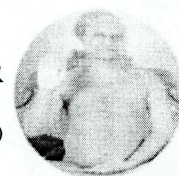


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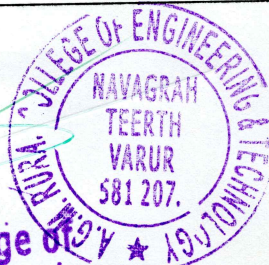
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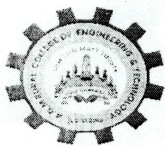
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SL.NO	SUB NAME	COs	CO Statement
<b>I SEM</b>			
1	Calculus and Linear Algebra	18MAT11.1	Apply the knowledge of calculus to problems related to polar curves and its applications in determining the bentness of the curve
		18MAT11.2	Learn the lotion of partial differentiation to calculate rates of change of multivariate function and solve problems related to composite functions and jacobians
		18MAT11.3	Apply the concept of change of order of integration and variables to evaluate multiple integrates and their usage in computing the area and volumes
		18MAT11.4	Solve first order linear/nonlinear differential equations analytically using standard methods
		18MAT11.5	Make use of matrix theory for solving system of linear equations and compute Eigenvalues and Eigenvectors required for matrix diagonalization process
2	Engineering Physics	18PHY12.1	Learn and understand various types of oscillations and their implications. Recognize the significance of shock waves and its application in various fields
		18PHY12.2	To get acquainted with elastic properties of materials by understanding the definition of elasticity, stress, strain, modulus of rigidity, young's modulus, bulk modulus and elastic limits
		18PHY12.3	To realize the inter relation between time varying electric field and magnetic field, Properties of EM waves, Maxwell's Equation and their role in Optical fiber communication
		18PHY12.4	Gain Knowledge of the intricacies of matter and energy, which is essential to explore the role of subatomic particles in understanding the matter at macro, micro and Nano level using the principles of quantum mechanics and understand the physics of lasers, various types of lasers and to appreciate their role in modern technology.

  
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		<b>18PHY12.5</b>	Learn the niceties of technologically important materials such as conductor, semiconductor and dielectrics, their potential properties in understanding their use in engineering applications
<b>3</b>	<b>Basic Electrical Engineering</b>	<b>18ELE13.1</b>	Students will be able to comprehend the basic concept of AC and DC circuits
		<b>18ELE13.2</b>	Explain the working principle of AC and DC circuits
		<b>18ELE13.3</b>	Explain the working principle of construction of Transformer
		<b>18ELE13.4</b>	Understand the basic concepts of wiring, earthing, Domestic protection device and electric shock
<b>4</b>	<b>Elements of Civil Engineering and Mechanics</b>	<b>18CIV14.1</b>	Mention the applications of various fields of Civil Engineering
		<b>18CIV14.2</b>	Compute the resultant of given force system subjected to various loads
		<b>18CIV14.3</b>	Comprehend the action of forces, moments and other loads on the system of rigid bodies and compute the reactive forces that develop as a result of external bodies
		<b>18CIV14.4</b>	Locate the centroid and compute the moment of Inertia of regular and buildup section
		<b>18CIV14.5</b>	Express the relationship between motion of bodies and analyze the bodies in motion
<b>5</b>	<b>Engineering Graphics</b>	<b>18EGDL15.1</b>	Prepare Engineering drawing as per BIS conventions mentioned in the relevant codes.
		<b>18EGDL15.2</b>	Produce computer generated drawings using CAED software
		<b>18EGDL15.3</b>	Use the knowledge of orthographic projections to represent engineering concepts and present the same in the form of drawings.
		<b>18EGDL15.4</b>	Develop isometric drawings of simple objects reading the orthographic projections of those objects.
		<b>18EGDL15.5</b>	Convert pictorial and isometric views of objects to orthographic views.

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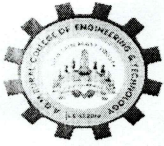
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6	Engineering Physics laboratory	18PHYL16.1	To recognize the light by exploring its interactions with matter and in realizing its characteristic properties
		18PHYL16.2	Understanding the mechanical properties of the material by application of stress
		18PHYL16.3	Appreciating the significance of elementary electric circuits in the functioning of various electric/ electronic devices and gaining understanding of physics of the materials
		18PHYL16.4	Design and implementation of electronic circuits to gain better understanding of physics in semiconductor devices
		18PHYL16.5	Appreciating the role of quantum mechanics in exploring the electrical properties of the materials
7	Basic Electrical Engineering Laboratory	18ELE17.1	Determine the current, power drawn and comparing the power factor of different lamps
		18ELE17.2	Determine impedance of an electrical circuit and power consumed in 3phase load
		18ELE17.3	Determine the earth resistance and understand the 2way and 3 way control of lamp
		18ELE17.4	Understand the basic functioning of domestic appliances of like fuse, MCB, UPS
<b>II SEM</b>			
8	Advanced Calculus and Numerical Methods	18MAT21.1	Illustrate the applications of multivariate calculus to understand the solenoidal and irrotational vectors and also exhibit the interdependence of line surface and volume integrals
		18MAT21.2	Demonstrate the various physical model through higher order differential equations and solve such higher order differential equations
		18MAT21.3	Construct a variety of partial differential equations and solve the linear differential equations

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		18MAT21.4	Explain the applications of differential equations and solution of ordinary differential equations
		18MAT21.5	Apply the knowledge of numerical methods in the modeling of various physical and engineering phenomena
9	Engineering Chemistry	18CHE22.1	Use of free energy in equilibria, rationalize bulk properties and processes using the thermodynamic consideration, electrochemical energy systems
		18CHE22.2	Causes and effect of corrosion of metals and control of corrosions. Modification of surface properties of metals to develop resistance to corrosion wear, tear impact et... by electro plating and electroless plating
		18CHE22.3	Production and consumption of energy for industrialization of country and living standard of people. Electrochemical and concentration of cells. Classical modern batteries and fuel cells. Utilization of solar energy for different useful forms of energy
		18CHE22.4	Environmental pollution, waste management and water chemistry.
		18CHE22.5	Different techniques of instrumental methods of analysis. Fundamental principles of Nan materials.
10	C-Programming for problem Solving	18CPS23.1	Illustrate simple algorithms from the different domains such as mathematic, physics etc.
		18CPS23.2	Construct a programming solutions to the given problems using C
		18CPS23.3	Identify and Correct the syntax and logical errors in C programming
		18CPS23.4	Modularize the given problems using functions and structures

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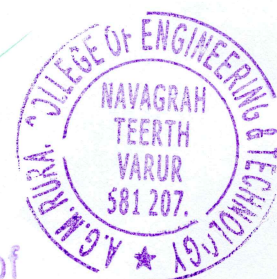
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11	Basic Electronics	18ELN24.1	Describe the operations of diodes, BJT, FET and Operational Amplifiers.
		18ELN24.2	Design and explain the constructions of rectifiers ,regulators, amplifiers and oscillators.
		18ELN24.3	Describe general operating principles of SCR and its applications
		18ELN24.4	Explain the working and design of Fixed voltage IC regulators using 7805 and a stable oscillator using timer IC 555
		18ELN24.5	Explain different number system and their conversions and construct simple combinational and sequential logic circuits using Flip-Flops.
		18ELN24.6	Describe the basic principles of operation of communication system and mobile phones
12	Elements of Mechanical Engineering	18ME25.1	Identify different sources of energy and their conversion process
		18ME25.2	Explain the working principles of Hydraulic turbines, pumps, IC engines and refrigerators
		18ME25.3	Recognize various metal joining process and power transmission elements
		18ME25.4	Understand the properties of common engineering materials and their applications in engineering industry
		18ME25.5	Discuss the working of conventional machine tools, machining process and accessories.
		18ME25.6	Describe the advanced manufacturing systems

  
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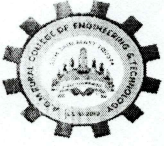
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13	Engineering Chemistry Laboratory	18CHEL26.1	Handling different types of instruments for analysis of materials using small quantities of materials involved in quick and accurate results
		18CHEL26.2	Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantity of materials involved for good results
14	C-Programming Laboratory	18CPL27.1	Write algorithms, flowcharts and program for simple problems
		18CPL27.2	Correct the syntax and logical errors to execute program
		18CPL27.3	Write iterative and wherever possible recursive programs
		18CPL27.4	Demonstrate use of functions, arrays, strings, strictures, and pointers in problem solving.
<b>III SEM</b>			
15	Transform Calculus, Fourier Series and Numerical Techniques	18MAT31.1	Use Laplace transform and inverse Laplace transform in solving differential/ integral equation arising in network analysis, control systems and other fields of engineering.
		18MAT31.2	Demonstrate Fourier series to study the behavior of periodic functions and their applications in system communications, digital signal processing and field theory.
		18MAT31.3	Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in wave and heat propagation, signals and systems.
		18MAT31.4	Solve first and second order ordinary differential equations arising in engineering problems using single step and multistep numerical methods.
		18MAT31.5	Determine the extremals of functional using calculus of variations and solve problems arising in dynamics of rigid bodies and vibrational analysis

  
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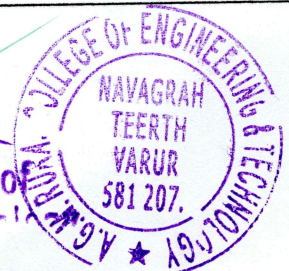
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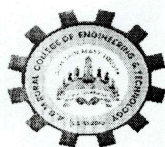
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16	<b>STRENGTH OF MATERIALS</b>	18CV32.1	To evaluate the basic concepts of the stresses and strains for different materials and strength of structural elements
		18CV32.2	To evaluate the development of internal forces and resistance mechanism for one dimensional and two-dimensional structural elements.
		18CV32.3	To analyse different internal forces and stresses induced due to representative loads on structural elements.
		18CV32.4	To evaluate slope and deflections of beams.
		18CV32.5	To evaluate the behavior of torsion members, columns and struts.
17	<b>FLUIDS MECHANICS</b>	18CV33.1	Possess a sound knowledge of fundamental properties of fluids and fluid Continuum
		18CV33.2	Compute and solve problems on hydrostatics, including practical applications
		18CV33.3	Apply principles of mathematics to represent kinematic concepts related to fluid flow
		18CV33.4	Apply fundamental laws of fluid mechanics and the Bernoulli's principle for practical applications
		18CV33.5	Compute the discharge through pipes and over notches and weirs
18	<b>BUILDING MATERIALS AND CONSTRUCTION</b>	18CV34.1	Select suitable materials for buildings and adopt suitable construction techniques.
		18CV34.2	Decide suitable type of foundation based on soil parameters
		18CV34.3	Supervise the construction of different building elements based on suitability
		18CV34.4	Exhibit the knowledge of building finishes and form work requirements
19	<b>BASIC SURVEYING</b>	18CV35.1	Possess a sound knowledge of fundamental principles Geodetics
		18CV35.2	Measurement of vertical and horizontal plane, linear and angular dimensions to arrive at solutions to basic surveying problems

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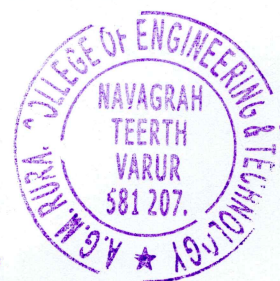
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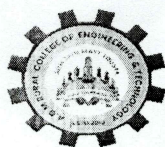


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		18CV35.3	Capture geodetic data to process and perform analysis for survey problems
		18CV35.4	Analyse the obtained spatial data and compute areas and volumes. Represent 3D data on plane figures as contours
20	ENGINEERING GEOLOGY	18CV36.1	Apply geological knowledge in different civil engineering practice.
		18CV36.2	Students will acquire knowledge on durability and competence of foundation rocks, and confidence enough to use the best building materials
		18CV36.3	Civil Engineers are competent enough for the safety, stability, economy and life of the structures that they construct.
		18CV36.4	Able to solve various issues related to ground water exploration, build up dams, bridges, tunnels which are often confronted with ground water problems
		18CV36.5	Intelligent enough to apply GIS, GPS and remote sensing as a latest tool in different civil engineering construction.
<b>IV SEM</b>			
21	Engineering Mathematics-IV	18MAT41.1	Use the concepts of analytic function and complex potentials to solve the problems arising in electromagnetic field theory.
		18MAT41.2	Utilize conformal transformation and complex integral arising in aero foil theory, fluid flow visualization and image processing.
		18MAT41.3	Apply discrete and continuous probability distributions in analyzing the probability models arising in engineering field.
		18MAT41.4	Make use of the correlation and regression analysis to fit a suitable mathematical model for the statistical data.
		18MAT41.5	Construct joint probability distributions and demonstrate the validity of testing the hypothesis.
22	ANALYSIS OF DETERMINATE STRUCTURES	18CV42.1	Identify different forms of structural systems.
		18CV42.2	Construct ILD and analyse the beams and trusses subjected to moving loads

  
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		18CV42.3	Understand the energy principles and energy theorems and its applications to determine the deflections of trusses and beams.
		18CV42.4	Determine the stress resultants in arches and cables.
23	APPLIED HYDRAULICS	18CV43.1	Apply dimensional analysis to develop mathematical modeling and compute the parametric values in prototype by analyzing the corresponding model parameters
		18CV43.2	Design the open channels of various cross sections including economical channel sections
		18CV43.3	Apply Energy concepts to flow in open channel sections, Calculate Energy dissipation,
		18CV43.4	Compute water surface profiles at different conditions
		18CV43.5	Design turbines for the given data, and to know their operation characteristics under different operating conditions
24	CONCRETE TECHNOLOGY	18CV44.1	Relate material characteristics and their influence on microstructure of concrete.
		18CV44.2	Distinguish concrete behavior based on its fresh and hardened properties
		18CV44.3	Illustrate proportioning of different types of concrete mixes for required fresh and hardened properties using professional codes.
		18CV44.4	Adopt suitable concreting methods to place the concrete based on requirement.
		18CV44.5	Select a suitable type of concrete based on specific application.
25	ADVANCED SURVEYING	18CV45.1	Apply the knowledge of geometric principles to arrive at surveying problems
		18CV45.2	Use modern instruments to obtain geo-spatial data and analyse the same to appropriate engineering problems.
		18CV45.3	Capture geodetic data to process and perform analysis for survey problems with the use of electronic instruments

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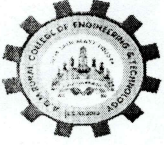


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		<b>18CV45.4</b>	Design and implement the different types of curves for deviating type of alignments
26	<b>WATER SUPPLY AND TREATMENT ENGINEERING</b>	<b>18CV46.1</b>	Estimate average and peak water demand for a community
		<b>18CV46.2</b>	Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
		<b>18CV46.3</b>	Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
		<b>18CV46.4</b>	Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.
27	<b>ENGINEERING GEOLOGY LABORATORY</b>	<b>18CVL47.1</b>	The students able to identify the minerals, rocks and utilize them effectively in civil engineering practices.
		<b>18CVL47.2</b>	The students will interpret and understand the geological conditions of the area for implementation of civil engineering projects.
		<b>18CVL47.3</b>	The students will interpret subsurface information such as thickness of soil, weathered zone, depth of hard rock and saturated zone by using geophysical methods.
		<b>18CVL47.4</b>	The students will learn the techniques in the interpretation of LANDSAT Imageries to find out the lineaments and other structural features for the given area
		<b>18CVL47.5</b>	The students will be able to identify the different structures in the field.
28	<b>FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY</b>	<b>18CVL48.1</b>	Properties of fluids and the use of various instruments for fluid flow measurement.
		<b>18CVL48.2</b>	Working of hydraulic machines under various conditions of working and their characteristics.

  
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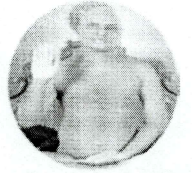




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V SEM			
29	CONSTRUCTION MANAGEMENT AND ENTREPRENEURSHIP	18CV51.1	Prepare a project plan based on requirements and prepare schedule of a project by understanding the activities and their sequence.
		18CV51.2	Understand labour output, equipment efficiency to allocate resources required for an activity / project to achieve desired quality and safety.
		18CV51.3	Analyze the economics of alternatives and evaluate benefits and profits of a construction activity based on monetary value and time value.
		18CV51.4	Establish as an ethical entrepreneur and establish an enterprise utilizing the provisions offered by the federal agencies
30	ANALYSIS OF INDETERMINATE STRUCTURES	18CV52.1	Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope deflection method
		18CV52.2	Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
		18CV52.3	Construct the bending moment diagram for beams and frames by Kani's method.
		18CV52.4	Construct the bending moment diagram for beams and frames using flexibility method
		18CV52.5	Analyze the beams and indeterminate frames by system stiffness method.
31	DESIGN OF RC STRUCTURAL ELEMENTS	18CV53.1	Understand the design philosophy and principles.
		18CV53.2	Solve engineering problems of RC elements subjected to flexure, shear and torsion
		18CV53.3	Demonstrate the procedural knowledge in designs of RC structural elements such as slabs, columns and footings
		18CV53.4	Owns professional and ethical responsibility.

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Navagrah Teerth, VARUR-581 207





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**A.G.M RURAL COLLEGE OF ENGINEERING AND TECHNOLOGY, VARUR**

Navagrah Teerth, NH-4 P. B. Road Opp, VRL Head Office, VARUR-581207, Hubballi, Dist. Dharwad, Karnataka  
(APPROVED BY AICTE NEW DELHI, AFFILIATED TO VTU BELAGAUM AND RECOGNIZED BY STATE GOVT.)  
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**DEPARTMENT OF CIVIL ENGINEERING**  
**CO STATEMENT FOR THE SCHEME 2018 (BATCH 2018-2022)**

32	<b>BASIC GEOTECHNICAL ENGINEERING</b>	<b>18CV54.1</b>	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
		<b>18CV54.2</b>	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils
		<b>18CV54.3</b>	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
		<b>18CV54.4</b>	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
		<b>18CV54.5</b>	Capable of estimating load carrying capacity of single and group of piles
33	<b>MUNICIPAL WASTEWATER ENGINEERING</b>	<b>18CV55.1</b>	Select the appropriate sewer appurtenances and materials in sewer network.
		<b>18CV55.2</b>	Design the sewers network and understand the self purification process in flowing water.
		<b>18CV55.3</b>	Design the varies physic- chemical treatment units
		<b>18CV55.4</b>	Design the various biological treatment units
		<b>18CV55.5</b>	Design various AOPs and low cost treatment units.
34	<b>HIGHWAY ENGINEERING</b>	<b>18CV56.1</b>	Acquire the capability of proposing a new alignment or re-alignment of existing roads, conduct necessary field investigation for generation of required data.
		<b>18CV56.2</b>	Evaluate the engineering properties of the materials and suggest the suitability of the same for pavement construction.
		<b>18CV56.3</b>	Design road geometrics, structural components of pavement and drainage.
		<b>18CV56.4</b>	Evaluate the highway economics by few select methods and also will have a basic knowledge of various highway financing concepts.

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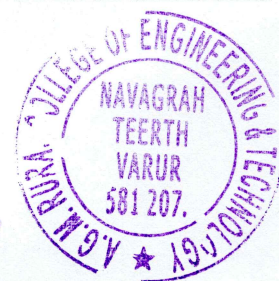
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35	SURVEYING PRACTICE	18CVL57.1	Apply the basic principles of engineering surveying and for linear and angular measurements.
		18CVL57.2	Comprehend effectively field procedure required for a professional surveyor
		18CVL57.3	Use techniques, skills and conventional surveying instruments necessary for engineering practice.
36	CONCRETE AND HIGHWAY MATERIALS LABORATORY	18CVL58.1	Able to interpret the experimental results of concrete and highway materials based on laboratory tests.
		18CVL58.2	Determine the quality and suitability of cement.
		18CVL58.3	Design appropriate concrete mix Using Professional codes.
		18CVL58.4	Determine strength and quality of concrete
		18CVL58.5	Evaluate the strength of structural elements using NDT techniques
		18CVL58.6	Test the soil for its suitability as sub grade soil for pavements
<b>VI SEM</b>			
37	DESIGN OF STEEL STRUCTURAL ELEMENTS	18CV61.1	Possess knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behavior of structural steel
		18CV61.2	Understand the Concept of Bolted and Welded connections.
		18CV61.3	Understand the Concept of Design of compression members, built-up columns and columns splices.
		18CV61.4	Understand the Concept of Design of tension members, simple slab base and gusseted base.
		18CV61.5	Understand the Concept of Design of laterally supported and un-supported steel beams.
38	APPLIED GEOTECHNICAL ENGINEERING	18CV62.1	Ability to plan and execute geotechnical site investigation program for different civil engineering projects
		18CV62.2	Understanding of stress distribution and resulting settlement beneath the loaded footings on sand and clayey soils

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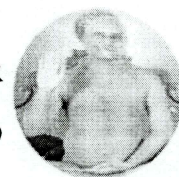




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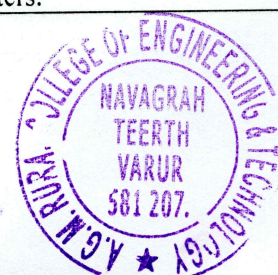
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		18CV62.3	Ability to estimate factor of safety against failure of slopes and to compute lateral pressure distribution behind earth retaining structures
		18CV62.4	Ability to determine bearing capacity of soil and achieve proficiency in proportioning shallow isolated and combined footings for uniform bearing pressure
		18CV62.5	Capable of estimating load carrying capacity of single and group of piles
39	<b>HYDROLOGY AND IRRIGATION ENGINEERING</b>	18CV63.1	Understand the importance of hydrology and its components
		18CV63.2	Measure precipitation and analyze the data and analyze the losses in precipitation.
		18CV63.3	Estimate runoff and develop unit hydrographs
		18CV63.4	Find the benefits and ill-effects of irrigation.
		18CV63.5	Find the quantity of irrigation water and frequency of irrigation for various crops
		18CV63.6	Find the canal capacity, design the canal and compute the reservoir capacity.
40	<b>Professional Elective-1 RAILWAYS, HARBOUR, TUNNELING AND AIRPORTS</b>	18CV641.1	Acquires capability of choosing alignment and also design geometric aspects of railway system, runway and taxiway.
		18CV641.2	Suggest and estimate the material quantity required for laying a railway track and also will be able to determine the hauling capacity of a locomotive.
		18CV641.3	Develop layout plan of airport, harbor, dock and will be able relate the gained knowledge to identify required type of visual and/or navigational aids for the same.
		18CV641.4	Apply the knowledge gained to conduct surveying, understand the tunneling activities.
41	<b>SOFTWARE APPLICATION LABORATORY</b>	18CVL66.1	use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work
42	<b>ENVIRONMENTAL ENGINEERING</b>	18CVL67.1	Acquire capability to conduct experiments and estimate the concentration of different parameters.

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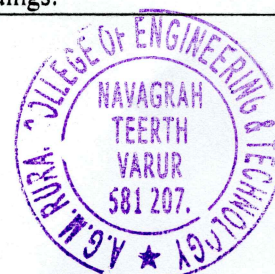
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	<b>LABORATORY</b>	<b>18CVL67.2</b>	Compare the result with standards and discuss based on the purpose of analysis.
		<b>18CVL67.3</b>	Determine type of treatment, degree of treatment for water and wastewater.
		<b>18CVL67.4</b>	Identify the parameter to be analyzed for the student project work in environmental stream.
<b>43</b>	<b>EXTENSIVE SURVEY PROJECT</b>	<b>18CVEP68.1</b>	Apply Surveying knowledge and tools effectively for the projects
		<b>18CVEP68.2</b>	Understanding Task environment, Goals, responsibilities, Task focus, working in Teams towards common goals, Organizational performance expectations, technical and behavioral competencies.
		<b>18CVEP68.3</b>	Application of individual effectiveness skills in team and organizational context, goal setting, time management, communication, and presentation skills.
		<b>18CVEP68.4</b>	Professional etiquettes at workplace, meeting and general
		<b>18CVEP68.5</b>	Establishing trust-based relationships in teams & organizational environment
		<b>18CVEP68.6</b>	Orientation towards conflicts in team and organizational environment, Understanding sources of conflicts, Conflict resolution styles and techniques
<b>VII SEM</b>			
<b>44</b>	<b>QUALITY SURVEYING AND CONTRACT MANAGEMENT</b>	<b>18CV71.1</b>	Taking out quantities and work out the cost and preparation of abstract for the estimated cost for various civil engineering works.
		<b>18CV71.2</b>	Prepare detailed and abstract estimates for various road works, structural works and water supply and sanitary works.
		<b>18CV71.3</b>	Prepare the specifications and analyze the rates for various items of work.
		<b>18CV71.4</b>	Assess contract and tender documents for various construction works.
		<b>18CV71.5</b>	Prepare valuation reports of buildings.

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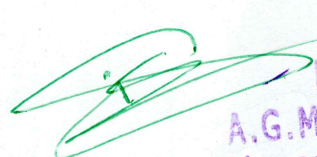
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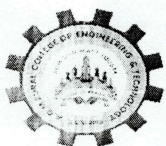


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45	<b>DESIGN OF RCC AND STEEL STRUCTURES</b>	18CV72.1	Students will acquire the basic knowledge in design of RCC and Steel Structures.
		18CV72.2	Students will have the ability to follow design procedures as per codal provisions and skills to arrive at structurally safe RC and Steel members.
46	<b>PAVEMENT MATERIALS AND CONSTRUCTION</b>	18CV733.1	Students will be able to evaluate and assess the suitability of any pavement material to be used in various components of pavement by conducting required tests as per IS,IRC specifications
		18CV733.2	Students will be able to formulate the proportions of different sizes of aggregates to suit gradation criteria for various mixes as per MORTH and also design bituminous mixes.
		18CV733.3	Students will be competent to adapt suitable modern technique and equipment for speedy and economic construction.
		18CV733.4	Student will be able to execute the construction of embankment, flexible, rigid pavement and perform required quality control tests at different stages of pavement construction.
47	<b>DESIGN CONCEPT OF BUILDING SERVICES</b>	18CV742.1	Describe the basics of house plumbing and wastewater collection and disposal.
		18CV742.2	Discuss the safety and guidelines with respect to fire safety.
		18CV742.3	Describe the issues with respect to quantity of water, rainwater harvesting and roof top harvesting.
		18CV742.4	Understand and implement the requirements of thermal comfort in buildings.
48	<b>COMPUTER AIDED DETAILING OF STRUCTURES</b>	18CVL76.1	Prepare detailed working drawings
49	<b>GEOTECHNICAL ENGINEERING LABORATORY</b>	18CVL77.1	Physical and index properties of the soil
		18CVL77.2	Classify based on index properties and field identification
		18CVL77.3	To determine OMC and MDD, plan and assess field compaction program
		18CVL77.4	Shear strength and consolidation parameters to assess strength and deformation characteristics.
		18CVL77.5	In-situ shear strength characteristics (SPT-Demonstration)

  
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VIII SEM			
50	DESIGN OF PRE-STRESS CONCRETE	18CV81.1	Understand the requirement of PSC members for present scenario
		18CV81.2	Analyse the stresses encountered in PSC element during transfer and at working.
		18CV81.3	Understand the effectiveness of the design of PSC after studying losses
		18CV81.4	Capable of analyzing the PSC element and finding its efficiency.
		18CV81.5	Design PSC beam for different requirements.
51	REHABILITATION AND RETROFITTING	18CV824.1	Identify the causes for structural (Concrete) deterioration.
		18CV824.2	Assess the type and extent of damage and carry out damage assessment of structures through various types of tests.
		18CV824.3	Recommend maintenance requirements of the buildings and preventive measures against influencing factors
		18CV824.4	Select suitable material and suggest an appropriate method for repair and rehabilitation.
52	PROJECT WORK PHASE-II	18CVP83.1	Describe the project and be able to defend it.
		18CVP83.2	Develop critical thinking and problem-solving skills.
		18CVP83.3	Learn to use modern tools and techniques.
		18CVP83.4	Communicate effectively and to present ideas clearly and coherently both in written and oral forms
		18CVP83.5	Develop skills to work in a team to achieve common goal
		18CVP83.6	Develop skills of project management and finance.
		18CVP83.7	Develop skills of self-learning, evaluate their learning and take appropriate actions to improve it
		18CVP83.8	Prepare them for life-long learning to face the challenges and support the technological changes to meet the societal needs
53	TECHNICAL SEMINAR	18CVS84.1	Develop knowledge in the field of Civil Engineering and other disciplines through independent learning and collaborative study
		18CVS84.2	Identify and discuss the current, real-time issues and challenges in engineering & technology
		18CVS84.3	Develop written and oral communication skills.
		18CVS84.4	Explore concepts in larger diverse social and academic contexts
		18CVS84.5	Apply principles of ethics and respect in interaction with others.
		18CVS84.6	Develop the skills to enable life-long learning

  
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