D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY::BHIMAVARAM

DEPARTMENT OF CIVIL ENGINEERING

Course Outcomes

Program Name:	B.TECH	**AY**	2021-22
Course Name:	CIVIL ENGINEERING	**Class / Sem**	II/I
Faculty Name:		**Regulation**	R20

After completion of this course students will be able to:

C211	**Mathematics -III (Vector Calculus, Transforms and PDE)**	**BTL**
#CO	**CO Statement**	
C211.1	**Interpret** the physical meaning of different operators such as gradient, curl anddivergence	**Analyse**
C211.2	**Determine** the work done against a field, circulation and flux using vector calculus	**Apply**
C211.3	**Apply** the Laplace transform for solving differential equations	**Apply**
C211.4	**Compute** the Fourier series of periodic signals	**Evaluate**
C211.5	**Apply** integral expressions for the forwards and inverse Fourier transform to arange of non-periodic waveforms	**Apply**
C211.6	**Assess** solution methods for partial differential equations that model physicalprocesses	**Evaluate**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C212	**Strength of Materials - I**	**BTL**
#CO	**CO Statement**	
C212.1	**Understand** the basic materials behavior under the influence of different external loading conditions and the support conditions.	**Understand**
C212.2	**Outline** the relationship between bending moment, shear force and rate of loading with the help of diagrams.	**Analyse**
C212.3	**Apply** the theory of simple bending to beams for computing the flexural strength across the section.	**Apply**
C212.4	**Apply** the theory of simple bending to beams for computing the shear stress across the section	**Apply**
C212.5	**Evaluate** the Slopes and Deflections in beams and trusses subjected to various load combinations using energy methods.	**Evaluate**
C212.6	**Apply** fluid pressure concepts for computing circumferential and longitudinal stresses and strains on thick and thin-walled cylinders.	**Apply**

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After completion of this course students will be able to:

C213	**Fluid Mechanics**	**BTL**
#CO	**CO Statement**	
C213.1	**Understand** Various Properties Of Fluids And Their Influence On Fluid Motion and **Analyse** Variety of Problems in Fluid Statics And Dynamics.	**Analyse**
C213.2	**Calculate** the Forces that Act on Submerged Planes and Curves.	**Apply**
C213.3	**Analyse** Various types Of Fluid Flows & draw simple hydraulic and energy gradient lines.	**Analyse**
C213.4	**Apply** Integral Forms of 3 Fundamental Laws of Fluid Mechanics to Turbulent And Laminar Flow to Predict Relevant Pressures, Velocities and Forces.	**Apply**
C213.5	**Measure** the quantities of Fluid Flowing In Pipes, Tanks And Channels.	**Evaluate**
C213.6	**Illustrate** the Concept of Boundary Layer To Practical Situations.	**Apply**

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After completion of this course students will be able to:

C214	**Surveying and Geometrics**	**BTL**
#CO	**CO Statement**	
C214.1	**Operate** and use surveying equipment.	**Apply**
C214.2	**Sketch** plan or map of the existing permanent features on the ground.	**Apply**
C214.3	**Classify** the ground features from the map or plan.	**Analyse**
C214.4	**Analyse** temporary adjustments and check permanent adjustments of theTheodolite	**Analyse**
C214.5	**Derive** different types of Curves & know their applications	**Create**
C214.6	**Evaluate** Construction Survey & Various Space Based Positioning System.	**Evaluate**

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After completion of this course students will be able to:

C215	**Highway Engineering**	**BTL**
#CO	**CO Statement**	
C215.1	**Assess** highway development of India and **Classify** roads and road patterns.	**Analyse**
C215.2	**Analyse** various Geometric design like Cross section & Dignal distance elements, Curves, Gradients & Super Elevation.	**Analyse**
C215.3	**Assess** Traffic Studies, Signal design & other important Concepts.	**Evaluate**
C215.4	**Test** Highway construction materials to find desirable Properties.	**Analyse**
C215.5	**Design** a Flexible Pavement by considering different methods like CBR method, IRC method etc..	**Create**
C215.6	**Design** a Rigid Pavement slab by considering different Stresses & using IRC method.	**Create**

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After completion of this course students will be able to:

C216	**Concrete Technology Lab**	**BTL**
#CO	**CO Statement**	
C216.1	**Outline** the importance of testing of cement and its properties	**Analyse**
C216.2	**Assess** the different properties of aggregate	**Evaluate**
C216.3	**Determine** the concept of workability and testing of concrete	**Apply**
C216.4	**Prepare** fresh concrete apparatus after finalising Mix Proportion.	**Create**
C216.5	**Evaluate** the properties of hardened concrete	**Evaluate**
C216.6	**Explain** the non-destructive testing procedures on concrete.	**Understand**

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After completion of this course students will be able to:

C217	**Highway Engineering Lab**	**BTL**
#CO	**CO Statement**	
C217.1	**Determine** engineering properties of Road aggregates.	**Apply**
C217.2	**Determine** index properties of Road aggregates.	**Apply**
C217.3	**Examine** the grade & properties of bitumen.	**Apply**
C217.4	**Outline** the various properties of bitumen material and mixes by performingvarious tests on it	**Analyse**
C217.5	**Calculate** the design speed, maximum speed and minimum speed limits of alocation through spot speed.	**Apply**
C217.6	**Evaluate** the strength of subgrade soil by CBR test.	**Evaluate**

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After completion of this course students will be able to:

C218	**Surveying Field Work – I (Lab)**	**BTL**
#CO	**CO Statement**	
C218.1	**Apply** standard Practices to perform chain survey in the field and to plot from field data	**Apply**
C218.2	**Apply** Principles to Perform compass survey and plot from field data	**Apply**
C218.3	**Apply** basics of plane table survey for making plans and calculating areas	**Apply**
C218.4	**Apply** basic techniques and engineering tools for leveling.	**Apply**
C218.5	**Apply** knowledge of levelling in Longitudinal and cross sectioning for the given alignment	**Apply**
C218.6	**Explain** the methods of levelling and chaining.	**Understand**

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After completion of this course students will be able to:

C219	**Topographic Survey with Contour Map using Total Station (Skill oriented course)**	**BTL**
#CO	**CO Statement**	
C219.1	**Understand** the basics like Topography, Contour Maps, levelling etc..	**Understand**
C219.2	**Install** the Total Station at the Field and perform levelling.	**Apply**
C219.3	**Identify** and eliminate Parallel axis errors in the instrument.	**Analyse**
C219.4	**Handle** the Instrument setup carefully, perform the experiment and gather data at the field.	**Apply**
C219.5	**Analyse** the data obtained in the field by applying necessary corrections.	**Analyse**
C219.6	**Apply** the knowledge of Total station in different operations of Traversing & Contouring.	**Apply**

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C2110	**Constitution of India**	**BTL**
#CO	**CO Statement**	
C2110.1	**Understand** the importance of constitution	**Understand**
C2110.2	**Understand** the structure of executive, legislature and judiciary	**Understand**
C2110.3	**Evaluate** philosophy of fundamental rights and duties	**Evaluate**
C2110.4	**Evaluate** the autonomous nature of constitutional bodies like Supreme Court andhigh court controller and auditor general of India and election commission of India.	**Evaluate**
C2110.5	**Compare** Central and state relation financial and administrative.	**Analyse**
C2110.6	**Differentiate** between structure and functions of state secretariat.	**Analyse**

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After completion of this course students will be able to:

C221	**Complex Variables and Statistical Methods**	**BTL**
#CO	**CO Statement**	
C221.1	**Apply** Cauchy-Riemann equations to complex functions in order to determinewhether a given continuous function is analytic	**Apply**
C221.2	**Solve** differentiation and integration of complex functions used in engineeringproblems	**Apply**
C221.3	**Use** of the Cauchy residue theorem to evaluate certain integrals (	**Apply**
C221.4	**Apply** discrete and continuous probability distributions	**Apply**
C221.5	**Design** the components of a classical hypothesis test	**Create**
C221.6	**Infer** the statistical inferential methods based on small and large sampling tests	**Analyse**

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After completion of this course students will be able to:

C222	**Strength of Materials -II**	**BTL**
#CO	**CO Statement**	
C222.1	**Calculate** principal stresses, strains, and Theories of failures in the materials.	**Apply**
C222.2	**Analyze** Torsion in Circular Shafts and Deflections in Springs.	**Analyse**
C222.3	**Analyse** Critical load in Columns for various end conditions.	**Analyse**
C222.4	**Analyse** Direct & Bending Stresses in the case of chimneys, retaining walls anddams	**Analyse**
C222.5	**Analyse** Unsymmetrical Bending in different sections and also calculate theDeflection of beams.	**Analyse**
C222.6	**Evaluate** shear center for various sections like Channel, I, T, & L Section.	**Evaluate**

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After completion of this course students will be able to:

C223	**Hydraulics and Hydraulic Machinery**	**BTL**
#CO	**CO Statement**	
C223.1	**Solve** uniform and non uniform open channel flow problems.	**Apply**
C223.2	**Outline** the Ideas and Importance of Critical Flow Parameters	**Analyse**
C223.3	**Examine** the Principles of Dimensional Analysis For building The RelationshipBetween Model And Prototypes.	**Apply**
C223.4	**Illustrate** the Similitude Concept for Testing of Engineering Models	**Apply**
C223.5	**Examine** the Principles of Dimensional Analysis and Similitude In HydraulicModel Testing.	**Apply**
C223.6	**Assess** the Working Principles of Various Hydraulic Machinery and Pumps.	**Evaluate**

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After completion of this course students will be able to:

C224	**Environmental Engineering**	**BTL**
#CO	**CO Statement**	
C224.1	**Estimate** design population and water demand & Select a source based onquality and quantity	**Evaluate**
C224.2	**Assess** different Treatment & Disinfection methods for water.	**Evaluate**
C224.3	**Determine** Pipe line Network for a Community & Testing of Pipe lines.	**Apply**
C224.4	**Design** a water treatment plant for a village/city	**Create**
C224.5	**Design** a sewer by estimating DWF and Strom water flow and plumbing systemfor buildings.	**Create**
C224.6	**Design** a Sewage Treatment Plant for a town/city.	**Create**

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After completion of this course students will be able to:

C225	**Managerial Economics & Financial Analysis**	**BTL**
#CO	**CO Statement**	
C225.1	**Compare** the Demand and Demand Elasticities for a product	**Analyse**
C225.2	**Evaluate** the Input-Output-Cost relationships and estimation of the least costcombination of inputs	**Evaluate**
C225.3	**Understand** the nature of different markets and determine price outputdetermination under various market conditions	**Understand**
C225.4	**Describe** different Business Units, market structures, pricing strategies	**Understand**
C225.5	**Formulate** Financial Statements and the Usage of various accounting tools forAnalysis	**Analyse**
C225.6	**Evaluate** various investment project proposals with the help of capitalBudgeting techniques for decision making	**Evaluate**

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After completion of this course students will be able to:

C226	**Environmental Engineering Lab**	**BTL**
#CO	**CO Statement**	
C226.1	**Estimate** the characteristics of water, waste water and soil in the laboratory.	**Evaluate**
C226.2	**Decide** whether the water is Potable or not.	**Evaluate**
C226.3	**Estimate** Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture.	**Evaluate**
C226.4	**Estimate** the pollution characteristics of waste water by analyzing DO, BOD andCOD.	**Evaluate**
C226.5	**Calculate** the amount of coagulant required for optimum sedimentation for agiven Turbid sample.	**Apply**
C226.6	**Assess** physical parameters of water as turbidity and colour.	**Evaluate**

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After completion of this course students will be able to:

C227	**Strength of Material Lab**	**BTL**
#CO	**CO Statement**	
C227.1	**Evaluate** the values of Tensile and compressive stresses of the given specimen.	**Evaluate**
C227.2	**Analyse** stress of various beams subjected to bending loads.	**Analyse**
C227.3	**Examine** the stiffness of the open coil and closed coil spring.	**Apply**
C227.4	**Evaluate** the capacity of a material to withstand torsional and shearing stresses.	**Evaluate**
C227.5	**Determine** the hardness, impact strength to analyze the application of a specificmaterial.	**Apply**
C227.6	**Determine** the of stress, strain, deformation of material under different types ofloading.	**Apply**

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After completion of this course students will be able to:

C228	**Fluid Mechanics & Hydraulics Machinery Lab**	**BTL**
#CO	**CO Statement**	
C228.1	**Analyse** the flow discharge through venturi meter an orifice meter	**Analyse**
C228.2	**Determine** the rate of flow through notches	**Apply**
C228.3	**Determine** minor losses in the pipes	**Apply**
C228.4	**Apply** the principles of Bernoulli's equation in measurement of discharge inpipes, and in other pipe flow problems	**Apply**
C228.5	**Evaluate** the impact of jets on different vanes	**Evaluate**
C228.6	**Evaluate** the performance characteristics of hydraulic turbines and pumps	**Evaluate**

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After completion of this course students will be able to:

C311	**Structural Analysis**	**BTL**
#CO	**CO Statement**	
C311.1	**Solve** indeterminate beams like Propped Cantilever & Fixed Beams underdifferent loading & Support Conditions.	**Apply**
C311.2	**Apply** 3 moment method, slope deflection method, Moment distributionmethod to solve the continuous beams.	**Apply**
C311.3	**Evaluate** Frames & Trusses by using different methods.	**Evaluate**
C311.4	**Analyse** structures due to moving loads acting on the structure & draw theinfluence line diagrams for them.	**Analyse**
C311.5	**Analyse** the Beams & Frames using Flexibility matrix method.	**Analyse**
C311.6	**Analyse** the Beams & Frames using Stiffness matrix method.	**Analyse**

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After completion of this course students will be able to:

C312	**Concrete Technology**	**BTL**
#CO	**CO Statement**	
C312.1	**Illustrate** the basic physical and chemical properties of construction materialsfor determining quality of concrete.	**Analyse**
C312.2	**Evaluate** the most economical and eco-friendly concrete mix based onstandard methods for producing quality of concrete	**Evaluate**
C312.3	**Determine** the workability and manufacturing process of concrete forobtaining economical and durable concrete.	**Apply**
C312.4	**Analyse** the impact of water/cement ratio on strength and durability of concrete by measuring its hardened strength by compressive, tensile and flexuralstrengths	**Analyse**
C312.5	**Apply** the knowledge of mechanical properties of concrete like Elasticity, Creep & Shrinkage in the designing of the concrete structures.	**Apply**
C312.6	**Examine** special concretes and new generation concrete for satisfying thefuture needs of industry in real time	**Apply**

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After completion of this course students will be able to:

C313	**Water Resources Engineering - I**	**BTL**
#CO	**CO Statement**	
C313.1	**Interpret** the components of Water Cycle & its measurement for Evolving theeffects of Hydrology.	**Understand**
C313.2	**Illustrate** the factors effecting the rate of Evaporation & Infiltration forreducing the water loss in the Environment.	**Apply**
C313.3	**Develop** hydrographs for the Rainfall-Runoff data to design Storage Capacity& Life of Reservoirs.	**Create**
C313.4	**Estimate** the Floof Magnitude & carry out Floof Routing.	**Apply**
C313.5	**Examine** different Aquifer properties & their uses for Construction of Well.	**Apply**
C313.6	**Examine** the Rainfall- Runnoff Models for the advance Computation ofHydrograph.	**Apply**

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After completion of this course students will be able to:

C314	**Environmental Engineering - II**	**BTL**
#CO	**CO Statement**	
C314.1	**Determine** the sewage characteristics and comprehend the quality and quantityof sewage.	**Apply**
C314.2	**Choose** The Appropriate Appurtenances In The Sewerage Systems	**Evaluate**
C314.3	**Analyse** Sewage And Suggest And Design Suitable Treatment System ForSewage Treatment	**Analyse**
C314.4	**Design** secondary treatment units along with activated sludge process andtrickling filters.	**Create**
C314.5	**Design** a Septic tank and understand the working & disposal mechanism of itseffluents.	**Create**
C314.6	**Understand** the Sludge Characteristics & Effective Handeling of it.	**Understand**

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After completion of this course students will be able to:

C315	**Program Elective – I Environmental Impact Assessment**	**BTL**
#CO	**CO Statement**	
C315.1	**Understand** the role of stakeholder and public hearing in the preparation ofEIA	**Understand**
C315.2	**Choose** appropriate EIA methodology for Impact assessment.	**Evaluate**
C315.3	**Apply** RS & GIS for the Assessment of Soil & Ground water	**Apply**
C315.4	**Assess** the Impact Significance & Identification of Mitigation Measures.	**Evaluate**
C315.5	**Analyse** the Risk Assessment and management.	**Analyse**
C315.6	**Prepare** EMP, EIS & EIA Reports & evaluation the EIA report	**Create**

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After completion of this course students will be able to:

C316	**Open Elective – I Environmental Pollution & Control**	**BTL**
#CO	**CO Statement**	
C316.1	**Infer** the air pollutant control devices & have knowledge on the NAAQstandards and air emission standards.	**Analyse**
C316.2	**Infer** the Noise pollutant control methods & have knowledge on the ISO14000Standards.	**Analyse**
C316.3	**Categorize** treatment techniques used for sewage and industrial wastewatertreatment methods	**Analyse**
C316.4	**Apply** the fundamentals of solid waste management, practices adopted and itsimportance in keeping the health of the city.	**Apply**
C316.5	**Evaluate** the methods of environmental sanitation and the management ofcommunity facilities without spread of epidemics.	**Evaluate**
C316.6	**Appreciate** the importance of sustainable development while planning aproject or executing an activity.	**Understand**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

Faculty Signature

D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY::BHIMAVARAM

DEPARTMENT OF CIVIL ENGINEERING

Course Outcomes

Program Name:	B.TECH	**AY**	2021-22
Course Name:	CIVIL ENGINEERING	**Class / Sem**	III/I
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After completion of this course students will be able to:

C317	**Concrete Technology Lab**	**BTL**
#CO	**CO Statement**	
C317.1	**Outline** the importance of testing of cement and its properties	**Analyse**
C317.2	**Assess** the different properties of aggregate	**Evaluate**
C317.3	**Determine** the concept of workability and testing of concrete	**Apply**
C317.4	**Prepare** fresh concrete apparatus after finalising Mix Proportion.	**Create**
C317.5	**Evaluate** the properties of hardened concrete	**Evaluate**
C317.6	**Explain** the non-destructive testing procedures on concrete.	**Understand**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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DEPARTMENT OF CIVIL ENGINEERING

Course Outcomes

Program Name:	B.TECH	**AY**	2021-22
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Faculty Name:		**Regulation**	R19

After completion of this course students will be able to:

C318	**Surveying Field Work - II**	**BTL**
#CO	**CO Statement**	
C318.1	Apply the knowledge of Theodolite in different operations in civil engineeringprojects.	**Apply**
C318.2	Apply the knowledge of principles and purpose of Tacheometry in finding out the constants.	**Apply**
C318.3	Setup the Simple Curve by using different methods and to plot from field data.	**Create**
C318.4	Calculate of areas, drawing planes and contour maps using different measuringequipment at field level.	**Apply**
C318.5	Measure the area and heights using total station in the field	**Evaluate**
C318.6	Apply the knowledge of Total station in different operations of Traversing &Contouring.	**Apply**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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COURSE OUTCOMES

III YEAR - II SEM **R19**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C321	**Design & Drawing of Reinforced Concrete Structures**	**BTL**
#CO	**CO Statement**	
C321.1	**Apply** Fundamental Concepts Of Limit State Method And Working StressMethods	**Apply**
C321.2	**Analyse** The Structural Behavior Of Reinforced Concrete Elements In Bending,Shear, Compression And Torsion	**Analyse**
C321.3	**Design** a structures Subjected To Shear, Bond And Torsion	**Create**
C321.4	**Design** Different type Of Compression Members subjected to different Loading	**Create**
C321.5	**Design** Different type Of Footings subjected to different Loading Conditions	**Create**
C321.6	**Analyse** & **Design** different types of Slabs	**Create**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C322	**Water Resources Engineering – II**	**BTL**
#CO	**CO Statement**	
C322.1	**Estimate** Irrigation Water Requirements & Irrigation Efficiencies.	**Evaluate**
C322.2	**Design** Irrigation Canals And Canal Network while Considering differentTheories.	**Create**
C322.3	**Design** of Canal Structures like Falls, Regulators, Cross Drainage Works etc.	**Create**
C322.4	**Evaluate** various Theories used to design Diversion Head Works.	**Evaluate**
C322.5	**Analyse** stability of gravity and earth dams	**Analyse**
C322.6	**Design** ogee spillways and energy dissipation works.	**Create**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C323	**Geotechnical Engineering - I**	**BTL**
#CO	**CO Statement**	
C323.1	**Assess** Soil Structure & Clay Mineralogy & Understand Compaction & its Mechanism.	**Evaluate**
C323.2	**Classify** various types of Soil using different Concepts & Understand different Consistency Limits & Indices.	**Analyse**
C323.3	**Impart** the Concept of Seepage of The Water through Soils and **Determine** the Permeability of Water Through Soils.	**Apply**
C323.4	**Analyse** Boussinesq & Westergaad's theories for Stress Distribution in Soils.	**Analyse**
C323.5	**Impart** concept of Consolidation of Soils and **Determine** the Rate & degrre of Consolidation.	**Apply**
C323.6	**Determination** of Shear Strength of Soils using Mohr's Coulomb failure Theories & Stress- Strain behaviour of Sand & Clay.	**Apply**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C324	**Managerial Economics & Financial Analysis**	**BTL**
#CO	**CO Statement**	
C324.1	**Compare** the Demand and Demand Elasticities for a product	**Analyse**
C324.2	**Evaluate** the Input-Output-Cost relationships and estimation of the least cost combination of inputs	**Evaluate**
C324.3	**Understand** the nature of different markets and determine price outputdetermination under various market conditions	**Understand**
C324.4	**Describe** different Business Units, market structures, pricing strategies	**Understand**
C324.5	**Formulate** Financial Statements and the Usage of various accounting tools forAnalysis	**Analyse**
C324.6	**Evaluate** various investment project proposals with the help of capitalBudgeting techniques for decision making	**Evaluate**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C325	**Program Elective – II Pre-stressed Concrete**	**BTL**
#CO	**CO Statement**	
C325.1	**Understand** the Basic concept of Prestressing along with its Types &Characteristics.	**Understand**
C325.2	**Analyse** a Prestressed Member and can draw its Stress diagram	**Analyse**
C325.3	**Calculate** the Total Losses of Pre-stressing in the member due to variousCauses.	**Apply**
C325.4	**Design** for Flexural resistance along with knowledge about Deflection Control.	**Create**
C325.5	**Design** for Shear & Torsion as per Codal Provisions.	**Create**
C325.6	**Analyse** End Zone & Anchorage Zone Reinforcement in Prestressed Member.	**Analyse**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C326	**Open Elective – II Waste Water Treatment**	**BTL**
#CO	**CO Statement**	
C326.1	**Analyse** the Quality & Quantity requirements of Water in different stages ofproduction in different industries.	**Analyse**
C326.2	**Assess** different Treatment methods used for removal of Impurities in Industries.	**Evaluate**
C326.3	**Differentaiate** between Unit Operations & Unit Processes employed forIndustrial Waste warer Management.	**Analyse**
C326.4	**Decide** the need of common effluent treatment plant for the industrial area intheir vicinity	**Evaluate**
C326.5	**Outline** the manufacturing process & treatment methods employed at differentIndustrials.	**Analyse**
C326.6	**Apply** their Knowledge to Suggest Suitable treatment methods for any industrialwastewater.	**Apply**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C327	**CAD Lab**	**BTL**
#CO	**CO Statement**	
C327.1	**Draw** Projections of solids inclined to both planes on Paper	**Create**
C327.2	**Develop** Surfaces of Right Regular Solids & Interpenetrate them.	**Create**
C327.3	**Develop** Isometric & Perspective projections and Transform them.	**Create**
C327.4	**Develop** the components using 2D and 3D wire frame models through variousediting commands.	**Create**
C327.5	**Understand** & use various modelling techniques such as edit, zoom, crosshatching, pattern filling,rotation,etc.	**Understand**
C327.6	**Generate** assembly of various components of compound solids.	**Create**

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After completion of this course students will be able to:

C328	**Environmental Engineering Lab**	**BTL**
#CO	**CO Statement**	
C328.1	**Estimate** the characteristics of water, waste water and soil in the laboratory.	**Evaluate**
C328.2	**Decide** whether the water is Potable or not.	**Evaluate**
C328.3	**Estimate** Chloride, EC and Salinity of Soil and suggest their suitability for Construction/Agriculture.	**Evaluate**
C328.4	**Estimate** the pollution characteristics of waste water by analyzing DO, BODand COD.	**Evaluate**
C328.5	**Calculate** the amount of coagulant required for optimum sedimentation for agiven Turbid sample.	**Apply**
C328.6	**Assess** physical parameters of water as turbidity and colour.	**Evaluate**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C329	**Socially Relevant Project**	**BTL**
#CO	**CO Statement**	
C329.1	**Learn** to Interact with People and develop Social skills	**Understand**
C329.2	**Identify** different problems faced by Society.	**Understand**
C329.3	**Analyse** different Situations for the cause of Problerms.	**Analyse**
C329.4	**Choose** a solutions to the problems of society	**Evaluate**
C329.5	**Select** new technologies available for problems of the society.	**Analyse**
C329.6	**Recommend** technological changes which suits current needs of society	**Evaluate**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C3210	**Employability Skills**	**BTL**
#CO	**CO Statement**	
C3210.1	**Solve** aptitude and reasoning problems	**Apply**
C3210.2	**Apply** the soft skills in dealing the issues related to employability,	**Apply**
C3210.3	**Operate** effectively in Competition	**Apply**
C3210.4	**Show** Team Work and Leadership Skills.	**Apply**
C3210.5	**Demonstrate** self Confidence to face the Interviews	**Apply**
C3210.6	**Derive** Success in getting employment in campus placement interview	**Create**

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COURSE OUTCOMES

IV YEAR - I SEM **R16**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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Program Name:	B.TECH	**AY**	2021-22
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After completion of this course students will be able to:

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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Course Outcomes

Program Name:	B.TECH	**AY**	2021-22
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Faculty Name:		**Regulation**	R16

C411	**Environmental Engineering – II**	**BTL**
#CO	**CO Statement**	
C411.1	**Determine** the sewage characteristics and comprehend the quality and quantityof sewage.	**Apply**
C411.2	**Choose** The Appropriate Appurtenances In The Sewerage Systems	**Evaluate**
C411.3	**Analyse** Sewage And Suggest And Design Suitable Treatment System ForSewage Treatment	**Analyse**
C411.4	**Design** secondary treatment units along with activated sludge process andtrickling filters.	**Create**
C411.5	**Design** a Septic tank and understand the working & disposal mechanism of its effluents.	**Create**
C411.6	**Understand** the Sludge Characteristics & Effective Handeling of it.	**Understand**

After completion of this course students will be able to:

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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Course Outcomes

Program Name:	B.TECH	**AY**	2021-22
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Faculty Name:		**Regulation**	R16

C412	**Water Resources Engineering–II**	**BTL**
#CO	**CO Statement**	
C412.1	**Estimate** Irrigation Water Requirements & Irrigation Efficiencies.	**Evaluate**
C412.2	**Design** Irrigation Canals And Canal Network while Considering differentTheories.	**Create**
C412.3	**Design** of Canal Structures like Falls, Regulators, Cross Drainage Works etc.	**Create**
C412.4	**Evaluate** various Theories used to design Diversion Head Works.	**Evaluate**
C412.5	**Analyse** stability of gravity and earth dams	**Analyse**
C412.6	**Design** ogee spillways and energy dissipation works.	**Create**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C413	**Geotechnical Engineering - II**	**BTL**
#CO	**CO Statement**	
C413.1	**Analyse** the Stability of earth Slopes using different Methods & finding thestability number.	**Analyse**
C413.2	**Analyse** Rankine's & Columb's theory of Earth Pressure in normal & layeredSoils.	**Analyse**
C413.3	**Estimate** the Bearing Capacity for Shallow Foundation along with SettlementCriteria.	**Evaluate**
C413.4	**Apply** the principles of bearing capacity of piles and design them accordingly.	**Apply**
C413.5	**Estimate** Design Criteria and Construction parameters for Well Foundation	**Evaluate**
C413.6	**Determine** Soil Exploration Methods & prepare soil Investigation report.	**Apply**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C414	**Remote Sensing and GIS Applications**	**BTL**
#CO	**CO Statement**	
C414.1	**Understand** and be familiar With Ground, Air And Satellite Based Sensor Platforms	**Understand**
C414.2	**Analyse** and Interpret The Aerial Photographs And Satellite Imageries	**Analyse**
C414.3	**Create** and Input Spatial Data For GIS Application	**Create**
C414.4	**Apply** RS And GIS Applications In General	**Apply**
C414.5	**Apply** RS And GIS Concepts In Water Resources Engineering	**Apply**
C414.6	**Understand** the principles of spatial analysis	**Understand**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C415	**ELECTIVE-I - GROUND IMPROVEMENT TECHNIQUES**	**BTL**
#CO	**CO Statement**	
C415.1	**Outline** purpose of ground improvement techniques to obtain the suitableconstruction site for long-lasting structures	**Analyse**
C415.2	**Illustrate** the various methods of ground improvement techniques to increaseload bearing capacity of beneath and surface soils.	**Apply**
C415.3	**Determine** importance of admixtures and its composition for injecting thematerial into the soils	**Apply**
C415.4	**Analyse** the practical applications of reinforced soil and grid reinforced soilsfor better strength and durability of soils	**Analyse**
C415.5	**Outline** various functions of Geosynthetics and their applications in CivilEngineering practice.	**Analyse**
C415.6	**Illustrate** various grouting techniques and its applications for improving loadbearing of beneath soils	**Apply**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C416	**Elective II - Environmental Impact Assessment &Management**	**BTL**
#CO	**CO Statement**	
C416.1	**Understand** the role of stakeholder and public hearing in the preparation ofEIA	**Understand**
C416.2	**Choose** appropriate EIA methodology for Impact assessment.	**Evaluate**
C416.3	**Apply** RS & GIS for the Assessment of Soil & Ground water	**Apply**
C416.4	**Assess** the Impact Significance & Identification of Mitigation Measures.	**Evaluate**
C416.5	**Analyse** the Risk Assessment and management.	**Analyse**
C416.6	**Prepare** EMP, EIS & EIA Reports & evaluation the EIA report	**Create**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C417	**IPR & Patents**	**BTL**
#CO	**CO Statement**	
C417.1	**Illustrate** the significance of practice and procedure of Patents.	**Apply**
C417.2	**Illustrate** the statutory provisions of different forms of IPRs in simple forms.	**Apply**
C417.3	**Outline** the procedure of obtaining Patents, Copyrights, Trade Marks &Industrial Design.	**Analyse**
C417.4	**Examine** types of Intellectual Properties (IPs), Right of ownership, scope of protection & ways to create and extract value from IP.	**Apply**
C417.5	**Compare** the crucial role of IP in organizations of different industrial sectorsfor product and technology development.	**Evaluate**
C417.6	**Understanding** the Framework of Strategic Management of IntellectualProperty (IP).	**Understand**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C418	**GIS & CAD Lab**	**BTL**
#CO	**CO Statement**	
C418.1	**Create** and digitize the thematic map and extract important features	**Create**
C418.2	**Develop** digital elevation model	**Create**
C418.3	**Analyse** and design 2D & 3D trusses using structural analysis software	**Analyse**
C418.4	**Analyse** and design 2D & 3D frames using structural analysis software	**Analyse**
C418.5	**Design** and Analyse retaining wall using CADD software	**Create**
C418.6	**Design** and Analyse simple towers using CADD software	**Create**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

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After completion of this course students will be able to:

C419	**Irrigation Design & Drawing**	**BTL**
#CO	**CO Statement**	
C419.1	**Design** Surplus Weir of an Irrigation Structure.	**Create**
C419.2	**Design** Tank sluice with a tower head of an Irrigation Structure.	**Create**
C419.3	**Design** Canal drop-Notch type of an Irrigation Structure.	**Create**
C419.4	**Design** Canal regulator of an Irrigation Structure.	**Create**
C419.5	**Design** Under tunnel of an Irrigation Structure.	**Create**
C419.6	**Design** Syphon aqueduct type III of an Irrigation Structure.	**Create**

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IV YEAR - II SEM **R16**

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After completion of this course students will be able to:

C421	**Estimating, Specifications & Contracts**	**BTL**
#CO	**CO Statement**	
C421.1	**Explain** terms related to estimation along with preparation of approximateestimate.	**Understand**
C421.2	**Outline** Rate Analysis with Working out data for various Items.	**Analyse**
C421.3	**Create** Bar Bending Schedule for the given structure.	**Create**
C421.4	**Examine** contracts, types of contract and conditions of contract	**Apply**
C421.5	**Conclude** the quantities to prepare the detailed estimate	**Evaluate**
C421.6	**Develop** Detailed Estimation of a Building using different methods.	**Create**

Blooms Taxonomy: Remember, Understand, Apply, Analyse, Evaluate, Create.

Faculty Signature

D.N.R COLLEGE OF ENGINEERING & TECHNOLOGY::BHIMAVARAM

DEPARTMENT OF CIVIL ENGINEERING

Course Outcomes

Program Name:	B.TECH	**AY**	2021-22
Course Name:	CIVIL ENGINEERING	**Class / Sem**	IV/II
Faculty Name:		**Regulation**	R16

After completion of this course students will be able to:

C422	**Construction Technology & Management**	**BTL**
#CO	**CO Statement**	
C422.1	**Understand** the basic Qualities of a Project Manager along with the study ofdifferent Charts.	**Understand**
C422.2	**Illustrate** Resourse Allocation & review Project Evaluation.	**Apply**
C422.3	**Outline** the functioning of various earthwork equipment and their handeling.	**Analyse**
C422.4	**Outline** the functioning of various Conctrete equipment and their handeling.	**Analyse**
C422.5	**Evaluate** Various Construction Methods at different stages of Construction.	**Evaluate**
C422.6	**Infer** Quality Control and Safety noms while performing Construction activity.	**Analyse**

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Course Outcomes

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Faculty Name:		**Regulation**	R16

After completion of this course students will be able to:

C423	**Prestressed Concrete**	**BTL**
#CO	**CO Statement**	
C423.1	**Understand** the Basic concept of Prestressing along with its Types &Characteristics.	**Understand**
C423.2	**Analyse** a Prestressed Member and can draw its Stress diagram	**Analyse**
C423.3	**Calculate** the Total Losses of Pre-stressing in the member due to variousCauses.	**Apply**
C423.4	**Design** for Flexural resistance along with knowledge about Deflection Control.	**Create**
C423.5	**Design** for Shear & Torsion as per Codal Provisions.	**Create**
C423.6	**Analyse** End Zone & Anchorage Zone Reinforcement in Prestressed Member.	**Analyse**

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After completion of this course students will be able to:

C424	**Elective III - Solid and Hazardous Waste Management**	**BTL**
#CO	**CO Statement**	
C424.1	**Classify** Solid Waste & factors Influencinf it & Measurement of CalorificValue.	**Analyse**
C424.2	**Suggest** various Collection methods for Solid waste along with OnsiteHandeling, Storage & Processing.	**Understand**
C424.3	**Categorise** various Unit Operations for transformation of Soild Waste.	**Analyse**
C424.4	**Choose** various Energy & Material Recovery methods.	**Evaluate**
C424.5	**Apply** various disposal methods and post disposal effects of municipal solidwastes	**Apply**
C424.6	**Breakdown** Origin, handeling & disposal methods employed for HazardousWaste.	**Analyse**

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After completion of this course students will be able to:

C425	**Seminar on Internship Project**	**BTL**
#CO	**CO Statement**	
C425.1	**Recognise** any topic of interest and develop a thought process for technical presentation.	**Understand**
C425.2	**Analysis** and comprehension of proof-of-concept and related data.	**Analyse**
C425.3	**Grade** a detailed literature survey and build a document with respect totechnical publications.	**Evaluate**
C425.4	**Apply** tools and techniques to Present the report.	**Apply**
C425.5	**Create** technical reports using the Summarized Data	**Create**
C425.6	**Develop** effective presentation and improve soft skills.	**Create**

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After completion of this course students will be able to:

C426	**Project Work**	**BTL**
#CO	**CO Statement**	
C426.1	**Identify** thrust area in civil engineering and finalize problem statement.	**Remember**
C426.2	**Review** the literature to search for technical information from various resourceson selected problem.	**Understand**
C426.3	**Formulate** the appropriate solution methodology.	**Analyse**
C426.4	**Apply** all levels of Engineering knowledge for solving the problems.	**Apply**
C426.5	**Apply** the principles, tools and techniques to solve the problem.	**Apply**
C426.6	**Work** in a group as a part of multidisciplinary team with professionalresponsibility	**Apply**
C426.7	**Analysis** and design of structure to meet desired needs within realisticconstraints.	**Analyse**
C426.8	**Plan** activity schedule and implementation in a given time span.	**Evaluate**
C426.9	**Prepare** a report and presentation of project.	**Create**

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SIGNATURE OF HOD **SIGNATURE OF PRINCIPAL**

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