoCAD Software to draw 2D diagrams of various objects

Course Name: **ENGINEERING PHYSICS LABORATORY**

#	COURSE OUTCOME
CO1	Would recognize the important of optical phenomenon like Interference and diffraction.
CO2	Would have acquired the practical application knowledge of optical fiber, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
CO3	Would recognize the significant importance of nanomaterials in various engineering fields.
CO4	Determine the wavelength of laser, particle size, numerical aperture and acceptance angle by applying the principles of lasers and optical fibres
CO5	Measure the elastic constants, Poisson's ratio of the material
CO6	Measure the strain of the metal bar by using strain gauge.

Course Name: **COMPUTER PROGRAMMING LAB**

#	COURSE OUTCOME
CO1	Apply problem solving techniques to find solutions to problems
CO2	Able to use C language features effectively and implement solutions using C language.
CO3	Improve logical skills.
CO4	Understands about files and its applications.
CO5	Develop real-world applications, files and exception handling provided by python

  
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### I B. Tech II Sem

Course Name: **ENGLISH FOR PROFESSIONAL COMMUNICATION**

#	COURSE OUTCOME
CO1	Have acquired ability to participate effectively in group discussions.
CO2	Have developed ability in writing in various contexts.
CO3	Have acquired a proper level of competence for employability.
CO4	Construct necessary skills to deliver presentation confidently for improving in respective domains
CO5	Apply language structures to construct good relations

Course Name: **MATHEMATICS – II**

#	COURSE OUTCOME
CO1	The student gains the knowledge to tackle the engineering problems using the concepts of Fourier series, various transforms and partial differential equations.
CO2	Analyze the non-homogeneous linear differential equations along with method of variation of parameters.
CO3	Apply the concept of higher order differential equations to the various streams like Mass spring system and L-C-R Circuit problems.
CO4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs.
CO5	Analyze the vector calculus involving divergence, curl and their properties along with vector identities.

Course Name: **ENGINEERING MECHANICS**

#	COURSE OUTCOME
CO1	Develop students to acquire knowledge of static and dynamic behavior of the bodies.
CO2	Develop students to acquire the knowledge, so that they can understand physical phenomenon with the help of various theories.
CO3	Develop students, who will be able to explain the physical phenomenon with help of diagrams.
CO4	Develop students with a broad vision with the skills of visualizing and developing their own ideas, and to convert those ideas into engineering problems and solving those problems with the acquired knowledge of the Engineering Mechanics.
CO5	Analyze the perfect frames using different methods and concepts of Mechanical vibrations.

  
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Course Name: **ENGINEERING CHEMISTRY**

#	COURSE OUTCOME
CO1	Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
CO2	Understand the electrochemical sources of energy
CO3	Understand industrially based polymers, various engineering materials.
CO4	Explain the preparation properties and applications of polymers and describe the mechanism of conduction in conducting polymers..
CO5	Understand the principles of different analytical instruments and explain their applications.

Course Name: **ENVIRONMENTAL STUDIES**

#	COURSE OUTCOME
CO1	Students will get the sufficient information that will clarify modern environmental concepts like equitable use of natural resources, more sustainable life styles etc
CO2	Students will realize the need to change their approach so as to perceive our own environmental issues correctly, using practical approach based on observation and self learning.
CO3	Students become conversant with the fact that there is a need to create a concern for our environment that will trigger pro-environmental action; including simple activities we can do in our daily life to protect it.
CO4	By studying environmental sciences, students is exposed to the environment that enables one to find out solution of various environmental problems encountered on and often. At the end of the course, it is expected that students will be able to identify and analyze environmental problems as well as the risks associated with these problems and efforts to be taken to protect the environment from getting polluted. This will enable every human being to live in a more sustainable manner.
CO5	Solve environmental problems through higher level of personal involvement and interest

  
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Course Name: **APPLIED MECHANICS LAB**

#	COURSE OUTCOME
CO1	Acquire knowledge of static and dynamic behavior of the bodies.
CO2	Acquire the knowledge, so that they can understand physical phenomenon with the help of various theories.
CO3	Explain the physical phenomenon with help of diagrams.
CO4	with broad vision with the skills of visualizing and developing their own ideas, and to convert those ideas in to engineering problems and solving those problems with the acquired knowledge of the Engineering mechanics
CO5	Apply the principles of mechanics to analyze structural and machine elements.
CO6	Identify the different types of beams and the types of loading. Derive expressions to determine the bending stress, deflection and shear stress in beams subjected to various types loading.

Course Name: **ENGINEERING CHEMISTRY LAB**

#	COURSE OUTCOME
CO1	Would be confident in handling energy storage systems and would be able combat chemical corrosion
CO2	Would have acquired the practical skill to handle the analytical methods with confidence.
CO3	Would feel comfortable to think of design materials with the requisite properties
CO4	Would be in a position to technically address the water related problems.
CO5	Calculate the hardness of water and calculation of dissolved oxygen percentages

Course Name: **ENGINEERING & I.T. WORKSHOP**

#	COURSE OUTCOME
CO1	To provide Technical training to the students on Productivity tools like Word processors, Spreadsheets, Presentations
CO2	To make the students know about the internal parts of a computer, assembling a computer from the parts, preparing a computer for use by installing the operating system
CO3	To learn about Networking of computers and use Internet facility for Browsing and Searching.

  
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CO4	Apply wood working skills in real world applications. Build different parts with metal sheets in real world applications
CO5	Apply fitting operations in various applications
CO6	Apply different types of basic electric circuit connections

  
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## II B. Tech I Sem

Course Name: **MATHEMATICS-III**

#	COURSE OUTCOME
CO1	Demonstrate knowledge of matrix calculation as an elegant and powerful mathematical language in connection with rank of a matrix, linear system of equations, linear dependence and independence
CO2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem. Define a quadratic form and determine its nature using Eigen values
CO3	Perform the solutions of algebraic and transcendental equations employing bisection method, false position method and Newton-Raphson method
CO4	Understand the technique of interpolation along with Lagrange's formula and Newton's interpolation formulae.
CO5	Understand and apply the concepts of curve fitting, numerical differentiation and integration.
CO6	Interpret the numerical solutions of ordinary differential equations Employing Taylor series, Euler's, Picard's and Runge-kutta methods.

Course Name: **STRENGTH OF MATERIALS - I**

#	COURSE OUTCOME
CO1	Learn the behaviour of materials under different stress & strain conditions
CO2	Draw the bending moment diagrams and shear force diagrams
CO3	Understand the concept of flexural stresses on beams
CO4	Draw the shear stress distribution for beams under different loading conditions
CO5	Compute the deflection of beams for various loading
CO6	Analyze the direct and bending stresses on various structural elements

Course Name: **SURVEYING - I**

#	COURSE OUTCOME
CO1	Learn the basics of surveying, units of measurement and duties of surveyor
CO2	Compute bearings and angles
CO3	Learn the fundamentals of levelling and contouring
CO4	Measure angles using theodolite

  
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CO5	Compute areas and volumes
CO6	Undertake measurement and plotting in civil engineering

Course Name: **MECHANICS OF FLUIDS**

#	COURSE OUTCOME
CO1	Learn the concepts of fluid mechanics useful in Civil Engineering applications
CO2	Determine the properties of fluid like pressure and their measurement.
CO3	Compute forces on immersed plane and curved plates.
CO4	Apply continuity equation and energy equation in solving problems on flow through conduits.
CO5	Compute the frictional loss in laminar and turbulent flows.
CO6	Compute the minor losses in laminar and turbulent flows

Course Name: **BUILDING MATERIALS AND CONSTRUCTION**

#	COURSE OUTCOME
CO1	Understand the quality of various construction materials
CO2	Learn the intelligent use of plastics and glass
CO3	Analyse the smart way of allocation of insulating material
CO4	Identify the various construction activities at the time of actual execution.
CO5	Recognise the internal elements of a building technically
CO6	Select the materials for construction activities

Course Name: **GEOMATICS LAB – I**

#	COURSE OUTCOME
CO1	Apply the principle of surveying for civil Engineering Applications
CO2	Calculate areas, draw plans and contour maps using different measuring equipment at field level

  
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CO3	Plot the area by using Plane table Method
CO4	Calculate the levels using Levelling Instrument
CO5	Analyse the Geographical Maps
CO6	Write a technical laboratory report

Course Name: **STRENGTH OF MATERIALS LABORATORY**

#	COURSE OUTCOME
CO1	Understand the basics of material properties, stress and strain
CO2	Know the basic concepts of different kind of materials which are subjected to various loading conditions
CO3	Learn the concept of beams and springs its deflections
CO4	Know the concepts of Compressive behavior of materials
CO5	Facilitate the concept of bending and its theoretical analysis

Course Name: **BASIC MATERIAL TESTING LAB**

#	COURSE OUTCOME
CO1	Learn the properties of cement
CO2	Understand the quality of various construction materials
CO3	Identify and select the materials for construction activities
CO4	Classify bricks and stones
CO5	Recommend the materials for construction

Course Name: **QUANTITATIVE APTITUDE -1**

#	COURSE OUTCOME
CO1	Identify the problems by applying mathematical fundamentals
CO2	Apply the suitable logical methods to solve the problems
CO3	Solve the various problems by using quantitative mathematical fundamentals
CO4	Analyse the comprehensive data with logical ability
CO5	Shortcut methodology problems analysis by applying mathematical fundamentals

  
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## II B. Tech II Sem

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

#	COURSE OUTCOME
CO1	Analyze fundamentals of Economics such as Demand, Elasticity & Forecasting methods
CO2	Apply production, pricing & supply concepts for effective business administration
CO3	Identify the influence of various markets, the forms of business Organization and its International Economic Environment.
CO4	Analyze how to invest adequate amount of capital in order to get maximum return from Selected business activity.
CO5	Prepare accounting statements like income & expenditure statement, balance Sheet
CO6	Understand financial performance of the Business and to initiate the appropriate decisions to run the business profitably.

Course Name: **STRENGTH OF MATERIALS – II**

#	COURSE OUTCOME
CO1	Calculate the principal stresses and strains
CO2	Design shafts using theories of failure
CO3	Calculate load on columns using Euler's formula, Secant formula – Empirical formulae — Rankine – Gordon formula- Straight line formula – Prof. Perry's formula
CO4	Understand the design considerations to prevent the failure
CO5	Learn the concepts of longitudinal and circumferential stresses in thin cylinders
CO6	Apply Lames theory for thick cylinders

Course Name: **HYDRAULICS AND HYRAULIC MACHINERY**

#	COURSE OUTCOME
CO1	Learn and classify the types of flow
CO2	Compute and locate hydraulic jump
CO3	Calculate forces and work done by a jet on fixed or moving plate and curved plates
CO4	Learn about working principles of various types of turbines
CO5	Learn the characteristics of centrifugal pumps
CO6	Remember boundary layer theory

  
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Course Name: **GEOMATICS – II**

#	COURSE OUTCOME
CO1	Determine the Elevation by using trigonometric levelling
CO2	Measure horizontal and vertical- distances and angles Recording of observation accurately and Calculate Instrumental Constants
CO3	Know the Calculation of area by using Triangulation Method
CO4	Perform Setting out of Building, Culverts and piers etc.
CO5	Apply surveying principles to setting out curves by using different Methods
CO6	Know the different models of EDM Instruments and Information about RIS & GIS

Course Name: **STRUCTURAL ANALYSIS – I**

#	COURSE OUTCOME
CO1	Apply knowledge of various energy theorems
CO2	Apply knowledge to analyse the concept of deflection, bending moment and shear force diagrams
CO3	Apply knowledge to analyse columns under various loading conditions
CO4	Gain knowledge on slope and deflection of various members
CO5	Analyze continuous beams
CO6	Analyze the statically indeterminate members such as fixed bars, continuous beams and for various types of loading.

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

#	COURSE OUTCOME
CO1	Learn the behaviour of water current in rivers, canal and drains.
CO2	Use important practical results in common fluid flows
CO3	Determine metacentre of a floating vessel.
CO4	Calibrate various flow measuring devices in pipe and open channel flow
CO5	Determine various losses and velocity in pipe flow in field
CO6	Learn the concepts of centrifugal and reciprocating pumps

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Course Name: **GEOMATICS LAB –II**

#	COURSE OUTCOME
CO1	Find the inaccessible point by using theodolite
CO2	Find the constants of tachometric surveying
CO3	Carry out of various curve alignment
CO4	Use of various advanced instruments involved in surveying with respect to utility and precision
CO5	Perform area calculation by total station
CO6	Write a technical laboratory report

Course Name: **AUTO CAD LAB**

#	COURSE OUTCOME
CO1	Use the AutoCAD commands for drawing 2D & 3D building drawings required for different Civil Engineering applications
CO2	Plan and draw Civil Engineering Buildings as per aspect and orientation
CO3	Present drawings as per user requirements and preparation of technical report
CO4	Learn Basic concepts of Metric geometry
CO5	Learn Engineering and Drawing-related applications

Course Name: **VERBAL ABILITY AND LOGICAL REASONING**

#	COURSE OUTCOME
CO1	This course builds to improve the vocabulary, verbal reasoning, abstract and spatial reasoning
CO2	Identify the problems by applying mathematical fundamentals
CO3	Apply the suitable logical methods to solve the problems
CO4	Solve the various problems by using quantitative mathematical fundamentals
CO5	Analyse the comprehensive data with logical ability

  
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### III B. Tech I Sem

Course Name: **WATER RESOURCES ENGINEERING-I**

#	COURSE OUTCOME
CO1	Interpret rainfall data using different methods
CO2	Apply various methods to estimate surface and ground water hydrology components
CO3	Build the knowledge to connect hydrology with respect to field requirement
CO4	Design irrigation channels using silt theories
CO5	Classify various hydraulic structures involved in cross drainage works

Course Name: **DESIGN OF REINFORCED CONCRETE STRUCTURES**

#	COURSE OUTCOME
CO1	Make use of Indian Standard code provisions in designing reinforced concrete structures
CO2	Apply limit state design for serviceability, deflection and cracking
CO3	Justify the various modes of failure in reinforced concrete members
CO4	Design various reinforced concrete members to meet different loading conditions
CO5	Develop the reinforcement detailing drawings of concrete members to implement

Course Name: **STRUCTURAL ANALYSIS – II**

#	COURSE OUTCOME
CO1	Interpret structural actions in statically determinate and indeterminate structures
CO2	Analyze three hinged arches, continuous beams and portal frames using displacement method of analysis
CO3	Apply flexibility and stiffness method of analysis for two span continuous beams subjected to sinking of supports
CO4	Determine support reactions, shear forces and bending moments in beams and frames subjected to vertical and lateral loads
CO5	Draw SFD and BMD.
CO6	Assess the collapse mechanism and energy absorption capacity of fixed and continuous beams

  
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Course Name: **GEOTECHNICAL ENGINEERING – I**

#	COURSE OUTCOME
CO1	Evaluate the index and engineering properties of the soil
CO2	Determine the stress distributions in the founded soil
CO3	Analyze the compressibility of soils to obtain the coefficients
CO4	Assess the shear strength of the soils under different drainage conditions
CO5	Assess the soils for its bearing capacity

Course Name: **ENGINEERING GEOLOGY LABORATORY**

#	COURSE OUTCOME
CO1	Identify various minerals and rocks by their origin and properties.
CO2	Apply geological features influencing rock masses and discontinuities.
CO3	Measure strike and dip of the bedding planes
CO4	Interpret geological maps to represent the distribution of rocks and minerals.
CO5	Analyse strength and distribution of rocks and minerals

Course Name: **GEOTECHNICAL ENGINEERING LABORATORY**

#	COURSE OUTCOME
CO1	Determine the index properties of the soil.
CO2	Evaluate the engineering properties of the soil
CO3	Assess the sub grade strength of roads and pavements
CO4	Measure the coefficient of permeability for cohesive and non-cohesive soils
CO5	Estimate the shear strength under controlled drainage conditions

Course Name: **COMPUTER AIDED DESIGN LABORATORY – I**

#	COURSE OUTCOME
CO1	Evaluate beams with different loading conditions
CO2	Analyze trusses and portal frames
CO3	Develop building component models

  
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CO4	Design footings for residential and commercial structures
CO5	Analyze and design cantilever retaining wall

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

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

  
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### III B. Tech II Sem

Course Name: **GEOTECHNICAL ENGINEERING – II**

#	COURSE OUTCOME
CO1	Determine the depth of foundation for various soil conditions
CO2	Assess the failure of slopes under different conditions
CO3	Evaluate the earth pressures acting on retaining walls.
CO4	Calculate the bearing capacity of soils and foundation settlements
CO5	Estimate load carrying capacity of pile and pile group

Course Name: **CONCRETE TECHNOLOGY**

#	COURSE OUTCOME
CO1	Evaluate various properties of cement and aggregate
CO2	Measure the fresh and hardened properties of concrete
CO3	Classify various special concretes based on their performance
CO4	Assess the mechanical properties of concrete
CO5	Design concrete mixes for various field applications

Course Name: **TRANSPORTATION ENGINEERING – I**

#	COURSE OUTCOME
CO1	Develop a strong analytical and practical knowledge of highway
CO2	Apply theories of transportation engineering to design
CO3	Classify various highway geometrical design elements
CO4	Apply traffic regulations for intersection design
CO5	Design flexible and rigid pavements as per IRC

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Course Name: **ENVIRONMENTAL ENGINEERING**

#	COURSE OUTCOME
CO1	Distinguish the physical, chemical and biological properties of the water samples
CO2	Interpret various treatments for drinking water, waste water and solid waste
CO3	Design treatment plants by forecasting population for drinking water, wastewater and solid waste
CO4	Select appropriate distribution layout for municipal watersupply
CO5	Measure and propose control measures for noise and air pollution in the environment

Course Name: **CONCRETE TECHNOLOGY LABORATORY**

#	COURSE OUTCOME
CO1	Evaluate various properties of cement and aggregate
CO2	Determine compressive strength of concrete by using non-destructive tests
CO3	Design concrete mix as per the site conditions and specifications of materials available
CO4	Assess the mechanical properties of concrete
CO5	Determine shear strength of concrete by using non-destructive tests

Course Name: **TRANSPORTATION ENGINEERING LABORATORY**

#	COURSE OUTCOME
CO1	Identify basic engineering properties of various materials
CO2	Determine the grade and properties of bitumen
CO3	Conduct traffic studies for estimating traffic flow characteristics
CO4	Design traffic signals using Webster method
CO5	Evaluate longitudinal and cross-section details of roads

  
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Course Name: **ENVIRONMENTAL ENGINEERING LABORATORY**

#	COURSE OUTCOME
CO1	Discuss about importance of water and its quality analysis
CO2	Analyze various physico-chemical parameters of water in case of quality requirements
CO3	Assess complete water quality for domestic supplies
CO4	Suggest various types of treatment methods required to purify raw water with different contaminants
CO5	Analyze biological parameters of water in case of quality requirements

Course Name: **ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS**

#	COURSE OUTCOME
CO1	Recall vocabulary and enhance accuracy in grammar
CO2	Understand and communicate effectively in speaking and in writing
CO3	Apply language structures to construct good relations
CO4	Identify and develop effective technical writing skills
CO5	Determine and develop personal presentation techniques
CO6	Design necessary skills to deliver presentation confidently for improving in respective domains.

  
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**IV B. Tech I Sem**

Course Name: **TRANSPORTATION ENGINEERING – II**

#	COURSE OUTCOME
CO1	Develop a strong analytical and practical knowledge in air, waterways
CO2	Apply theories of transportation engineering to design railway tracks
CO3	Classify various airport geometrical design elements
CO4	Apply traffic regulations for Signaling and interlocking
CO5	Acquire knowledge on types of Docks, Ports and Harbors

Course Name: **ESTIMATION COSTING AND VALUATION**

#	COURSE OUTCOME
CO1	Develop knowledge on various Building items, their standard units and principles
CO2	Apply quantity of each item for RCC buildings by different methods of estimation
CO3	Evaluate various types of contracts, valuations, tenders and specifications
CO4	Apply rates and bill preparation for different building elements
CO5	Acquire valuation of assets

Course Name: **WATER RESOURCES ENGINEERING – II**

#	COURSE OUTCOME
CO1	Apply concepts of systems analysis for planning of water resources systems
CO2	Perform basic economic analysis to evaluate the economic feasibility of water resources and environmental engineering projects
CO3	Formulate and solve stochastic and fuzzy optimization problems for decision making under

  
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	uncertainty
CO4	Formulate and solve deterministic optimization models for design and operation of water resources systems
CO5	Understand different aspects of design of hydraulic structures

Course Name: **DESIGN OF STEEL STRUCTURES**

#	COURSE OUTCOME
CO1	Estimate strength of welds and bolts to find the efficiency of various connections
CO2	Design and detail tension and compression members under different conditions adopting IS Code
CO3	Analyze and design flexural members as per code provisions
CO4	Design built-up compression members and slab bases with necessary connections
CO5	Apply IS code of practice to design various components of welded steel plate girder

Course Name: **COMPUTER AIDED DESIGN LABORATORY –II**

#	COURSE OUTCOME
CO1	Evaluate beams with different loading conditions
CO2	Analyze trusses and portal frames
CO3	Develop building component models
CO4	Design footings for residential and commercial structures
CO5	Analyze and design cantilever retaining wall

Course Name: **HIGHWAY MATERIALS TESTING LABORATORY**

#	COURSE OUTCOME
CO1	Identify engineering properties of various materials

  
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CO2	Determine elongation, flash point for various grades of bitumen
CO3	Conduct traffic studies for estimating traffic flow characteristics
CO4	Determine hardness for various aggregates
CO5	Evaluate longitudinal and cross-section details of railways

#### IV B. Tech II Sem

Course Name: **URBAN TRANSPORTATION PLANNING**

#	COURSE OUTCOME
CO1	Develop a strong analytical and practical knowledge in urban mobility
CO2	Apply theories of transportation planning to design urban roads
CO3	Classify economic impacts of new transportation plans
CO4	Apply traffic assignment regulations to urban modes
CO5	Acquire knowledge on trip generation and distribution

Course Name: **FUNDAMENTALS OF DBMS**

#	COURSE OUTCOME
CO1	Apply suitable data models for given application
CO2	Design database using integrity constraints and ACID properties
CO3	Construct optimized SQL queries to solve real time problems
CO4	Apply suitable normal form to eliminate data redundancy
CO5	Choose appropriate index structure to improve performance

  
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**PROFESSIONAL ELECTIVE-I**

Course Name: **COST EFFECTIVE HOUSING TECHNIQUES**

#	COURSE OUTCOME
CO1	Categorize the various types of housing levels like low income group (LIG), Middle-income group (MIG) and high-income group (HIG) based on density norms
CO2	Choose housing policies and programs using concepts of GIS and MIS system in slums
CO3	Adopt innovative construction techniques for low cost housing
CO4	Make use of alternative building materials to condense overall cost of construction
CO5	Apply appropriate techniques and safety measures for housing in disaster prone areas

Course Name: **DISASTER MANAGEMENT AND MITIGATION**

#	COURSE OUTCOME
CO1	Classify different kind of hazards/disasters and their effects on environment
CO2	Analyze the causes of hazards/disasters which effects human life
CO3	Apply disaster management strategies through engineering applications
CO4	Apply emerging approaches in disaster management to reduce effect of disasters
CO5	Apply emerging approaches in present day problems

  
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**PROFESSIONAL ELECTIVE-II**

Course Name: **CONSTRUCTION PLANNING AND PROJECT MANAGEMENT**

#	COURSE OUTCOME
CO1	Build knowledge on roles and responsibilities of a project manager
CO2	Plan the construction facilities to expedite project activities
CO3	Develop schedule of activities to complete the construction project on time
CO4	Analyze and implement safety practices in construction industry
CO5	Create tender and contract document for a construction project

Course Name: **AIR POLLUTION AND CONTROL**

#	COURSE OUTCOME
CO1	Classify various sources and effects of air pollution
CO2	Analyze plume dispersion needs to control the pollutants
CO3	Interpret atmospheric properties with air quality-wind rose diagrams
CO4	Apply various methods for the control of particulates
CO5	Design sampling methods of air pollution with emission quality standards

  
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**PROFESSIONAL ELECTIVE-III**

Course Name: **BRIDGE ENGINEERING**

#	COURSE OUTCOME
CO1	Conduct site investigations to find the suitability of ground conditions for proposed bridge structure
CO2	Interpret the IRC regulations and railway bridge rules for detailed calculation of loadings
CO3	Design various types of bridges as per Indian Standard code provisions
CO4	Perform stability analysis of piers and abutments to find resistance against sliding and overturning
CO5	Estimate the unknown quantities of resistance, inductance and capacitance using bridges

Course Name: **INDUSTRIAL WASTE AND WASTE MANAGEMENT**

#	COURSE OUTCOME
CO1	Analyze the characteristics of industrial wastewaters
CO2	Select appropriate cleaner production method for industries.
CO3	Analyze the effects of disposal of industrial wastes.
CO4	Design treatment options for handling industrial wastewater.
CO5	Identify various treatment methods for hazardous wastes.

  
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### OPEN ELECTIVES

Course Name: **FUNDAMENTALS OF IOT**

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

Course Name: **PYTHON FOR EVERYONE**

#	COURSE OUTCOME
CO1	Apply the basic constructs of Python to solve problems
CO2	Organize lists, tuples and dictionaries appropriately to solve complex problems
CO3	Build functions to increase code reusability
CO4	Implement modular programming for organized software development
CO5	Make use of exception handling for robust programming

  
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# G PULLAIAH COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous)

(Approved by AICTE | NAAC Accreditation with 'A' Grade |  
Accredited by NBA (CIV, CSE, ECE & EEE) | Affiliated to JNTUA)  
Nandikotkur Road, Venkayapalli (V), Kurnool - 518452, Andhra Pradesh

## DEPARTMENT OF CIVIL ENGINEERING

The following are the Course Outcomes of all the courses for the Academic Year 2019-20  
from I-B.Tech to IV B.Tech

### R19 REGULATION

#### I B.TECH I SEM

Course Name: **MATHEMATICS – I**

#	COURSE OUTCOMES
CO1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
CO2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
CO3	Utilize mean value theorems to real life problems.
CO4	Familiarize with functions of several variables, which is useful in optimization.
CO5	Apply important tools of calculus in higher dimension and will become familiar with 2dimensional coordinate systems.
CO6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course Name: **ENGINEERING PHYSICS**

#	COURSE OUTCOMES
CO1	Apply mechanics for solving engineering problems.
CO2	Apply the principles of acoustics for noise cancellation and in designing buildings
CO3	Analyse the applications of ultrasonics in various engineering fields
CO4	Explainthe principles of physics in dielectrics and magnetic materials.
CO5	Interpret the concepts of lasers and optical fibers in various applications
CO6	Elucidate the applications of superconductors and nano-materials

Course Name: **COMPUTER PROGRAMMING**

  
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#	COURSE OUTCOMES
CO1	Comprehend the fundamental concepts of computer hardware and problem solving.
CO2	Knowledge on the basic concepts of algorithms, flow charts and python programming.
CO3	Ability to analyze the procedure for providing input and acquire output from the program along with implementation of control statements.
CO4	Interpret the importance of functions in programming.
CO5	Analyze and modularize the problem and its solution by using functions.
CO6	Ability to relate the concepts of strings, files and pre-processors to the real world Applications.

Course Name: **COMMUNICATIVE ENGLISH**

#	COURSE OUTCOMES
CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
CO2	Apply grammatical structures to formulate sentences and correct word forms
CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
CO5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
CO6	Improve upon speaking skills over telephone, role plays and public speaking

Course Name: **COMMUNICATIVE ENGLISH LABORATORY**

#	COURSE OUTCOMES
CO1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.
CO2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids
CO3	Apply development concepts to draw development of surfaces of simple solids
CO4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
CO5	Apply orthographic projection concepts to convert isometric view to orthographic views
CO6	Make use of AutoCAD Software to draw 2D diagrams of various objects

  
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Course Name: **ENGINEERING PHYSICS LABORATORY**

#	COURSE OUTCOMES
CO1	Estimate the mechanical properties of materials
CO2	Determine moment of inertia of a flywheel
CO3	Measure the velocity of ultrasonics in liquid by applying the basic concepts of ultrasonics
CO4	Determine the wavelength of laser, particle size, numerical aperture and acceptance angle by applying the principles of lasers and optical fibres
CO5	Measure the elastic constants, Poisson's ratio of the material
CO6	Measure the strain of the metal bar by using strain gauge.

Course Name: **COMPUTER PROGRAMMING LAB**

#	COURSE OUTCOMES
CO1	Design solutions to mathematical problems & Organize the data for solving the problem
CO2	Understand and implement modular approach using python
CO3	Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc
CO4	Understands about files and its applications.
CO5	Develop real-world applications, files and exception handling provided by python
CO6	Select appropriate programming construct for solving the problem

  
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## I B.TECH II SEM

Course Name: **MATHEMATICS – II**

#	COURSE OUTCOMES
CO1	Apply the mathematical principles to solve second and higher order differential equations.
CO2	Analyze the non- homogeneous linear differential equations along with method of variation of parameters.
CO3	Apply the concept of higher order differential equations to the various streams like Mass spring system and L-C-R Circuit problems.
CO4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs.
CO5	Analyze the vector calculus involving divergence, curl and their properties along with vector identities.
CO6	Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals.

Course Name: **ENGINEERING CHEMISTRY**

#	COURSE OUTCOMES
CO1	To illustrate the molecular orbital energy levels for different molecular species and Apply Schrodinger wave equation and particle in a box
CO2	To differentiate between pH metry, Potentiometric and conductometric titrations
CO3	Explain the preparation properties and applications of polymers and describe the mechanism of conduction in conducting polymers..
CO4	Understand the principles of different analytical instruments and explain their applications.
CO5	Explain the concept of nano clusters nano wires and characterize the applications of SEM & TEM.
CO6	Explain of different types of colloids, their preparations, properties and applications

Course Name: **DATA STRUCTURES**

#	COURSE OUTCOMES
CO1	Learn to choose appropriate data structure as applied to specified problem definition.
CO2	Design and analyze linear and non-linear data structures.
CO3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs in python

  
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CO4	Demonstrate advantages and disadvantages of specific algorithms and data structures
CO5	Develop a base for advanced computer science study.
CO6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course Name: **ENGINEERING MECHANICS**

#	COURSE OUTCOMES
CO1	Analyze the basic concepts of rigid bodies subjected to different types of loads and supports.
CO2	Analyze the motion of the bodies considering friction and external loads.
CO3	Determine centroids, center of gravity, moment of inertia of simple and composite figures.
CO4	Analyze the motion of particle without considering forces and considering forces, develop equations for different motions.
CO5	Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies.
CO6	Analyze the perfect frames using different methods and concepts of Mechanical vibrations.

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

#	COURSE OUTCOMES
CO1	Learning conventions of Drawing, which is an Universal Language Of Engineers. Also Interpret and Sketch the various curves which Including ellipse, parabola, hyperbola
CO2	Analyze and draft the orthographic projections of points and lines
CO3	Analyze and sketch the orthographic projections of planes and solids
CO4	Revise and Improve their visualization skills in the development of new products
CO5	Construct the isometric projection of an object employing orthographic projections
CO6	Drawing 2D and 3D diagrams of various objects

Course Name: **ENGINEERING CHEMISTRY LABORATORY**

#	COURSE OUTCOMES
CO1	Determine the cell constant and conductance of solutions
CO2	Prepare advanced polymer materials.
CO3	Determine the physical properties like surface tension, adsorption and viscosity
CO4	Estimate the Iron and Calcium in cement
CO5	Calculate the hardness of water and calculation of dissolved oxygen percentages
CO6	Determination of percentage of Iron in Cement sample by colorimetry

  
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Course Name: **DATA STRUCTURES LABORATORY**

#	COURSE OUTCOMES
CO1	Learn to choose appropriate data structure as applied to specified problem definition.
CO2	Design and analyze linear and non-linear data structures.
CO3	Design and implement algorithms for manipulating linked lists, stacks, queues, trees and graphs in python
CO4	Implement recursive algorithms as they apply to trees and graphs.
CO5	Formulate new solutions for programming problems or improve existing code using learned algorithms and data structures
CO6	Implement operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.

Course Name: **APPLIED MECHANICS LABORATORY**

#	COURSE OUTCOMES
CO1	Acquire knowledge of static and dynamic behavior of the bodies
CO2	Verify the Principle of moments using the bell crank lever apparatus.
CO3	Determine velocity ratio, mechanical advantage and efficiency of single and double gear crab
CO4	Determine the velocity ratio of the machine and to interpret the law of machine
CO5	Analyze the coefficient of static friction between two surfaces
CO6	Apply laws of mechanics to determine efficiency of simple machines with consideration of friction

Course Name: **CO-ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	To acquire the knowledge about the characteristics and working principles of semiconductor diodes, Bipolar Junction Transistor
CO2	Analysis of Single Phase AC Circuits, the representation of alternating quantities and determining the power in these circuits
CO3	Able to Measure the amplitude and frequency utilizing oscilloscope and analyze the fabrication processes of printed circuit boards
CO4	Apply wood working skills in real world applications. Build different parts with metal sheets in real world applications
CO5	Apply fitting operations in various applications
CO6	Apply different types of basic electric circuit connections

  
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## II B.TECH I SEM

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

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

Course Name: **STRENGTH OF MATERIALS-I**

#	COURSE OUTCOMES
CO1	Interpret simple stresses and strains to find out various properties of materials
CO2	Develop bending moment and shear force diagrams of beams subjected to different loading conditions
CO3	Compute flexural and shear stresses across various sections to plot the stress distribution envelopes
CO4	Apply various theorems such as Mohr's, Double integration, Conjugate beam etc., to find slope and deflections of beams
CO5	Analyze the direct and bending stresses on various structural elements for stability conditions

Course Name: **SURVEYING**

#	COURSE OUTCOMES
CO1	Compute linear measurement and angles using compasses, chain to prepare plans and maps
CO2	Determine elevations of station points along the irregular intervals to prepare contour maps and to calculate the volume of earth work
CO3	Measure horizontal angles by Theodolite for a traverse to find areas and elevations
CO4	Apply surveying principles for setting out simple curves by using different methods and compare fixed and movable hair method in tachometric surveying
CO5	Make use of advanced surveying instruments to solve Construction problems

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## II B.TECH II SEM

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

#	COURSE OUTCOMES
CO1	Analyze the concepts of managerial economics and financial accounting to make better decisions in the organization
CO2	Analyze the demand, production, cost and break even to know inter relationship among variables and their impact
CO3	Classify the market structure to decide the fixation of suitable price
CO4	Apply capital budgeting techniques to select best investment opportunity
CO5	Analyze and prepare financial statements to assess financial health of business

Course Name: **FLUIDS MECHANICS**

#	COURSE OUTCOMES
CO1	Make use of conservation laws of mass, momentum and energy to find properties of fluids
CO2	Compute the force of buoyancy on submerged and floating bodies to locate metacentre
CO3	Apply Euler's and Bernoulli's equation to find the characteristics of fluid in motion
CO4	Identify various flow measuring devices to find the coefficient of discharge
CO5	Evaluate minor and major energy losses to solve complex pipe network systems

Course Name: **STRENGTH OF MATERIALS LABORATORY**

#	COURSE OUTCOMES
CO1	Experiment with different types of materials to find the mechanical properties
CO2	Determine the Brinell and Rockwell hardness number to find the hardness of given specimen
CO3	Analyze elastic constants of spring and beam to design structural members
CO4	Determine toughness of materials using Charpy and Izod test
CO5	Prove Maxwell's reciprocal theorem for its validity on beams

  
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Course Name: **SURVEYING LABORATORY**

#	COURSE OUTCOMES
CO1	Make use of conventional surveying instruments in plotting of a layout
CO2	Determine horizontal and vertical angles by Theodolite for a given traverse
CO3	Compute the difference in elevations using various levelling Instruments
CO4	Utilize Rankin's and two Theodolite methods to plot curves
CO5	Experiment with total station to find fundamental measurements accurately in the field

Course Name: **FLUID MECHANICS LABORATORY**

#	COURSE OUTCOMES
CO1	Calibrate flow measuring devices to check the rate of flow
CO2	Prove the validity of Bernoulli equation when applied to fluid flow patterns
CO3	Conduct experiments on flow measuring devices to find coefficient of discharge
CO4	Gain knowledge to calculate and design engineering applications involving fluid
CO5	Evaluate minor and major energy losses to solve complex pipe network systems

Course Name: **BUILDING CONSTRUCTION AND PLANNING**

#	COURSE OUTCOMES
CO1	Identify suitable materials to be used for construction works
CO2	Apply Building Bye-Laws and Regulations with respect to classification of buildings based on occupancy
CO3	Plan Residential and Public Buildings as per the requirements
CO4	Gain knowledge to calculate and design engineering applications involving fluid Draw the conventional signs of doors, windows, ventilators and various materials d
CO5	Generate plan, elevation, section of single storey and Multi-storey buildings as per the given requirements

  
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Course Name: **ENVIRONMENTAL SCIENCE**

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

Course Name: **PROBABILITY AND STATISTICS**

#	COURSE OUTCOMES
CO1	Adopt correlation methods and principle of least squares, regression analysis
CO2	Apply discrete and continuous probability distributions
CO3	Classify the concepts of data science and its importance
CO4	Interpret the association of characteristics & through correlation & regression tools
CO5	Design the components of a classical hypothesis

Course Name: **HYDRAULICS AND HYDRAULIC MACHINERY**

#	COURSE OUTCOMES
CO1	Apply Chezy's and Manning's equation to find geometric properties of channels
CO2	Analyze specific energy and flow conditions to find critical depth in various channel
CO3	Determine the characteristics of hydraulic jump in channels using momentum and specific energy equations
CO4	Evaluate force exerted by the jet of water on stationary and moving plates to understand the working principles of turbine
CO5	Assess the characteristics of hydraulic turbines and pumps to find the efficiency

  
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Course Name: **STRENGTH OF MATERIALS – II**

#	COURSE OUTCOMES
CO1	Assess an inclined section to find principal stresses and strains using analytical and graphical methods
CO2	Design different types of shafts and springs subjected to torsion
CO3	Analyze failure of columns and struts for various end conditions by calculating the crushing load
CO4	Apply various theories of failure on the structural members for safe design
CO5	Design thin and thick cylinders subjected to fluid pressure

Course Name: Course Name: **STRUCTURAL ANALYSIS**

#	COURSE OUTCOMES
CO1	Interpret various energy theorems to find deflections in beams
CO2	Analyze the statically indeterminate members for various loading conditions beams
CO3	Develop shear force and bending moment diagrams for fixed and continuous
CO4	Apply Clapeyron's three moment theorem to find end and intermediate moments
CO5	Analyze indeterminate beams with and without support settlements using slope-deflection and moment distribution methods

Course Name: Course Name: **WATER RESOURCES ENGINEERING**

#	COURSE OUTCOMES
CO1	Interpret rainfall data using different methods
CO2	Apply various methods to estimate surface and ground water hydrology components
CO3	Build the knowledge to connect hydrology with respect to field requirement
CO4	Design irrigation channels using silt theories
CO5	Classify various hydraulic structures involved in cross drainage works

  
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Course Name: Course Name: **COMPUTER AIDED DRAWING LAB-I**


#	COURSE OUTCOMES
CO1	Make use of different tools in AutoCAD to draw regular and irregular shapes
CO2	Modify existing drawings as per client requirements using necessary commands
CO3	Develop a plan, section and elevation of various structures to implement on site
CO4	Apply computer aided drawings to find sectional properties of structural components
CO5	Create 3D drawings from 2D plan of various buildings for architectural purposes

Course Name: Course Name: **ENGINEERING GEOLOGY LABORATORY**

#	COURSE OUTCOMES
CO1	Identify various minerals and rocks by their origin and properties
CO2	Apply geological features influencing rock masses and discontinuities
CO3	Measure strike and dip of the bedding planes
CO4	Interpret geological maps to represent the distribution of rocks and minerals
CO5	Interpret geological maps to represent the distribution of rocks and minerals

Course Name: Course Name: **HYDRAULIC MACHINERY LABORATORY**

#	COURSE OUTCOMES
CO1	Calibrate flow measuring devices to check the rate of flow
CO2	Prove the validity of Bernoulli equation when applied to fluid flow patterns
CO3	Conduct experiments on flow measuring devices to find coefficient of discharge
CO4	Measure the impact forces produced by jet of water striking on flat and curved surfaces
CO5	Test basic performance parameters of hydraulic turbines and pumps

  
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Course Name: Course Name: **BASIC REMOTE SENSING AND GIS**

#	COURSE OUTCOMES
CO1	Distinguish the characteristics of satellites, platforms & sensors used in acquisition of remote sensing data
CO2	Apply the concepts of Electro Magnetic energy spectrum and spectral signature curves in the practical problems
CO3	Apply GIS in land use, disaster management, ITS and resource information system
CO4	Interpret data for water resource applications
CO5	Apply remote sensing and GIS in various civil engineering applications

  
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### III B.TECH I SEM

Course Name: **DESIGN OF REINFORCED CONCRETE STRUCTURES**

#	COURSE OUTCOMES
CO1	Make use of Indian Standard code provisions in designing reinforced concrete structures
CO2	Apply limit state design for serviceability, deflection and cracking
CO3	Justify the various modes of failure in reinforced concrete members
CO4	Design various reinforced concrete members to meet different loading conditions
CO5	Develop the reinforcement detailing drawings of concrete members to implement

Course Name: **GEOTECHNICAL ENGINEERING – I**

#	COURSE OUTCOMES
CO1	Evaluate the index and engineering properties of the soil
CO2	Determine the stress distributions in the founded soil
CO3	Analyze the compressibility of soils to obtain the coefficients
CO4	Assess the shear strength of the soils under different drainage conditions

Course Name: **WATER RESOURCES ENGINEERING – II**

#	COURSE OUTCOMES
CO1	Apply concepts of systems analysis for planning of water resources systems
CO2	Perform basic economic analysis to evaluate the economic feasibility of water resources and environmental engineering projects
CO3	Formulate and solve stochastic and fuzzy optimization problems for decision making under uncertainty
CO4	Formulate and solve deterministic optimization models for design and operation of water resource systems
CO5	Understand different aspects of design of hydraulic structures

Course Name: **STRUCTURAL ANALYSIS – II**

#	COURSE OUTCOMES
CO1	Interpret structural actions in statically determinate and indeterminate structures
CO2	Analyze three hinged arches, continuous beams and portal frames using displacement method of analysis
CO3	Apply flexibility and stiffness method of analysis for two span continuous beams subjected to sinking of supports

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CO4	Determine support reactions, shear forces and bending moments in beams and frames subjected to vertical and lateral loads
CO5	Assess the collapse mechanism and energy absorption capacity of fixed and continuous beams

Course Name: **GEOTECHNICAL ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	Determine the index properties of the soil.
CO2	Evaluate the engineering properties of the soil
CO3	Assess the sub grade strength of roads and pavements
CO4	Measure the coefficient of permeability for cohesive and non-cohesive soils
CO5	Estimate the shear strength under controlled drainage conditions

Course Name: **COMPUTER AIDED DESIGN LABORATORY – I**

#	COURSE OUTCOMES
CO1	Evaluate beams with different loading conditions
CO2	Analyze trusses and portal frames
CO3	Develop building component models
CO4	Design footings for residential and commercial structures
CO5	Analyze and design cantilever retaining wall

Course Name: **GENDER SENSITIZATION**

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

  
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### III B.TECH II SEM

Course Name: **CONCRETE TECHNOLOGY**

#	COURSE OUTCOMES
CO1	Evaluate various properties of cement and aggregate
CO2	Measure the fresh and hardened properties of concrete
CO3	Classify various special concretes based on their performance
CO4	Assess the mechanical properties of concrete
CO5	Design concrete mixes for various field applications

Course Name: **DESIGN OF STEEL STRUCTURES**

#	COURSE OUTCOMES
CO1	Estimate Strength of welds and bolts to find efficiency
CO2	Design and detail tension and compression members under different conditions
CO3	Analyze and design flexural members as per code provisions
CO4	Design built up compression members and slab bases with necessary connections
CO5	Apply Is code of practice to design various components of welded plate girder

Course Name: **TRANSPORTATION ENGINEERING**

#	COURSE OUTCOMES
CO1	Understand various modes of transportation
CO2	Apply basic principles of physics in estimating stopping and overtaking sight distance requirements
CO3	Compute the geometric features of road like horizontal and vertical alignment
CO4	Analyze the factors influencing road vehicle performance, characteristics and design.
CO5	Illustrate the basic traffic stream parameters and perform basic traffic signal phasing and timing plan.

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#### IV B.TECH I SEM

Course Name: **ENVIRONMENTAL ENGINEERING**

#	COURSE OUTCOMES
CO1	Distinguish the physical, chemical and biological properties of the water samples
CO2	Interpret various treatments for drinking water, waste water and solid waste
CO3	Design treatment plants by forecasting population for drinking water, wastewater and solid waste
CO4	Select appropriate distribution layout for municipal watersupply
CO5	Measure and propose control measures for noise and air pollution in the environment

Course Name: **GEOTECHNICAL ENGINEERING – II**

#	COURSE OUTCOMES
CO1	Determine the depth of foundation for various soil conditions
CO2	Assess the failure of slopes under different conditions
CO3	Evaluate the earth pressures acting on retaining walls.
CO4	Calculate the bearing capacity of soils and foundation settlements
CO5	Estimate load carrying capacity of pile and pile group

Course Name: **ESTIMATION COSTING AND VALUATION**

#	COURSE OUTCOMES
CO1	Develop knowledge on various Building items, their standard units and principles
CO2	Apply quantity of each item for RCC buildings by different methods of estimation
CO3	Evaluate various types of contracts, valuations, tenders and specifications
CO4	Apply rates and bill preparation for different building elements
CO5	Acquire valuation of assets

  
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Course Name: **CONCRETE TECHNOLOGY LABORATORY**

#	COURSE OUTCOMES
CO1	Evaluate various properties of cement and aggregate
CO2	Determine compressive strength of concrete by using non-destructive tests
CO3	Design concrete mix as per the site conditions and specifications of materials available
CO4	Assess the mechanical properties of concrete

Course Name: **ENVIRONMENTAL ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	Discuss about importance of water and its quality analysis
CO2	Analyze various physico-chemical parameters of water in case of quality requirements
CO3	Assess complete water quality for domestic supplies
CO4	Suggest various types of treatment methods required to purify raw water with different contaminants
CO5	Analyze biological parameters of water in case of quality requirements

Course Name: **PROFESSIONAL ENGLISH COMMUNICATION SKILLS**

#	COURSE OUTCOMES
CO1	Build inferences and predictions based on the information provided in the context
CO2	Choose academic vocabulary appropriately both in speaking and in writing
CO3	Develop effective technical writing skills
CO4	Construct necessary skills to deliver presentation confidently for improving in respective domains
CO5	Apply language structures to construct good relations

Course Name: **INDIAN CONSTITUTION**

#	COURSE OUTCOMES
CO1	Understand historical background of the constitution making and its importance for building a democratic India
CO2	Explain the role of President and Prime Minister.
CO3	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary
CO4	Understand the value of the fundamental rights and duties for becoming good citizen of India

  
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CO5	Analyze the decentralization of power between central, state and local self- government
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Course Name: **REMOTE SENSING AND GIS**

#	COURSE OUTCOMES
CO1	Distinguish the characteristics of satellites, platforms & sensors used in acquisition of remote sensing data.
CO2	Apply the concepts of Electro Magnetic energy spectrum and spectral signature curves in the practical problems
CO3	Apply GIS in land use, disaster management, ITS and resource information system
CO4	Interpret data for water resource applications
CO5	Apply remote sensing and GIS in various civil engineering applications

Course Name: **HYDROPOWER ENGINEERING**

#	COURSE OUTCOMES
CO1	Analyze the requirements of hydropower based on flow and power duration curves
CO2	Determine storage capacity of various hydropower plants
CO3	Interpret various water conveyance systems to draw water from reservoirs
CO4	Design penstocks and turbines for power generation
CO5	Plan the layout of a hydropower plant

Course Name: **DISASTER MANAGEMENT AND MITIGATION**

#	COURSE OUTCOMES
CO1	Classify different kind of hazards/disasters and their effects on environment
CO2	Analyze the causes of hazards/disasters which effects human life
CO3	Apply disaster management strategies through engineering applications
CO4	Apply emerging approaches in disaster management to reduce effect of disasters

  
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Course Name: **CONSTRUCTION PLANNING AND PROJECT MANAGEMENT**

#	COURSE OUTCOMES
CO1	Build knowledge on roles and responsibilities of a project manager
CO2	Plan the construction facilities to expedite project activities
CO3	Develop schedule of activities to complete the construction project on time
CO4	Analyze and implement safety practices in construction industry
CO5	Create tender and contract document for a construction project

Course Name: **EARTHQUAKE ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply the concept of theory of vibrations to earthquake engineering to find the building response.
CO2	Make use of response spectrum graphs to find the maximum displacements of the building due to different ground motions.
CO3	Analyze the multi degree of freedom structures by using seismic coefficient and response spectrum methods to find the drifts of the building.
CO4	Examine the latest Indian Seismic codes IS: 4326 and IS: 13920 provisions for ductile detailing of R.C buildings
CO5	Assess the different plan configurations in aseismic planning of the earthquake resistance building.

Course Name: **ENGINEERING HYDROLOGY**

#	COURSE OUTCOMES
CO1	Analyze hydro-meteorological data using rain gauges, evapometer and barometers
CO2	Apply groundwater flow equations to aquifer parameters for computation of runoff
CO3	Compute yield from surface and subsurface basin
CO4	Develop rainfall-runoff models
CO5	Compute groundwater drawdown based on water well withdrawal

Course Name: **AIR POLLUTION AND CONTROL**

#	COURSE OUTCOMES
CO1	Classify various sources and effects of air pollution
CO2	Analyze plume dispersion needs to control the pollutants

  
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CO3	Interpret atmospheric properties with air quality-wind rose diagrams
CO4	Apply various methods for the control of particulates
CO5	Design sampling methods of air pollution with emission quality standards

Course Name: **BASIC CIVIL ENGINEERING**

#	COURSE OUTCOMES
CO1	Classify various materials and components used in building construction
CO2	List out different domains like Structural, Transportation and Geotechnical Engineering in Civil engineering stream
CO3	Identify types of soils and foundations for various structures
CO4	Measure the linear and angular parameters using concepts of surveying
CO5	Develop water supply system for domestic and irrigational needs

Course Name: **BUILDING PLANNING AND CONSTRUCTION**

#	COURSE OUTCOMES
CO1	Plan buildings by adhering to laws laid by regulatory bodies
CO2	Classify different masonry types of brick and stones used in construction
CO3	Select appropriate floors and roofs for a proposed building
CO4	Identify building materials which can be employed in construction
CO5	Make use of damp proofing techniques to prevent ingress of water in buildings

  
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#### IV B.TECH II SEM

Course Name: **DISASTERMANAGEMENT**

#	COURSE OUTCOMES
CO1	Classify different kind of hazards/disasters and their effects on environment
CO2	Analyze the causes of hazards/disasters which effects human life
CO3	Apply disaster management through engineering applications
CO4	Apply suitable mitigation measures to minimize the effects of hazards and disasters

Course Name: **WATER RESOURCES CONSERVATION**

#	COURSE OUTCOMES
CO1	Interpret ground and surface water utilization for conservation of water resources
CO2	Apply the concepts of artificial ground water recharge to increase ground water level
CO3	Make use of the concepts of harvesting for preservation of water
CO4	Utilize new technologies like ion exchange and UV radiation techniques to recycle and reuse wastewater
CO5	Plan efficient use of water resources with minimum energy

Course Name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply network reduction techniques and knowledge of alternating quantities to calculate current, voltage and power for complex circuits.
CO2	Analyze the electrical circuits using nodal analysis, mesh analysis and network theorems
CO3	Demonstrate the working principle and operation of DC machines, AC machines and single-phase transformers.
CO4	Test the Performance of DC machines, AC machines and single-phase transformers.

Course Name: **RENEWABLE ENERGY SOURCES**

#	COURSE OUTCOMES
CO1	Apply the principles of Renewable energy sources for the construction of Power generating station
CO2	Apply the principles of Renewable energy sources for the construction of Power generating station

  
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CO3	Analyze Renewable energy sources for various environmental conditions
CO4	Analyze the generation principles and operation of variety of sources of energy

Course Name: **ELECTRICAL MEASURING INSTRUMENTS**

#	COURSE OUTCOMES
CO1	Categorise various electrical instruments used for measuring electrical parameters
CO2	Design appropriate arrangement for extension of range in measuring instruments.
CO3	Analyze the errors and compensations in various electrical measuring instruments
CO4	Measure current, voltage, power and energy in 1-phase and 3-phase circuits.
CO5	Estimate the unknown quantities of resistance, inductance and capacitance using bridges

Course Name: **OPTIMIZATION TECHNIQUES**

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

Course Name: **MECHANICAL TECHNOLOGY**

#	COURSE OUTCOMES
CO1	Identify the types of engines and their cycles
CO2	Classify the reciprocating air compressors and their working principles.
CO3	Discuss the constructional features of domestic refrigeration and air conditioning systems.
CO4	Inspect the mechanism of power transmission elements of various engineering systems.
CO5	Select suitable engineering materials and welding methods for real time applications.

  
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Course Name: **INTRODUCTION TO AUTOMOBILE SYSTEMS**

#	COURSE OUTCOMES
CO1	Identify the different parts of the automobile systems used in daily life
CO2	Analyze brakes, steering, axles, suspension and frames of an engine for better performance.
CO3	Inspect the mechanism of power transmission elements, and applications of various engineering systems.
CO4	Compare the significance of various engines in terms of their performance.
CO5	Classify various electrical systems that are used for efficient functioning of automobiles.

Course Name: **BASIC ELECTRONICS**

#	COURSE OUTCOMES
CO1	Analyze the operation and characteristics of diodes and transistors
CO2	Analyze various applications of diodes and transistors.
CO3	Make use of Boolean algebra postulates to minimize boolean functions
CO4	Construct and analyze various combinational and sequential circuits used in digital systems.

Course Name: **INTRODUCTION TO COMMUNICATION SYSTEMS**

#	COURSE OUTCOMES
CO1	Analyze the operation of basic communication system.
CO2	Compute the Fourier transform, energy and power of communications signals
CO3	Compare the performance of different modulation schemes used in communication systems
CO4	Differentiate time division and frequency division multiplexing techniques
CO5	Select an appropriate modulation technique while designing a communication system
Total Sessions	

Course Name: **FUNDAMENTALS OF IOT**

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

  
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Course Name: **BASIC DATA STRUCTURES**

#	COURSE OUTCOMES
CO1	Analyze the time and space complexities of algorithms
CO2	Apply various operations on linear data structures
CO3	Design searching and sorting techniques for a given application
CO4	Develop non-linear programming for optimization techniques

Course Name: **FUNDAMENTALS OF DBMS**

#	COURSE OUTCOMES
CO1	Apply suitable data models for a given application
CO2	Design database using integrity constraints and ACID properties
CO3	Construct optimized SQL queries to solve real time problems
CO4	Apply suitable normal form to eliminate data redundancy
CO5	Choose appropriate index structure to improve performance

Course Name: **BASICS OF SOFTWARE ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply the phases of software development life cycle in application development
CO2	Identify software requirements for construction
CO3	Design requirement engineering process for change management
CO4	Apply the design concepts for design models
CO5	Design requirement engineering process for change management

Course Name: **PYTHON FOR EVERYONE**

#	COURSE OUTCOMES
CO1	Apply the basic constructs of Python to solve problems
CO2	Organize lists, tuples and dictionaries appropriately to solve complex problems
CO3	Build functions to increase code reusability
CO4	Implement modular programming for organized software development
CO5	Make use of exception handling for robust programming

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Course Name: **COMPUTER ORGANIZATION AND OPERATING SYSTEMS**

#	COURSE OUTCOMES
CO1	Apply the concepts of programming language to solve system problems
CO2	Apply the concepts of programming language to solve system problems
CO3	Make use of the Operating Systems design structure and its services for system programming
CO4	Develop Process Scheduling algorithms and Inter-Process Communication systems for resource management
CO5	Classify memory management techniques and virtual memory mechanisms for apt implementations

Course Name: **FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**

#	COURSE OUTCOMES
CO1	Analyze different fields in which AI is applied
CO2	Apply suitable search strategies in finding better solution for a given problem
CO3	Identify linear regression with single and multiple variables
CO4	Perform predictive analysis using decision trees and random forest classifier
CO5	Implement deep learning neural network models with TensorFlow

Course Name: **MANAGEMENT SCIENCE**

#	COURSE OUTCOMES
CO1	Apply the concepts, theories, and principles of management in professional life
CO2	Design suitable organization structure for managing the operations in the organization
CO3	Apply principles of management to the various functional areas of an organization such as Human Resource, Marketing and Production.
CO4	Evaluate cost and time of each business project by using PERT and CPM techniques.
CO5	Formulate the new strategies that enhance competitive edge.

Course Name: **RESEARCH METHODOLOGY**

#	COURSE OUTCOMES
CO1	Interpret the importance of literature survey to identify the research problem

  
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CO2	Develop suitable research methodologies to conduct engineering research.
CO3	Apply the principles of research to gather the required data from various sources
CO4	Evaluate the gathered data by using appropriate statistical techniques
CO5	Prepare and present the research report effectively with the help of visual aids

Course Name: **INTELLECTUAL PROPERTY RIGHTS**

#	COURSE OUTCOMES
CO1	Analyse ethical and professional issues which arise in the intellectual property law context
CO2	Apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems
CO3	Analyse the social impact of intellectual property law and policy
CO4	Make use of copyrighted material so that it does not obstruct the progress of human knowledge
CO5	Analyze IPR policies before filing patentable inventions and discoveries

Course Name: **NATIONAL SERVICE SCHEME**

#	COURSE OUTCOMES
CO1	Classify the organizational structure of NSS and its activities
CO2	Identify the methods of mobilization and importance of youth Leadership
CO3	Develop a sense of social and civic responsibility and provide solutions to individual and community problems
CO4	Recognize the need for lifelong learning capabilities with the concepts of volunteerism and its functions
CO5	Develop capacity to meet emergencies and natural disasters

Course Name: **YOGA**

#	COURSE OUTCOMES
CO1	Improve physical conditioning related to flexibility through participation in yoga
CO2	Develop and maintain a personal yoga practice
CO3	Develop and maintain a personal yoga practice
CO4	Select as an as appropriate for personal needs
CO5	Identify and apply relaxation techniques for stress reduction

  
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Course Name: **DESIGN THINKING**

#	COURSE OUTCOMES
CO1	Appreciate various design processes for creativity and innovation
CO2	Develop design ideas through different techniques
CO3	Identify the significance of reverse engineering about products
CO4	Make use of design drawings to communicate ideas effectively
CO5	Build organizations that support creative and innovative thinking

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**G. PULLAIAH COLLEGE OF ENGINEERING AND TECHNOLOGY: KURNOOL**

**DEPARTMENT OF CIVIL ENGINEERING**

The following are the Course Outcomes of all the courses for the Academic Year 2020-21 from I-B.Tech to IV B.Tech

**R20 REGULATION**

**I B.TECH I SEM**

Course Name: **MATHEMATICS – I**

#	COURSE OUTCOMES
CO1	Develop the use of matrix algebra techniques that is needed by engineers for practical Applications.
CO2	Interpret the Eigen values and Eigen vectors of matrix in terms of the transformation it represents in to a matrix Eigen value problem.
CO3	Utilize mean value theorems to real life problems.
CO4	Familiarize with functions of several variables, which is useful in optimization.
CO5	Apply important tools of calculus in higher dimension and will become familiar with 2dimensional coordinate systems.
CO6	Analyze 3- dimensional coordinate systems and utilization of special functions.

Course Name: **ENGINEERING PHYSICS**

#	COURSE OUTCOMES
CO1	Apply mechanics for solving engineering problems.
CO2	Apply the principles of acoustics for noise cancellation and in designing buildings
CO3	Analyse the applications of ultrasonics in various engineering fields
CO4	Explainthe principles of physics in dielectrics and magnetic materials.
CO5	Interpret the concepts of lasers and optical fibers in various applications
CO6	Elucidate the applications of superconductors and nano-materials

Course Name: **PYTHON PROGRAMMING**

#	COURSE OUTCOMES
CO1	Comprehend the fundamental concepts of computer hardware and problem solving.
CO2	Knowledge on the basic concepts of algorithms, flow charts and python programming.

  
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CO3	Ability to analyze the procedure for providing input and acquire output from the program along with implementation of control statements.
CO4	Interpret the importance of functions in programming.
CO5	Analyze and modularize the problem and its solution by using functions.
CO6	Ability to relate the concepts of strings, files and pre-processors to the real world Applications.

Course Name: **COMMUNICATIVE ENGLISH**

#	COURSE OUTCOMES
CO1	Understand the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English
CO2	Apply grammatical structures to formulate sentences and correct word forms
CO3	Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
CO4	Evaluate and exhibit acceptable etiquette essential in social and professional settings
CO5	Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
CO6	Improve upon speaking skills over telephone, role plays and public speaking

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

#	COURSE OUTCOMES
CO1	Interpret and Sketch the various curves which Including ellipse, parabola, hyperbola
CO2	Analyze and draft the orthographic projections of points and lines
CO3	Analyze and sketch the orthographic projections of planes and solids
CO4	Revise and Improve their visualization skills in the development of new products
CO5	Construct the isometric projection of an object employing orthographic projections
CO6	Drawing 2D and 3D diagrams of various objects

Course Name: **COMMUNICATIVE ENGLISH LABORATORY**

#	COURSE OUTCOMES
CO1	Construct various curves like ellipse, parabola, hyperbola etc which are used in Engineering drawing.

  
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CO2	Apply orthographic projection concepts to draw projections of points, lines, planes and solids
CO3	Apply development concepts to draw development of surfaces of simple solids
CO4	Analyze discourse markers to speak clearly on a specific topic in informal discussions
CO5	Apply orthographic projection concepts to convert isometric view to orthographic views
CO6	Make use of AutoCAD Software to draw 2D diagrams of various objects

Course Name: **ENGINEERING PHYSICS LABORATORY**

#	COURSE OUTCOMES
CO1	Estimate the mechanical properties of materials
CO2	Determine moment of inertia of a flywheel
CO3	Measure the velocity of ultrasonics in liquid by applying the basic concepts of ultrasonics
CO4	Determine the wavelength of laser, particle size, numerical aperture and acceptance angle by applying the principles of lasers and optical fibres
CO5	Measure the elastic constants, Poisson's ratio of the material
CO6	Measure the strain of the metal bar by using strain gauge.

Course Name: **PYTHON PROGRAMMING LAB**

#	COURSE OUTCOMES
CO1	Design solutions to mathematical problems & organize the data for solving the problem
CO2	Understand and implement modular approach using python
CO3	Learn and implement various data structures provided by python library including string, list, dictionary and its operations etc
CO4	Understands about files and its applications.
CO5	Develop real-world applications, files and exception handling provided by python
CO6	Select appropriate programming construct for solving the problem

  
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## I B.TECH II SEM

Course Name: **MATHEMATICS – II**

#	COURSE OUTCOMES
CO1	Apply the mathematical principles to solve second and higher order differential equations.
CO2	Analyze the non- homogeneous linear differential equations along with method of variation of parameters.
CO3	Apply the concept of higher order differential equations to the various streams like Mass spring system and L-C-R Circuit problems.
CO4	Apply a range of techniques to find solutions of standard PDEs and basic properties of standard PDEs.
CO5	Analyze the vector calculus involving divergence, curl and their properties along with vector identities.
CO6	Apply Green's, Stokes and Divergence theorem in evaluation of double and triple integrals.

Course Name: **ENGINEERING CHEMISTRY**

#	COURSE OUTCOMES
CO1	To illustrate the molecular orbital energy levels for different molecular species and Apply Schrodinger wave equation and particle in a box
CO2	To differentiate between pH metry, Potentiometric and conductometric titrations
CO3	Explain the preparation properties and applications of polymers and describe the mechanism of conduction in conducting polymers..
CO4	Understand the principles of different analytical instruments and explain their applications.
CO5	Explain the concept of nano clusters nano wires and characterize the applications of SEM & TEM.
CO6	Explain of different types of colloids, their preparations, properties and applications

Course Name: **C & DATA STRUCTURES**

#	COURSE OUTCOMES
CO1	Learn to choose appropriate data structure as applied to specified problem definition.
CO2	Design and analyze linear and non-linear data structures.
CO3	Design algorithms for manipulating linked lists, stacks, queues, trees and graphs in python

  
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CO4	Demonstrate advantages and disadvantages of specific algorithms and data structures
CO5	Develop a base for advanced computer science study.
CO6	Evaluate algorithms and data structures in terms of time and memory complexity of basic operations.

Course Name: **ENGINEERING MECHANICS**

#	COURSE OUTCOMES
CO1	Analyze the basic concepts of rigid bodies subjected to different types of loads and supports.
CO2	Analyze the motion of the bodies considering friction and external loads.
CO3	Determine centroids, center of gravity, moment of inertia of simple and composite figures.
CO4	Analyze the motion of particle without considering forces and considering forces, develop equations for different motions.
CO5	Apply Newton's laws and conservation laws to elastic collisions and motion of rigid bodies.
CO6	Analyze the perfect frames using different methods and concepts of Mechanical vibrations.

Course Name: **ENGINEERING CHEMISTRY LABORATORY**

#	COURSE OUTCOMES
CO1	Determine the cell constant and conductance of solutions
CO2	Prepare advanced polymer materials.
CO3	Determine the physical properties like surface tension, adsorption and viscosity
CO4	Estimate the Iron and Calcium in cement
CO5	Calculate the hardness of water and calculation of dissolved oxygen percentages
CO6	Determination of percentage of Iron in Cement sample by colorimetry

Course Name: **C & DATA STRUCTURES LABORATORY**

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

  
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CO6	Implement operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
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Course Name: **APPLIED MECHANICS LABORATORY**

#	COURSE OUTCOMES
CO1	Acquire knowledge of static and dynamic behavior of the bodies
CO2	Verify the Principle of moments using the bell crank lever apparatus.
CO3	Determine velocity ratio, mechanical advantage and efficiency of single and double gear crab
CO4	Determine the velocity ratio of the machine and to interpret the law of machine
CO5	Analyze the coefficient of static friction between two surfaces
CO6	Apply laws of mechanics to determine efficiency of simple machines with consideration of friction

Course Name: **ENGINEERING WORKSHOP LABORATORY**

#	COURSE OUTCOMES
CO1	Apply wood working skills to make products
CO2	Perform metal cutting operations in the fitting section to make models
CO3	Perform simple welding operations to join to metal pieces
CO4	Apply sheet metal working skills to make required models
CO5	Evaluate the performance analysis of various pumps and turbines
CO6	Perform general maintenance works on own at house/ work place

Course Name: **UNIVERSAL HUMAN VALUES**

#	COURSE OUTCOMES
CO1	Understand the significance of value inputs in a classroom and start applying them in their life and profession
CO2	Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc
CO3	Understand the value of harmonious relationship based on trust and respect in their life and profession
CO4	Understand the role of a human being in ensuring harmony in society and nature

  
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CO5	Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
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## II B.TECH I SEM

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

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

Course Name: **STRENGTH OF MATERIALS-I**

#	COURSE OUTCOMES
CO1	Interpret simple stresses and strains to find out various properties of materials
CO2	Develop bending moment and shear force diagrams of beams subjected to different loading conditions
CO3	Compute flexural and shear stresses across various sections to plot the stress distribution envelopes
CO4	Apply various theorems such as Mohr's, Double integration, Conjugate beam etc., to find slope and deflections of beams
CO5	Analyze the direct and bending stresses on various structural elements for stability conditions

Course Name: **SURVEYING**

#	COURSE OUTCOMES
CO1	Compute linear measurement and angles using compasses, chain to prepare plans and maps
CO2	Determine elevations of station points along the irregular intervals to prepare contour maps and to calculate the volume of earth work
CO3	Measure horizontal angles by Theodolite for a traverse to find areas and elevations

  
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CO4	Apply surveying principles for setting out simple curves by using different methods and compare fixed and movable hair method in tachometric surveying
CO5	Make use of advanced surveying instruments to solve Construction problems

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

#	COURSE OUTCOMES
CO1	Analyze the concepts of managerial economics and financial accounting to make better decisions in the organization
CO2	Analyze the demand, production, cost and break even to know inter relationship among variables and their impact
CO3	Classify the market structure to decide the fixation of suitable price
CO4	Apply capital budgeting techniques to select best investment opportunity
CO5	Analyze and prepare financial statements to assess financial health of business

Course Name: **FLUIDS MECHANICS**

#	COURSE OUTCOMES
CO1	Make use of conservation laws of mass, momentum and energy to find properties of fluids
CO2	Compute the force of buoyancy on submerged and floating bodies to locate metacentre
CO3	Apply Euler's and Bernoulli's equation to find the characteristics of fluid in motion
CO4	Identify various flow measuring devices to find the coefficient of discharge
CO5	Evaluate minor and major energy losses to solve complex pipe network systems

Course Name: **STRENGTH OF MATERIALS LABORATORY**

#	COURSE OUTCOMES
CO1	Experiment with different types of materials to find the mechanical properties
CO2	Determine the Brinell and Rockwell hardness number to find the hardness of given specimen
CO3	Analyze elastic constants of spring and beam to design structural members
CO4	Determine toughness of materials using Charpy and Izod test

  
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CO5	Prove Maxwell's reciprocal theorem for its validity on beams
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Course Name: **SURVEYING LABORATORY**


#	COURSE OUTCOMES
CO1	Make use of conventional surveying instruments in plotting of a layout
CO2	Determine horizontal and vertical angles by Theodolite for a given traverse
CO3	Compute the difference in elevations using various levelling Instruments
CO4	Utilize Rankin's and two Theodolite methods to plot curves
CO5	Experiment with total station to find fundamental measurements accurately in the field

Course Name: **FLUID MECHANICS LABORATORY**

#	COURSE OUTCOMES
CO1	Calibrate flow measuring devices to check the rate of flow
CO2	Prove the validity of Bernoulli equation when applied to fluid flow patterns
CO3	Conduct experiments on flow measuring devices to find coefficient of discharge
CO4	Gain knowledge to calculate and design engineering applications involving fluid
CO5	Evaluate minor and major energy losses to solve complex pipe network systems

Course Name: **BUILDING CONSTRUCTION AND PLANNING**

#	COURSE OUTCOMES
CO1	Identify suitable materials to be used for construction works
CO2	Apply Building Bye-Laws and Regulations with respect to classification of buildings based on occupancy
CO3	Plan Residential and Public Buildings as per the requirements
CO4	Gain knowledge to calculate and design engineering applications involving fluid Draw the conventional signs of doors, windows, ventilators and various materials d
CO5	Generate plan, elevation, section of single storey and Multi-storey buildings as per the given requirements

  
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Course Name: **ENVIRONMENTAL SCIENCE**

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

### II B.TECH II SEM

Course Name: **PROBABILITY AND STATISTICS**


#	COURSE OUTCOMES
CO1	Adopt correlation methods and principle of least squares, regression analysis
CO2	Apply discrete and continuous probability distributions
CO3	Classify the concepts of data science and its importance
CO4	Interpret the association of characteristics & through correlation & regression tools
CO5	Design the components of a classical hypothesis

Course Name: **HYDRAULICS AND HYDRAULIC MACHINERY**

#	COURSE OUTCOMES
CO1	Apply Chezy's and Manning's equation to find geometric properties of channels
CO2	Analyze specific energy and flow conditions to find critical depth in various channel
CO3	Determine the characteristics of hydraulic jump in channels using momentum and specific energy equations
CO4	Evaluate force exerted by the jet of water on stationary and moving plates to understand the working principles of turbine
CO5	Assess the characteristics of hydraulic turbines and pumps to find the efficiency

Course Name: **STRENGTH OF MATERIALS – II**

#	COURSE OUTCOMES
CO1	Assess an inclined section to find principal stresses and strains using analytical and graphical methods

  
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CO2	Design different types of shafts and springs subjected to torsion
CO3	Analyze failure of columns and struts for various end conditions by calculating the crushing load
CO4	Apply various theories of failure on the structural members for safe design
CO5	Design thin and thick cylinders subjected to fluid pressure

Course Name: Course Name: **STRUCTURAL ANALYSIS**

#	COURSE OUTCOMES
CO1	Interpret various energy theorems to find deflections in beams
CO2	Analyze the statically indeterminate members for various loading conditions beams
CO3	Develop shear force and bending moment diagrams for fixed and continuous
CO4	Apply Clapeyron's three moment theorem to find end and intermediate moments
CO5	Analyze indeterminate beams with and without support settlements using slope-deflection and moment distribution methods

Course Name: Course Name: **WATER RESOURCES ENGINEERING**

#	COURSE OUTCOMES
CO1	Interpret rainfall data using different methods
CO2	Apply various methods to estimate surface and ground water hydrology components
CO3	Build the knowledge to connect hydrology with respect to field requirement
CO4	Design irrigation channels using silt theories
CO5	Classify various hydraulic structures involved in cross drainage works

Course Name: Course Name: **COMPUTER AIDED DRAWING LAB-I**

#	COURSE OUTCOMES
CO1	Make use of different tools in AutoCAD to draw regular and irregular shapes
CO2	Modify existing drawings as per client requirements using necessary commands
CO3	Develop a plan, section and elevation of various structures to implement on site

  
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CO4	Apply computer aided drawings to find sectional properties of structural components
CO5	Create 3D drawings from 2D plan of various buildings for architectural purposes

Course Name: Course Name: **ENGINEERING GEOLOGY LABORATORY**

#	COURSE OUTCOMES
CO1	Identify various minerals and rocks by their origin and properties
CO2	Apply geological features influencing rock masses and discontinuities
CO3	Measure strike and dip of the bedding planes
CO4	Interpret geological maps to represent the distribution of rocks and minerals
CO5	Interpret geological maps to represent the distribution of rocks and minerals

Course Name: Course Name: **HYDRAULIC MACHINERY LABORATORY**

#	COURSE OUTCOMES
CO1	Calibrate flow measuring devices to check the rate of flow
CO2	Prove the validity of Bernoulli equation when applied to fluid flow patterns
CO3	Conduct experiments on flow measuring devices to find coefficient of discharge
CO4	Measure the impact forces produced by jet of water striking on flat and curved surfaces
CO5	Test basic performance parameters of hydraulic turbines and pumps

Course Name: Course Name: **BASIC REMOTE SENSING AND GIS**

#	COURSE OUTCOMES
CO1	Distinguish the characteristics of satellites, platforms & sensors used in acquisition of remote sensing data
CO2	Apply the concepts of Electro Magnetic energy spectrum and spectral signature curves in the practical problems
CO3	Apply GIS in land use, disaster management, ITS and resource information system
CO4	Interpret data for water resource applications
CO5	Apply remote sensing and GIS in various civil engineering applications

  
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### III B.TECH I SEM

Course Name: **DESIGN OF REINFORCED CONCRETE STRUCTURES**

#	COURSE OUTCOMES
CO1	Make use of Indian Standard code provisions in designing reinforced concrete structures
CO2	Apply limit state design for serviceability, deflection and cracking
CO3	Justify the various modes of failure in reinforced concrete members
CO4	Design various reinforced concrete members to meet different loading conditions
CO5	Develop the reinforcement detailing drawings of concrete members to implement

Course Name: **GEOTECHNICAL ENGINEERING – I**


#	COURSE OUTCOMES
CO1	Evaluate the index and engineering properties of the soil
CO2	Determine the stress distributions in the founded soil
CO3	Analyze the compressibility of soils to obtain the coefficients
CO4	Assess the shear strength of the soils under different drainage conditions

Course Name: **WATER RESOURCES ENGINEERING – II**

#	COURSE OUTCOMES
CO1	Apply concepts of systems analysis for planning of water resources systems
CO2	Perform basic economic analysis to evaluate the economic feasibility of water resources and environmental engineering projects
CO3	Formulate and solve stochastic and fuzzy optimization problems for decision making under uncertainty
CO4	Formulate and solve deterministic optimization models for design and operation of water resources systems
CO5	Understand different aspects of design of hydraulic structures

Course Name: **STRUCTURAL ANALYSIS – II**

#	COURSE OUTCOMES
CO1	Interpret structural actions in statically determinate and indeterminate structures
CO2	Analyze three hinged arches, continuous beams and portal frames using displacement method of analysis
CO3	Apply flexibility and stiffness method of analysis for two span continuous beams subjected to sinking of supports

  
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CO4	Determine support reactions, shear forces and bending moments in beams and frames subjected to vertical and lateral loads
CO5	Assess the collapse mechanism and energy absorption capacity of fixed and continuous beams

Course Name: **GEOTECHNICAL ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	Determine the index properties of the soil.
CO2	Evaluate the engineering properties of the soil
CO3	Assess the sub grade strength of roads and pavements
CO4	Measure the coefficient of permeability for cohesive and non-cohesive soils
CO5	Estimate the shear strength under controlled drainage conditions

Course Name: **COMPUTER AIDED DESIGN LABORATORY – I**

#	COURSE OUTCOMES
CO1	Evaluate beams with different loading conditions
CO2	Analyze trusses and portal frames
CO3	Develop building component models
CO4	Design footings for residential and commercial structures
CO5	Analyze and design cantilever retaining wall

Course Name: **GENDER SENSITIZATION**

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

  
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### III B.TECH II SEM

Course Name: **CONCRETE TECHNOLOGY**

#	COURSE OUTCOMES
CO1	Evaluate various properties of cement and aggregate
CO2	Measure the fresh and hardened properties of concrete
CO3	Classify various special concretes based on their performance
CO4	Assess the mechanical properties of concrete
CO5	Design concrete mixes for various field applications

Course Name: **DESIGN OF STEEL STRUCTURES**

#	COURSE OUTCOMES
CO1	Estimate Strength of welds and bolts to find efficiency
CO2	Design and detail tension and compression members under different conditions
CO3	Analyze and design flexural members as per code provisions
CO4	Design built up compression members and slab bases with necessary connections
CO5	Apply Is code of practice to design various components of welded plate girder

Course Name: **TRANSPORTATION ENGINEERING**

#	COURSE OUTCOMES
CO1	Understand various modes of transportation
CO2	Apply basic principles of physics in estimating stopping and overtaking sight distance requirements
CO3	Compute the geometric features of road like horizontal and vertical alignment
CO4	Analyze the factors influencing road vehicle performance, characteristics and design.
CO5	Illustrate the basic traffic stream parameters and perform basic traffic signal phasing and timing plan.

  
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#### IV B.TECH I SEM

Course Name: **ENVIRONMENTAL ENGINEERING**

#	COURSE OUTCOMES
CO1	Distinguish the physical, chemical and biological properties of the water samples
CO2	Interpret various treatments for drinking water, waste water and solid waste
CO3	Design treatment plants by forecasting population for drinking water, wastewater and solid waste
CO4	Select appropriate distribution layout for municipal watersupply
CO5	Measure and propose control measures for noise and air pollution in the environment

Course Name: **GEOTECHNICAL ENGINEERING – II**

#	COURSE OUTCOMES
CO1	Determine the depth of foundation for various soil conditions
CO2	Assess the failure of slopes under different conditions
CO3	Evaluate the earth pressures acting on retaining walls.
CO4	Calculate the bearing capacity of soils and foundation settlements
CO5	Estimate load carrying capacity of pile and pile group

Course Name: **ESTIMATION COSTING AND VALUATION**

#	COURSE OUTCOMES
CO1	Develop knowledge on various Building items, their standard units and principles
CO2	Apply quantity of each item for RCC buildings by different methods of estimation
CO3	Evaluate various types of contracts, valuations, tenders and specifications
CO4	Apply rates and bill preparation for different building elements
CO5	Acquire valuation of assets

  
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Course Name: **CONCRETE TECHNOLOGY LABORATORY**

#	COURSE OUTCOMES
CO1	Evaluate various properties of cement and aggregate
CO2	Determine compressive strength of concrete by using non-destructive tests
CO3	Design concrete mix as per the site conditions and specifications of materials available
CO4	Assess the mechanical properties of concrete

Course Name: **ENVIRONMENTAL ENGINEERING LABORATORY**

#	COURSE OUTCOMES
CO1	Discuss about importance of water and its quality analysis
CO2	Analyze various physico-chemical parameters of water in case of quality requirements
CO3	Assess complete water quality for domestic supplies
CO4	Suggest various types of treatment methods required to purify raw water with different contaminants
CO5	Analyze biological parameters of water in case of quality requirements

Course Name: **PROFESSIONAL ENGLISH COMMUNICATION SKILLS**

#	COURSE OUTCOMES
CO1	Build inferences and predictions based on the information provided in the context
CO2	Choose academic vocabulary appropriately both in speaking and in writing
CO3	Develop effective technical writing skills
CO4	Construct necessary skills to deliver presentation confidently for improving in respective domains
CO5	Apply language structures to construct good relations

Course Name: **INDIAN CONSTITUTION**

#	COURSE OUTCOMES
CO1	Understand historical background of the constitution making and its importance for building a democratic India
CO2	Explain the role of President and Prime Minister.
CO3	Understand the functioning of three wings of the government i.e., executive, legislative and judiciary
CO4	Understand the value of the fundamental rights and duties for becoming a good citizen of India

  
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CO5	Analyze the decentralization of power between central, state and local self- government
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Course Name: **REMOTE SENSING AND GIS**

#	COURSE OUTCOMES
CO1	Distinguish the characteristics of satellites, platforms & sensors used in acquisition of remote sensing data.
CO2	Apply the concepts of Electro Magnetic energy spectrum and spectral signature curves in the practical problems
CO3	Apply GIS in land use, disaster management, ITS and resource information system
CO4	Interpret data for water resource applications
CO5	Apply remote sensing and GIS in various civil engineering applications

Course Name: **HYDROPOWER ENGINEERING**

#	COURSE OUTCOMES
CO1	Analyze the requirements of hydropower based on flow and power duration curves
CO2	Determine storage capacity of various hydropower plants
CO3	Interpret various water conveyance systems to draw water from reservoirs
CO4	Design penstocks and turbines for power generation
CO5	Plan the layout of a hydro power plant

Course Name: **DISASTER MANAGEMENT AND MITIGATION**

#	COURSE OUTCOMES
CO1	Classify different kind of hazards/disasters and their effects on environment
CO2	Analyze the causes of hazards/disasters which effects human life
CO3	Apply disaster management strategies through engineering applications
CO4	Apply emerging approaches in disaster management to reduce effect of disasters

  
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Course Name: **CONSTRUCTION PLANNING AND PROJECT MANAGEMENT**

#	COURSE OUTCOMES
CO1	Build knowledge on roles and responsibilities of a project manager
CO2	Plan the construction facilities to expedite project activities
CO3	Develop schedule of activities to complete the construction project on time
CO4	Analyze and implement safety practices in construction industry
CO5	Create tender and contract document for a construction project

Course Name: **EARTHQUAKE ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply the concept of theory of vibrations to earthquake engineering to find the building response.
CO2	Make use of response spectrum graphs to find the maximum displacements of the building due to different ground motions.
CO3	Analyze the multi degree of freedom structures by using seismic coefficient and response spectrum methods to find the drifts of the building.
CO4	Examine the latest Indian Seismic codes IS: 4326 and IS: 13920 provisions for ductile detailing of R.C buildings
CO5	Assess the different plan configurations in a seismic planning of the earthquake resistance building.

Course Name: **ENGINEERING HYDROLOGY**

#	COURSE OUTCOMES
CO1	Analyze hydro-meteorological data using rain gauges, evapometer and barometers
CO2	Apply groundwater flow equations to aquifer parameters for computation of runoff
CO3	Compute yield from surface and subsurface basin
CO4	Develop rainfall-runoff models
CO5	Compute groundwater drawdown based on water well withdrawal

Course Name: **AIR POLLUTION AND CONTROL**

#	COURSE OUTCOMES
CO1	Classify various sources and effects of air pollution
CO2	Analyze plume dispersion needs to control the pollutants

  
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CO3	Interpret atmospheric properties with air quality-wind rose diagrams
CO4	Apply various methods for the control of particulates
CO5	Design sampling methods of air pollution with emission qualitystandards

Course Name: **BASIC CIVIL ENGINEERING**

#	COURSE OUTCOMES
CO1	Classify various materials and components used in building construction
CO2	List out different domains like Structural, Transportation and Geotechnical Engineering in Civil engineering stream
CO3	Identify types of soils and foundations for various structures
CO4	Measure the linear and angular parameters using concepts of surveying
CO5	Develop water supply system for domestic and irrigational needs

Course Name: **BUILDING PLANNING AND CONSTRUCTION**

#	COURSE OUTCOMES
CO1	Plan buildings by adhering to laws laid by regulatory bodies
CO2	Classify different masonry types of brick and stones used in construction
CO3	Select appropriate floors and roofs for a proposed building
CO4	Identify building materials which can be employed in construction
CO5	Make use of damp proofing techniques to prevent ingress of water in buildings

  
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#### IV B.TECH II SEM

Course Name: **DISASTERMANAGEMENT**

#	COURSE OUTCOMES
CO1	Classify different kind of hazards/disasters and their effects on environment
CO2	Analyze the causes of hazards/disasters which effects human life
CO3	Apply disaster management through engineering applications
CO4	Apply suitable mitigation measures to minimize the effects of hazards and disasters

Course Name: **WATER RESOURCES CONSERVATION**

#	COURSE OUTCOMES
CO1	Interpret ground and surface water utilization for conservation of water resources
CO2	Apply the concepts of artificial ground water recharge to increase ground water level
CO3	Make use of the concepts of harvesting for preservation of water
CO4	Utilize new technologies like ion exchange and UV radiation techniques to recycle and reuse wastewater
CO5	Plan efficient use of water resources with minimum energy

Course Name: **FUNDAMENTALS OF ELECTRICAL ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply network reduction techniques and knowledge of alternating quantities to calculate current, voltage and power for complex circuits.
CO2	Analyze the electrical circuits using nodal analysis, mesh analysis and network theorems
CO3	Demonstrate the working principle and operation of DC machines, AC machines and single-phase transformers.
CO4	Test the Performance of DC machines, AC machines and single-phase transformers.

Course Name: **RENEWABLE ENERGY SOURCES**

#	COURSE OUTCOMES
CO1	Apply the principles of Renewable energy sources for the construction of Power generating station
CO2	Apply the principles of Renewable energy sources for the construction of Power generating station

  
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CO3	Analyze Renewable energy sources for various environmental conditions
CO4	Analyze the generation principles and operation of variety of sources of energy

Course Name: **ELECTRICAL MEASURING INSTRUMENTS**

#	COURSE OUTCOMES
CO1	Categorise various electrical instruments used for measuring electrical parameters
CO2	Design appropriate arrangement for extension of range in measuring instruments.
CO3	Analyze the errors and compensations in various electrical measuring instruments
CO4	Measure current, voltage, power and energy in 1-phase and 3-phase circuits.
CO5	Estimate the unknown quantities of resistance, inductance and capacitance using bridges

Course Name: **OPTIMIZATION TECHNIQUES**

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

Course Name: **MECHANICAL TECHNOLOGY**

#	COURSE OUTCOMES
CO1	Identify the types of engines and their cycles
CO2	Classify the reciprocating air compressors and their working principles.
CO3	Discuss the constructional features of domestic refrigeration and air conditioning systems.
CO4	Inspect the mechanism of power transmission elements of various engineering systems.
CO5	Select suitable engineering materials and welding methods for real time applications.

  
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Course Name: **INTRODUCTION TO AUTOMOBILE SYSTEMS**

#	COURSE OUTCOMES
CO1	Identify the different parts of the automobile systems used in daily life
CO2	Analyze brakes, steering, axles, suspension and frames of an engine for better performance.
CO3	Inspect the mechanism of power transmission elements, and applications of various engineering systems.
CO4	Compare the significance of various engines in terms of their performance.
CO5	Classify various electrical systems that are used for efficient functioning of automobiles.

Course Name: **BASIC ELECTRONICS**

#	COURSE OUTCOMES
CO1	Analyze the operation and characteristics of diodes and transistors
CO2	Analyze various applications of diodes and transistors.
CO3	Make use of Boolean algebra postulates to minimize Boolean functions
CO4	Construct and analyze various combinational and sequential circuits used in digital systems.

Course Name: **INTRODUCTION TO COMMUNICATION SYSTEMS**

#	COURSE OUTCOMES
CO1	Analyze the operation of basic communication system.
CO2	Compute the Fourier transform, energy and power of communications signals
CO3	Compare the performance of different modulation schemes used in communication systems
CO4	Differentiate time division and frequency division multiplexing techniques
CO5	Select an appropriate modulation technique while designing a communication system
Total Sessions	

Course Name: **FUNDAMENTALS OF IOT**

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

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Course Name: **BASIC DATA STRUCTURES**

#	COURSE OUTCOMES
CO1	Analyze the time and space complexities of algorithms
CO2	Apply various operations on linear data structures
CO3	Design searching and sorting techniques for a given application
CO4	Develop nonlinear programming for optimization techniques

Course Name: **FUNDAMENTALS OF DBMS**


#	COURSE OUTCOMES
CO1	Apply suitable data models for given application
CO2	Design database using integrity constraints and ACID properties
CO3	Construct optimized SQL queries to solve real time problems
CO4	Apply suitable normal form to eliminate data redundancy
CO5	Choose appropriate index structure to improve performance

Course Name: **BASICS OF SOFTWARE ENGINEERING**

#	COURSE OUTCOMES
CO1	Apply the phases of software development life cycle in application development
CO2	Identify software requirements for construction
CO3	Design requirement engineering process for change management
CO4	Apply the design concepts for design models
CO5	Design requirement engineering process for change management

Course Name: **PYTHON FOR EVERYONE**

#	COURSE OUTCOMES
CO1	Apply the basic constructs of Python to solve problems
CO2	Organize lists, tuples and dictionaries appropriately to solve complex problems
CO3	Build functions to increase code reusability
CO4	Implement modular programming for organized software development
CO5	Make use of exception handling for robust programming

  
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Course Name: **COMPUTER ORGANIZATION AND OPERATING SYSTEMS**

#	COURSE OUTCOMES
CO1	Apply the concepts of programming language to solve system problems
CO2	Apply the concepts of programming language to solve system problems
CO3	Make use of the Operating Systems design structure and its services for system programming
CO4	Develop Process Scheduling algorithms and Inter-Process Communication systems for resource management
CO5	Classify memory management techniques and virtual memory mechanisms for apt implementations

Course Name: **FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**

#	COURSE OUTCOMES
CO1	Analyze different fields in which AI is applied
CO2	Apply suitable search strategies in finding better solution for a given problem
CO3	Identify linear regression with single and multiple variables
CO4	Perform predictive analysis using decision trees and random forest classifier
CO5	Implement deep learning neural network models with Tensor Flow

Course Name: **MANAGEMENT SCIENCE**

#	COURSE OUTCOMES
CO1	Apply the concepts, theories, and principles of management in professional life
CO2	Design suitable organization structure for managing the operations in the organization
CO3	Apply principles of management to the various functional areas of an organization such as Human Resource, Marketing and Production.
CO4	Evaluate cost and time of each business project by using PERT and CPM techniques.
CO5	Formulate the new strategies that enhance competitive edge.

Course Name: **RESEARCH METHODOLOGY**

#	COURSE OUTCOMES
CO1	Interpret the importance of literature survey to identify the research problem

  
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CO2	Develop suitable research methodologies to conduct engineering research.
CO3	Apply the principles of research to gather the required data from various sources
CO4	Evaluate the gathered data by using appropriate statistical techniques
CO5	Prepare and present the research report effectively with the help of visual aids

Course Name: **INTELLECTUAL PROPERTY RIGHTS**

#	COURSE OUTCOMES
CO1	Analyse ethical and professional issues which arise in the intellectual property law context
CO2	Apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems
CO3	Analyse the social impact of intellectual property law and policy
CO4	Make use of copyrighted material so that it does not obstruct the progress of human knowledge
CO5	Analyze IPR policies before filing patentable inventions and discoveries

Course Name: **NATIONAL SERVICE SCHEME**

#	COURSE OUTCOMES
CO1	Classify the organizational structure of NSS and its activities
CO2	Identify the methods of mobilization and importance of youth Leadership
CO3	Develop a sense of social and civic responsibility and provide solutions to individual and community problems
CO4	Recognize the need for lifelong learning capabilities with the concepts of volunteerism and its functions
CO5	Develop capacity to meet emergencies and natural disasters

Course Name: **YOGA**

#	COURSE OUTCOMES
CO1	Improve physical conditioning related to flexibility through participation in yoga
CO2	Develop and maintain a personal yoga practice
CO3	Develop and maintain a personal yoga practice
CO4	Select as an as appropriate for personal needs
CO5	Identify and apply relaxation techniques for stress reduction

  
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Course Name: **DESIGN THINKING**

#	COURSE OUTCOMES
CO1	Appreciate various design processes for creativity and innovation
CO2	Develop design ideas through different techniques
CO3	Identify the significance of reverse engineering about products
CO4	Make use of design drawings to communicate ideas effectively
CO5	Build organizations that support creative and innovative thinking

  
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