Program Name: CIVIL Faculty Name:Sd.Parveen

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	I	Probability & Statistics	R1621011	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Recall probability of event(s) and expectation(s) of random variable(s) for elementary problems, gets knowledge of probability distributions such as Normal distributions
2. Understand the Uniqueness of probability distributions.
3. Design and conduct experiments, as well as to analyze and interpret data for engineering problems
4. Apply hypothesis testing procedure and carryout appropriate tests to checks its acceptability
5. Analyze correlation between variables and find the mathematical relation between them.
6. Evaluate various types of control charts in Quality Improvement.

Course Objectives:

1. Acquire knowledge in various types of probability distributions and gain knowledge of modeling in the presence of uncertainties.
2. Learn properties and nature of probability distributions
3. Study elementary concepts in sampling theory, and the use of statistical inference in practical data analysis.
4. Aware of principle steps in hypothesis testing, and use of statistics in decision making.
5. Know how to use computers and/or calculators for statistical analysis of relationship between/among variables.
6. Obtain Process quality through control charts, and improve Statistical skills.

SYLLABUS:

UNIT-I: Random variables and Distributions

Introduction – Random variables – Distribution function – Discrete distributions: Review of Binomial and Poisson distributions – Continuous distributions: Normal distribution, Normal approximation to Binomial distribution, Gamma and Weibull distributions.

UNIT-II: Moments and Generating functions

Introduction – Mathematical expectation and properties – Moment generating function – Moments of standard distributions: Binomial, Poisson, and Normal distributions – Properties

UNIT-III: Sampling Theory

Introduction – Population and samples – Sampling distribution of mean for large samples and small samples (with known and unknown variance) – Proportion sums and differences of means – Sampling distribution of variance - Point and interval estimators for means and proportions.

UNIT-IV: Tests of Hypothesis

Introduction – Type I and Type II errors – Maximum error - One tail, two-tail tests – Tests concerning one mean and proportion, two means – proportions and their differences using Z-test – Student's t-test – F-test and Chi-square (χ^2) test – ANOVA for one-way and two-way classified data.

UNIT-V: Curve fitting and Correlation

Introduction – Fitting a Straight line – Second degree curve – Exponential curve – Power curve by method of least squares.

Simple Correlation and Regression – Rank Correlation – Multiple regression.

UNIT-VI: Statistical Quality Control Methods

Introduction – Methods for preparing control charts – Problems using x-bar, p, R charts and attribute charts.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: K.Narendra

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	I	BEEE	R1621012	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Describe different types of laws and networks and analyse various electrical networks.
2. Discuss principle of operation, types of DC Machine, analyse output equations, applications, speed control methods and predict efficiency by Swinburne's Test.
3. Explain the principle of operation of single phase transformer, emf equation and predict losses, efficiency and regulation.
4. Express principle of operation of alternator and 3-phase induction motors and predict the efficiency and regulation.
5. Classify different types of diodes, operational amplifiers and analyse the characteristics with their applications.
6. Recognize PNP and NPN transistors and illustrate their applications as an amplifiers.

Course Objectives:

1. Learn basic principles of electrical law's and analysis of networks.
2. Know the principle of operation and construction details of DC machines.
3. Understand the principle of operation and construction details of transformer.
4. Know the principle of operation and construction details of alternator and 3-Phase induction motor.
5. Study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPs.
6. Learn the operation of PNP and NPN transistors and variousamplifiers.

SYLLABUS:

UNIT – I, ELECTRICAL CIRCUITS:
Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, inductive networks, capacitive networks, series, parallel circuits and star-delta and delta-star transformations.

UNIT – II, DC MACHINES:
Principle of operation of DC generator – emf equation - types – DC motor types –torque equation – applications – three point starter, swinburn's Test, speed control methods.

UNIT – III, TRANSFORMERS:
Principle of operation of single phase transformers – e.m.f equation – losses –efficiency and regulation.

UNIT – IV, AC MACHINES: Principle of operation of alternators – regulation by synchronous impedance method –principle of operation of 3-Phase induction motor – slip-torque characteristics - efficiency – applications.

UNIT V, RECTIFIERS & LINEAR ICs: PN junction diodes, diode applications (Half wave and bridge rectifiers). Characteristics of operation amplifiers (OP-AMP) - application of OP-AMPs(inverting, non inverting, integrator and differentiator).

UNIT VI, TRANSISTORS: PNP and NPN junction transistor, transistor as an amplifier, single stage CE Amplifier, frequency response of CE amplifier, concepts of feedback amplifier.

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Program Name: CIVIL Faculty Name:S.Naga Bhargavi

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	I	Strength of Materials-I	R1621013	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

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

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Determine Stress, Strain & Strain Energy in Uniform, Varying cross section and Composite Bars.
2. Sketch Shear Force & Bending Moment diagrams, for different beams subjected to various types of loading.
3. Derive the equation of bending, Determination of bending stresses in beams of various cross sections for different loading conditions; Design of simple beams.
4. Determine Shear stresses in beams for different cross sections and its distribution.
5. Determine slope & deflection in beams of different cross sections and end conditions for various types of loading using different methods.
6. Estimate stresses and strains in Thin & Thick Cylinders and Spherical shells.

Course Objectives:

1. Learn preliminary concepts of Strength of Materials, Principles of Elasticity and Plasticity, Stress strain, behavior of materials and their governing laws ,relationship between elastic constants with poisons ratio and strain energy
2. Understand the concepts of Bending Moment and Shear force in beams with different boundary and loading conditions and to draw the shear force and bending moment diagrams.
3. To understand concepts of bending (Flexural) stresses developed , bending equations, calculation of section modulus for different beam cross sections.
4. To understand concepts of Shear stresses developed for different beam sections, shear centre.
5. To learn the concept of deflection and slope in beams under various loading and support conditions with different methods.
6. To understand the concepts of classification of cylinders, spherical shells and to derive equations for measurement of stresses and strains across the cross section when subjected to internal pressure.

SYLLABUS:

UNIT – I: Simple Stresses And Strains And Strain Energy: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.
Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple

applications.

UNIT- II : Shear Force And Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam

UNIT – III: Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R, Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections – Design of simple beam sections.

UNIT –IV: Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections, built up beams, shear centre.

UNIT – V: Deflection Of Beams: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L. Uniformly varying load. Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

UNIT – VI: Thin And Thick Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in diameter, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

HOD CIVIL DEPT.
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College of Engineering & Technology
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Program Name: Faculty Name:

Class	Semester	Title of The Paper	Paper Code	W.E.F
II	I	BMC	R1621014	11-6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical	3 HOURS	Internal	External	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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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.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

COURSE OBJECTIVES

1. Gain the knowledge on stones, bricks and tiles
2. Attain the concept of masonry and knowledge on timber
3. Define the properties of lime, cement, concrete
4. Get idea on components of the building
5. Know about the finishing process in the building construction.
6. Illustrate the properties of aggregates

COURSE OUTCOME

1. Select appropriate building materials like stones, bricks and tiles in the present day constructions for various applications.
2. Identify the type of Masonry and judge the timber to be used in construction activities
3. Specify the properties of lime, cement and concrete and its manufacturing process
4. Recognize and Distinguish the building components
5. Distinguish different types of finishing process and their applications
6. Judge the suitability of aggregates

Unit-I: **STONES BRICKS AND TILES**

Properties of building stones – relation to their structural requirements, classification of stones – Stone quarrying – precautions in blasting, dressing of stone, Composition of good brick earth, various methods of manufacturing of bricks, Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminum, Gypsum, Glass and Bituminous materials – their quality.

Unit-II: **MASONRY**

Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls.

WOOD: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiver – Reinforced Plastics, Steel, Aluminum.

Unit-III: LIME AND CEMENT

LIME: Various ingredients of lime – Constituents of lime stone –classification of lime – various methods of manufacture of lime.

CEMENT: Portland cement- Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

Unit-IV: BUILDING COMPONENTS

Lintels, arches, vaults, stair cases – types. Different types of floors –Concrete, Mosaic, and Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs – King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre-fabricated roofs.

Unit-V: FINISHINGS

Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering.

Paints: Constituents of paint – Types of paints – Painting of new/old wood- Varnish.

Form Works and Scaffoldings

Unit-VI: AGGREGATES

Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate–Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate-Bulking of sand – Sieve analysis.

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Program Name: B.Tech in Civil Engineering Faculty Name: T.S.V.DURGA

Class	Semester	Title of The Paper	Paper Code	W.E.F
II	1	Surveying	R1621015	11-6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical	3	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:**

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

2. **Problem** research literature, and analyze complex engineering problems reaching substantiated **analysis** Identify, formulate, conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:**

   Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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.

5. **Modern tool usage:**

   Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

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11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues

2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Illustrate the Principles and classification of Surveying.

2. Identify corrections to Linear Measurements & bearings. Analyze the Omitted Measurements in Traversing

3. Recognize the concept of leveling and practice the methods of leveling and contours.

4. Summarize the working of Theodolite by using trigonometric leveling and tacheometry

5. Design of Curves and define the importance of Total station and GPS

6. Evaluate the areas of boundaries and volumes of earthwork by various methods.

Course Objectives:

1.Definethe basic Principles of Surveying and discuss the Classification.

2.Memorize corrections to Linear Measurements & bearings. Calculation of Omitted Measurements in Traversing.

3.Discusswith Concept of leveling, methods of leveling and illustrate the characteristics of contours, methods and.

4. illustratewith function of Theodolite, Learn the methods of trigonometric leveling tachometry.

5.Developand setting out of horizontal curves, recognize the importance of Total station and GPS

6.**Evaluate the areas of regular and irregular boundaries and volumes [of earthwork] by various methods.**

UNIT – I

INTRODUCTION: definition-Uses of surveying- overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications – Errors in survey measurements.

UNIT – II

DISTANCES AND DIRECTION: Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements (EDM)-principles of electro optical EDM-errors and corrections to linear
Measurements - compass survey - Meridians, Azimuths and Bearings, declination, computation of angle. Traversing - Purpose-types of traverse-traverse computation – traverse adjustments - omitted measurements.

UNIT – III

LEVELING AND CONTOURING: Concept and Terminology, Leveling Instruments and their Temporary and permanent adjustments- method of leveling. Characteristics and Uses of contours- methods of conducting
Contour surveys and their plotting.

UNIT – IV

THEODOLITE: Theodolite, description, principles-uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite - Trigonometrical leveling,.
TACHEOMETRIC SURVEYING: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT – V

Curves: Types of curves, design and setting out – simple and compound curves- transition curves. Introduction to geodetic surveying, Total Station and Global positioning system.

UNIT – VI

COMPUTATION OF AREAS AND VOLUMES: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two
Level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: K.V.Lakshmi Narayana

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	I	Fluid Mechanics	R1621016	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

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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.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Listout Physical properties of fluids andAppraise pressure by applying Pascal's and Hydrostatic Laws
2. Solve total pressure, centre of pressure for various plane surfaces and Evaluate Velocity components by applying velocity potential & Stream functions
3. Apply Euler's, Bernoulli's & Impulse momentum equations on pipe bends
4. Evaluate Boundary layer thickness, Drag & Lift forces on submerged bodies and Create Vonkarmen momentum integral equation
5. Define Laminar & Turbulent flows, Major & Minor losses, TEL & HGL & Moody's chart. Design of pipe networks
6. Estimate the discharge and velocity by using Venturimeter, Orifice meter &Pitot tube in Pipe flows, Notches & Weirs across canals.

Course Objectives:

1. Study Physical properties of fluids, Pascal's law, Hydrostatic law & different Pressure measuring devices.
2. Learn classification of Fluid flow, Hydrostatic forces on submerged plane surfaces, Continuity equation and flow net analysis.
3. Familiarize the concept of Navier -Stokes, Bernoulli's, Euler's and Impulse momentum equations on a Pipes & Pipe bend.
4. Study the Characteristics of Boundary layer along a thin flat plate, Derive Vonkarmen momentum integral equation, concept of drag & lift.
5. Learn laws of fluid friction, Reynold's experiment, major loss by Darcy's equation & minor losses in pipe flow. TEL & HGL, Moody's Chart & to design pipe networks.
6. Determine the Velocity by Pitot tube & Discharge of flow through Channels & pipes by & Notches, Weirs &Venturimeter, Orifice meter.

SYLLABUS:

UNIT I

INTRODUCTION : Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion, pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: Differential and Micro Manometers.

UNTI – II

Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNTI – III

FLUID KINEMATICS: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flow net analysis.

UNIT – IV

FLUID DYNAMICS: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, Navier – Stokes equations (Explanationary) Momentum equation and its application – forces on pipe bend.

UNIT – V

Approximate Solutions of Navier-Stoke's Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers, no deviations BL in transition, separation of BL, Control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

UNIT – VI

Reynold's experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

UNIT – VII

CLOSED CONDUIT FLOW: Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems, variation of friction factor with Reynold's number – Moody's Chart.

UNIT – VIII

MEASUREMENT OF FLOW: Pitot tube, Venturi meter and Orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

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HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech in Civil Engineering Faculty Name: T.S.V.DURGA

Class	Semester	Title of The Paper	Paper Code	W.E.F
II	1	Surveying Field work-I	R1621017	11 – 6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
45 Hours	Theory	Practical 3	3	Internal 25	External 50	2

Programme Outcomes:

1. **Engineering knowledge:**

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

2. **Problem** research literature, and analyze complex engineering problems reaching substantiated **analysis** Identify, formulate, conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:**

   Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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.

5. **Modern tool usage:**

   Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues

2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Experiment the chain surveying in the field of civil engineering applications such as road profile & Area calculations.

2. Appraise the principle of compass surveying for distance and angle measurement.

3. Sketch the plan of site.

4. Evaluate the R.L of unknown point and draw the longitudinal & contours.

Course Objectives:

1. Familiarize with instruments used in chain survey.
2. Learn the direction measurement Using compass.
3. Understand the concept of plane table surveying.
4. Familiarize with different methods of leveling.

Course Syllabus:

1. Survey by chain survey of road profile with offsets in case of road widening.

2. Survey in an area by chain survey (Closed circuit).

3. Determination of distance between two inaccessible points by using compass.
4. Finding the area of the given boundary using compass (Closed Traverse).
5. Plane table survey : finding the area of a given boundary by the method of Radiation.
6. Plane table survey : finding the area of a given boundary by the method of intersection.
7. Two Point Problem by the plane table survey.
8. Fly leveling: Height of the instrument method (differential leveling) .
9. Fly leveling: rise and fall method.
10. Fly leveling: closed circuit/ open circuit.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name:S.Naga Bhargavi

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	I	Strength of Materials LAB	R1621018	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
40 Hours	Theory 0	Practical 3	3 Hours	Internal 25	External 50	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Determine Ultimate Tensile, Shear, Compressive & Impact strength of the given Specimen
2. Determine the Deflection, Young's Modulus &validation of Maxwell's reciprocal theorem
3. Determine the Shear Modulus for the Springs & Shafts.
4. Determine the Surface Hardness of the given material.

Course Objectives:

1. Acquire knowledge aboutthe mechanical properties of materials.
2. Acquire knowledge about Deflection & Young'sModulus of the material of given beam
3. Acquire knowledge about Shear Modulus of the Specimens.
4. Acquire knowledge about Surface Hardness of the given material.

SYLLABUS:

List of Experiments

1. Tension test on Steel bar
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of Electrical resistance strain gauges

Continuous beam – deflection test

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: Syed Imran

Class	Semester	Title of The Paper	Paper Code	W.E.F
III CIVIL	I	Engineering Geology	R1631012	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Define the importance of geology in civil engineering and weathering process of rocks
2. Identify the physical properties various Minerals and Rocks
3. Recognize various secondary structures and their importance in civil engineering point of view.
4. Discuss the knowledge on Ground water, Earthquakes, landslides.
5. Choose the suitable required geophysical method for solving various geological problems and Define Engineering properties of rocks
6. Describe the importance of Geology in construction of Dams, Reservoirs and tunnels

Course Objectives:

1. Acquire knowledge on importance of Engineering geology with their branches in Civil Engineering point of view
2. Classify various types of minerals, rocks by the study of their physical properties
3. Obtain the knowledge on Structural geology and their importance in Civil Engineering point of view
4. Understand the concepts of Ground water ,Earthquakes and Landslides with their types
5. Know the Importance and Classification about Geophysical study
6. Discuss about various dams and effects of tunneling, reservoirs.

SYLLABUS:

UNIT-I: Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies

Weathering: Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

UNIT-II Mineralogy And Petrology: Definitions of mineral, Structures of silicates and rock, Different methods of study of mineral and rock, The study of physical properties of minerals and rocks for megascopic study for the following minerals and rocks, Common rock forming minerals are Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and other ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite And Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate and their importance in Civil Engineering.

UNIT-III Structural Geology: Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering–Indian stratigraphy. Aims of statigrtaphy, Principles, Geological time scour, Geological division in India, Major stratigraphic units in India.

UNIT-IV Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.
Earthquakes And Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides. Case studies.

UNIT-V Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT-VI Geology of Dams, Reservoirs And Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: K.Prudhvi

Class	Semester	Title of The Subject	Subject Code	W.E.F
III	I	DDRCS	R1631014	11-6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours	06		3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

• Familiarize Students with different types of design philosophies

• Equip student with concepts of design of flexural members

• Understand Concepts of shear, bond and torsion

• Familiarize students with different types of compressions members and Design

• Understand different types of footings and their design

Course Outcomes:

• Work on different types of design philosophies

• Carryout analysis and design of flexural members and detailing

• Design structures subjected to shear, bond and torsion

• Design different type of compression members and footings

Syllabus Unit Wise:

UNIT –I Introduction:
a) **Working stress method**: Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, Elastic theory: design constants, modular ratio, neutral axis depth and moment of resistance for balanced, under-reinforced and over-reinforced sections. Design of singly and doubly reinforced beams.
b) Limit State Design: Concepts of limit state design – Basic statistical principles – Characteristic loads –Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance.
All units i.e. from unit II to unit VI are to be taught in Limit State Design.
UNIT –II Design for Flexure: Limit state analysis and design of singly reinforced sections effective depth- Moment of Resistance- Doubly reinforced and flanged (T and L) beam sections- Minimum depth for a given capacity- Limiting Percentage of Steel- Minimum Tension Reinforcement-Maximum Flexural Steel- Design of Flanged Sections (T&L)-
UNIT – III Design for Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

Limit state design for serviceability: Deflection, cracking and code provision, Design of formwork for beams and slabs.
UNIT – IV Slabs: Classification of slabs, design of one - way slabs, one way continuous slab using IS Coefficients (Conventional) –Design of two - way slabs-simply supported and various edge conditions using IS Coefficients .
UNIT – V Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and unbraced columns – I S Code provisions.
UNIT –VI

Footings: Different types of footings – Design of isolated footings – pedestal, square, rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: S.Naga Bhargavi

Class	Semester	Title of The Paper	Paper Code	W.E.F
III CIVIL	I	Structural Analysis-II	R1631013	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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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.
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11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Evaluate the forces, moment and effect of temperature on arches.
2. Appraise the forces and moments in beams and columns.
3. Evaluate the forces, moment and effect of temperature in Cable and Suspension Bridge structures.
4. Appraise Beams and Frames using Moment Distribution Method.
5. Appraise Beams and Frames using Kani's Method.
6. Appraise Beams using Matrix Methods..

Course Objectives:

1. Learn how to analyze different thrust's, Bending moment and temperature effects for different arches.
2. Familiarize the concepts of lateral load analysis and its application to building frames.
3. Study the concepts of analysis of cable and suspension bridges for different loading conditions and temperature stresses.
4. Study the concept of analysis of structural elements by using Moment distribution method.
5. Learn how to evaluate shear force and bending moment by using Kani's method.
6. Study the concept of Matrix methods of analysis (Flexibility & Stiffness methods).

SYLLABUS:

UNIT I Three Hinged Arches: Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature. Hinges with supports at different levels.
Two Hinged Arches: Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, Tied arches – Fixed arches – (No analytical question).

UNIT-II, Lateral Load Analysis Using Approximate Methods: application to building frames.
(i) Portal Method (ii) Cantilever Method.

UNIT – III, Cable Structures and Suspension Bridges: Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge, three hinged and two hinged stiffening girder suspension bridges.

UNIT – IV Moment Distribution Method: Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – Portal frames – including Sway-Substitute frame analysis by two cycle.

UNIT – V Kani's Method: Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

UNIT – VI Introduction to Matrix Methods: Flexibility methods: Introduction, application to continuous beams (maximum of two unknowns) including support settlements. Stiffness method: Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: B.Swetha Malika

Class	Semester	Title of The Subject	Subject Code	W.E.F
III	I	Transportation Engineering -II	R1631015	11-06-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours	06		3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Know the components and functions of a railway track.
2. Learn the design principles of railway geometrics
3. Learn the types of Turnouts and signals.
4. Study the concept of Airport planning and design
5. Learn the design principles of Airport Runway
6. Know the concept of Docks and harbours

Course Outcomes:

1. Define the Components of Railway Track
2. Design geometrics of Railway Track
3. Choose suitable methods for the effective movements of trains
4. Plan an Airport for the given area
5. Design of Airfield pavements & maintenance
6. Describe the concept of Docks and Harbours

Course Syllabus Unit Wise:

A.RAILWAY ENGINEERING

UNIT – I : Components of Railway Engineering: Permanent way components – Railway Track Gauge – Cross Section of Permanent Way – Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints.

UNIT – II : Geometric Design of Railway Track: Alignment – Engineering Surveys – Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – safe speed on curves – Transition curve – Compound curves – Reverse curves – Extra clearance on curves – widening of gauge on curves – vertical curves – cheek rails on curves.

UNIT – III: Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – Mechanical signalling system – Electrical signalling system – System for Controlling Train Movement – Interlocking – Modern signalling Installations.

B.AIRPORT ENGINEERING

UNIT – IV : Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics – Zoning laws – Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

UNIT – V : Runway Design: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strengthening of Airfield pavements – Airport Drainage – Design of surface and subsurface drainage.

C. DOCKS & HARBOURS

UNIT – VI : Planning, Layout, Construction & Maintenance Of Docks & Harbours: Classification of ports – Requirement of a good port – classification of Harbours – Docks – Dry & wet docks – Transition sheds and workhouses – Layouts; Quays – construction of Quay walls – Wharves – Jetties – Tides – Tidal data and Analysis – Break waters – Dredging – Maintenance of Ports and Harbours – Navigational aids.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: T.Mutyala Raju

Class	Semester	Title of The Paper	Paper Code	W.E.F
III	I	Concrete Technology Lab	R163106	11-6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
48 Hours	Theory -	Practical 3	3	Internal 25	External 50	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.

2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Evaluate properties of cement
2. Assess properties of aggregates.
3. Test properties of concrete in fresh state.
4. Determine properties of concrete in hardened state

Course Outcomes:

1. Measure properties of cement
2. Test properties of aggregates
3. Determine properties of concrete in fresh state
4. Test properties of concrete in hardened state

List of Experiments

1. Determination of normal Consistency and fineness of cement.
2. Determination of initial setting time and final setting time of cement.
3. Determination of specific gravity and soundness of cement.
4. Determination of compressive strength of cement.
5. Dtermination of grading and fineness modulus of Coarse aggregate by
6. sieve analysis.
7. Determination of specific gravity of coarse aggregate
8. Determination of grading and fineness modulus of fine aggregate (sand)

9. by sieve analysis.
10. Determination of bulking of sand.
11. Determination of workability of concrete by compaction factor method.
12. Determination of workability of concrete by slump test
13. Determination of workability of concrete by Vee-bee test.
14. Determination of compressive strength of cement concrete and its
15. young‟s modulus.
16. Determination of split tensile strength of concrete.
17. Non-Destructive testing on concrete (for demonstration)

HOD CIVIL DEPT.
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Program Name: B. Tech in Civil Engineering **Faculty Name:**U.Krishna Sainath

Class	Semester	Title of The Paper	Paper Code	W.E.F
III Year	I Semester	Geology Lab	R163107	11-6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
48 Hours	Theory -	Practical 3	3	Internal 25	External 50	3

Programme Outcomes:

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

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.

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.

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.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.

2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

The student will:

1. Identify the mega-scopic types of rock forming minerals and ore forming minerals
2. Describe the mega-scopic types of Igneous, Sedimentary and Metamorphic rocks
3. Interpret and draw sections of geological maps and calculate strike and dip for simple structural geology problems
4. Categorize the soil using Bore Hole Data with ISC classification system
5. Determine the strength of rocks using various laboratory tests.

Course Outcomes:

At the end of the Course/Subject, the students will be able to:

1. Identify physical properties of minerals
2. Recognize physical properties of rocks
3. Appraise the profile and calculate the creek gradient and steep slopes of given geological maps

4. Interpret the strike and dip problems for a given simple structural problems
5. Classify the soil by using bore hole data in ISC system.

List of Experiments as per Curriculum:

1) Physical Properties of minerals : Mega - scopic identification of

i) Rock forming minerals --- Quartz Group, Feldspar Group, Garnet Group, Mica Group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmaline, Calcite, Gypsum, etc...

ii) Ore Forming minerals --- Magnetite, Hematite, Pyrite, Pyrolusite, Graphite, Chromite, etc...

2) Mega - scopic description and identification of rocks

i) Igneous Rocks -- Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite, Porphyry, Basalt, etc..,

ii) Sedimentary rocks -- Sand stone, Ferrugeneous sand stone, Lime stone, Shale, laterite, Conglamorate, etc...

iii) Metamorphic Rocks -- Biotite - Granite Gneiss, Slate, Muscovite & Biotite schist, Marble, Khondalite, etc..,

3) Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.,

4) Simple structural Geology problems

5) Bore Hole Data

6) Strength of the rock using laboratory tests

7) Field work - To identify minerals, Rocks, Geomorphology & Structural Geology

HOD CIVIL DEPT.
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Program Name: B.Tech Faculty Name: B.Swetha Malika

Class	Semester	Title of The Subject	Subject Code	W.E.F
III	I	Transportation Engineering Lab	R1631018	11-06-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours		06	3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Test crushing value, impact resistance, specific gravity, water absorption, percentage attrition, percentage abrasion, flakiness index, elongation index, and Angularity number for the given and aggregates.
2. Know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.
3. Test the stability for the given bitumen mix.
4. Carry out surveys for traffic volume, speed and parking and design a rotary intersection.
5. Draw the cross-section of roads, carry Earth work calculations for road works.

Course Outcomes:

1. Test aggregates and judge the suitability of aggregates for the road construction.
2. Test the given bitumen samples and judge their suitability for the road construction.
3. Demonstrate the optimum bitumen content for the mix design
4. Determine the traffic volume, speed and parking characteristics and design rotary intersection.
5. Draw road cross-section, do Earth work calculations

List of Experiments as per Curriculum:

I.ROAD AGGREGATES:

1.Penetration test
2.Aggregate impact test
3.Specific gravity and water absorption test
4.Attrition test
5.Abrassion test
6.Stape test

II.BITUMINOUS MATERIALS:

1.penetration test
2.ductility test
3.softening test
4.flast and fire point test
5.stripping test
6.viscosity test

III.BITUMINOUS MIX:

1.Marshall stability test

IV:TRAFFIC SURVEYS:

1.Traffiv volume study at mid blocks

2. Traffic volume study at intersections
3.spot speed studies
4.parking studies

V:DESIGN &DRAWING:

1.Earth work calculations for road work
2.Drawing of road cross sections
3.Rotors intersection design

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Program Name: B.Tech Faculty Name: Syed.Imran

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV	I	Environmental Engineering-II	RT41011	11/6/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical	3	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.

2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. List the appropriate appurtenances in the sewerage systems
2. Discuss the Pumping of wastewater and design of building drainage system
3. Examine the waste water characteristics &design the preliminary and primary treatment units
4. Describe the secondary treatment of Sewage
5. Identify the Miscellaneous treatments and design the septic and imhoff tanks
6. State the suitable methods for sludge disposal.

Course Objectives:

1. Get the knowledge of collection, conveyance and estimation of waste water and sewerage system and it's appurtenances
2. Get the knowledge of pumping and house plumbing systems of waste water and design of drainage
3. Learn the analysis of waste water and design the preliminary & primary treatment units
4. Understand secondary treatment methods of sewage
5. Get the idea about the miscellaneous treatment method**s** and working principles and design of septic and imhoff tanks
6. Handle the sludge and learn it's safe disposal

Syllabus:

UNIT – I: Introduction To Sanitation – systems of sanitation – relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems- Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - Hydraulics of sewers and storm drains– design of sewers – appurtenances in sewerage – cleaning and ventilation of sewers.

UNIT – II: Pumping of wastewater: Pumping stations – location – components– types of pumps and their suitability with regard to wastewaters. House Plumbing: systems of plumbing-sanitary fittings and other accessories–one pipe and two pipe systems – Design of building drainage.

UNIT – III: Sewage characteristics – Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations. Treatment of sewage : Primary treatment-Screens-grit chambers-grease traps– floatation– sedimentation – design of preliminary and primary treatment units.

UNIT – IV: Secondary treatment: Aerobic and anaerobic treatment process-comparison. Suspended growth process: Activated Sludge Process, principles, designs, and operational problems, modifications of Activated Sludge Processes, Oxidation ponds, Aerated Lagoons. Attached Growth Process: Trickling Filters–mechanism of impurities removal- classification–design-operation and maintenance problems. RBCs, Fluidized bed reactors.

UNIT V: Miscellaneous Treatment Methods: Nitrification and Denitrification – Removal of Phosphates –UASB –Membrane reactors-Integrated fixed film reactors. Anaerobic Processes: Septic Tanks and Imhoff tanks- working Principles and Design– disposal of septic tank effluent.

UNIT – VI: Bio-solids (Sludge) management: Characteristics- handling and treatment of sludge-thickening – anaerobic digestion of sludge. Disposal of sewage: methods of disposal – disposal into water bodies, Oxygen Sag Curve-disposal on land-sewage sickness.

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Program Name: B. Tech in Civil Engineering **Faculty Name:** U.Krishna Sainath

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV Year	I Semester	Prestressed Concrete	RT41012	11/6/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical -	3	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.

2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Learn the basic concepts of prestressing, materials (High strength concrete and High strength steel) and methods of prestressing.

2. Learn different systems and tensioning devices used in prestressing. Assumptions in analysis of prestress, Resultant stresses at a section, Pressure Line and Load Balancing concepts.

3. Learn the different losses of prestress

4. Familiarize with the types of flexural failure & design of flexural members, Factors influencing, prediction and control of deflections.

5. Familiarize with shear and principal stresses, Design for shear, torsion and combined bending, shear, torsion.

6. Familiarize with relevant IS Codal provisions for end zone & Anchorage Zone reinforcement.

Course Outcomes:

1. Compare & Contrast Reinforced Concrete and Prestressed Concrete.

2. List systems, tensioning devices of prestressing & Evaluate the stresses in tendons by pressure line and load balancing concept

3. Estimate the losses in prestress.

4. Design prestressed concrete beams for flexure.

5. Formulate & Design shear, torsion and combined bending, shear, torsion using code provisions.

6. Design & Draw End & Anchorage zone reinforcement.

Syllabus:

UNIT I

Basic concepts of Prestressing– Advantages and Applications of Prestressed Concretes, High Strength Concrete- Permissible Stresses, Shrinkage, Creep, Deformation Characteristics, High strength Steel- Types, Strength- Permissible Stresses- Relaxation of Stress, Stress Corrosion- Durability, Fire Resistance, Cover Requirements.

UNIT-II

Prestressing Systems– Introduction, Tensioning devices, Pre-tensioning Systems, Post tensioning Systems, Basic Assumptions in Analysis of prestress and design, Analysis of prestress, Resultant Stresses at a section- pressure line- Concepts of load balancing- Stresses in Tendons, Cracking moment.

UNIT-III

Losses of Pre-stressing– Loss of Pre-stress in pre-tensioned and post tensioned members due to various causes -Elastic shortening of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage, differential shrinkage- bending of members and frictional losses- Total losses allowed for design.

UNIT-IV

Design for Flexural resistance– Types of flexural failure – Code procedures- Design of sections for flexure- Control of deflections- Factors influencing- Prediction of short term and long term deflections.

UNIT-V

Design for Shear and Torsion– Shear and Principal Stresses- Design of Shear reinforcements- Codal Provisions- Design for Torsion, Design for Combined bending, shear and torsion

UNIT-VI

Transfer of Prestress in pre tensioned members– Transmission length- Bond stresses- end zone reinforcement- Codal provisions- Anchorage zone Stresses in Post tensioned members- Stress distribution in end block- Anchorage Zone reinforcement.

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Program Name: B.Tech Faculty Name: T.Mutyala Raju

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV	I	Construction Technology & Management	RT41013	11/6/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical	3	Internal 30	External 70	3

Programme Outcomes:

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

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.

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.

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.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering

community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.

2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Explore the knowledge, about the concepts of project management
2. Evaluate the knowledge of PERT, Crashing and allocation of resources.
3. Define skills on various equipment related to construction like earth moving Etc.
4. Explore knowledge on various earth work equipment such as hoists, Cranes, etc
5. Appraise on various concreting equipment such as crushers etc
6. Infer knowledge on various construction methods such as Piling, safety etc

Course Outcomes:

1. Value the importance of construction planning by using various network analysis techniques.
2. Evaluate PERT, cost analysis, crashing of optimum cost and resources.
3. Apply the functioning of various earth moving equipments by their types.
4. Classify the functioning of various earthwork equipments.
5. Examine methods of production of aggregate and concreting Equipment.
6. Apply the gained knowledge to construction techniques and safety.

Syllabus:

UNIT I

Construction Project management & its relevance, Qualities of a project Manager, Project Planning, Co-ordination &Scheduling, Monitoring, Bar Charts &Milestone Charts, Critical Path Method.

UNIT-II

Project Evaluation &Review Technique, Cost Analysis, Updating, Crashing for Optimum cost, Crashing for Optimum Resources, and Allocation of resources

UNIT-III

Construction Equipment, Economical Considerations, Earth Work Equipment, Trucks &Handling Equipment, Rear Dump Trucks, Capacities Of Trucks And Handling Equipment, Calculation Of Truck Production, Compaction Equipment, Types Of Compaction Rollers

UNIT-IV

Hoisting and earthwork equipment, hoists, cranes, tractors, bulldozers, graders, scrapers, clamshell buckets draglines

UNIT-V

Concreting Equipment, Crushers, Jaw Crushers, Gyratory Crushers, Impact Crushers, Selection Of Crushing

Equipment, Screening Of Aggregate, Concrete Mixers, Mixing And Placing Of Concrete, Consolidating And Finishing.

UNIT-VI

Construction Methods, Earthwork, Piling, Placing of Concrete, Form Work, Fabrication and Erection, Quality Control And Safety Engineering

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College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: K.Prudhvi

Class	Semester	Title of The Subject	Subject Code	W.E.F
IV	I	WRE-II	RT41014	11-6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours	06		3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

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PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

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PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Know the types, Concepts in planning & design of Irrigation systems, Relationships between soil, water and plant ,Estimation of Duty and Delta and their significance in planning an irrigation system.
2. Learn the Design of Erodible Canals by using Kennedy's silt theory and Lacey's regime theory & Design of Non Erodible Canals , balancing depth of Cutting.
3. Study types and design principles of Canal structures like falls, canal regulators, cross drainage works, outlets.
4. Learn the types, components, failures of the diversion head works and design of impervious floor by using Bligh's Creep theory, Khosla's theory.
5. Learn about Reservoir planning, types of dams and analyze the stability of Gravity dam.
6. Know the types, stability of Earth dams and spillways and design principles of ogee spillways.

Course Outcomes:

1. Recognize water requirements and plan an Irrigation system
2. Design an Irrigation Canal and its network
3. Design an Irrigation Canal structure
4. Plan a diversion head works and Design impervious floor of diversion head works .
5. Select a suitable type of Dam and Appraise the stability of Gravity Dam
6. Examine the stability of earth dams, Design principles of Ogee spillways

Syllabus:

Unit-I: **IRRIGATION**

Necessity and importance of irrigation principal Crops and Crop seasons, types, methods of application soil-water-plant relationship, soil moisture Constants Consumptive use, estimation of Consumptive use Crop water requirement, duty and delta factors affecting duty, depth and frequency of irrigation, irrigation efficiencies Irrigation efficiencies Water logging and drainage, Standards of quality for irrigation water, Crop rotation.

Unit-II: **CANALS**

Classification of Canals Design of non-erodible Canals - methods of economic section and maximum permissible velocity Economics of Canal lining Design of erodible Canals -Kennedy's silt theory and Lacey's regime theory balancing depth of Cutting

Unit-III: CANAL STRUCTURES

Falls: Types and location, design principles of Sarda type fall and straight glacious fall **Regulators:** Head and Cross regulators, design principles **Cross Drainage Works:** Types, selection, design principles of aqueduct, siphon aqueduct and super passage. **Outlets**: Types, proportionality, **River Training:** Objectives and approaches sensitivity and flexibility

Unit-IV: DIVERSION HEAD WORKS

Types of diversion head works Layout of diversion head works, Components Causes and failures of weirs on permeable foundations Bligh's Creep theory, Khosla's theory Design of impervious floors for subsurface flow, exit gradient.

Unit-V: DAMS AND RESERVOIRS

Investigations, site selection, zones of storage and yield and storage Capacity of reservoir, reservoir sedimentation.
Dams: Types of dams, selection of type of dam, selection of site for a dam.
Gravity dams: Forces acting on a gravity dam**,** Causes of failure of gravity dam Elementary profile and practical profile of a gravity dam, limiting height of a dam Stability analysis, drainage galleries, grouting.
Unit-VI:
Earth Dams: Types, Causes of failure, Criteria for safe design, sudden drawdown Conditions.
Seepage, measures for Control of seepage. Stability analysis-stability of downstream slope during steady seepage and upstream slope during sudden drawdown Conditions.
Spillways: Types, design principles of ogee spillways, Types of spillways Crest gates. Energy dissipation below of spillways-stilling basin and its appurtenances.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: M Sudhakar

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV CIVIL	I	Remote Sensing & GIS	RT41015	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Define the physical principles of remote sensing(scattering, reflection, and absorption of electromagnetic radiation) and Digital image formats (line, pixel, sequential)
2. Recognize the visual interpretation processing, enhancement and classification.
3. Describe the concepts ,& components of GIS and different types of data representation models.
4. Recognize the Spatial data operators, Network for optimal path & Tracing .
5. Apply RS & GIS tool in the areas of agriculture, forestry, geology, geomorphology and urban land area
6. Apply RS & GIS tool in fields of Water Resources Engineering and Watershed Management.

Course Objectives:

1. Learn the concepts of Remote Sensing, Types of sensors & platforms and digital image formats.
2. Learn various elements of Visual interpretations & Image classification.
3. Understand the concepts of GIS, its components and various data representation models.
4. Learn Spatial data analysis using Overlay operators & decision table; Network analysis & Tracing.
5. Understand the applications of RS & GIS in agriculture, forestry, geology, geomorphology and urban land area applications.
6. Understand the applications of RS & GIS in Hydrology and water resources.

SYLLABUS:

UNIT – I Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces, Characteristics of remote sensing systems
Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT, MODIS, ASTER,RISAT and CARTOSAT

UNIT – II Image analysis: Introduction, elements of visual interpretations, digital image processing-image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT – III Geographic Information System: Introduction, key components, application areas of GIS, map projections.
Data entry and preparation: spatial data input, raster data models, vector data mode
UNIT – IV Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing and buffer analysis.

UNIT – V RS and GIS applications
General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications,

UNIT – VI Applications of Hydrology
Water Resources and Disaster Management: Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management and disaster management with case studies.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: P.Vinay

Class	Semester	Title of The Subject	Subject Code	W.E.F
IV	I	APC	RT41017	11-6-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours	06		3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Understand basic aspects on air pollution and its impact
2. Examine and clearly understand Kinetics of air pollution.
3. Clearly understand interpret and explain the properties of atmosphere. And plume behaviour.
4. Understand the pollutant concentration and compare to limit values
5. Describe the operation and control of particulates by equipment.
6. Identify the control methods for the control of flue gases

Syllabus:

UNIT-I: AIR POLLUTION: Sampling and analysis of air pollutants, conversion of ppm into ug/m^3. Defintion of terms related to air pollution and control secondary pollutants- Indoor air pollution- Climate change and its impact Carbon Trade.

UNIT-II: Thermodynamics and Kinetics of Air pollution: Applications in the removal of gases like Sox, NOx, CO and HC – Air fuel ratio, Computation and control of products of combustion, Automobile pollution. Odour pollution control, Flares.

UNIT-III: Metrology and Air Pollution: Properties of atmosphere: Heat, pressure, wind forces, Moisture and relative humidity, Lapse rates- influence of terrain and meteorological phenomena on plume behavior and air quality- Wind rose diagrams, plume rise models.

UNIT-IV: Ambient air quality management: monitoring of SPM, SO2: NOx and CO – stack Monitoring for flue gases- micro meteorological monitoring weather station. Estimation standards- Gaussian model for Plume dispersion.

UNIT-V: Air pollution control: control of particulates- control at sources, process changes, equipment modifications, design and operation of control equipments- settling chambers, cyclone separators-fabric filter scrubbers, electrostatic precipitators.

UNIT-VI : Air pollution control methods: control of NOx and Sox emissions- environmental friendly fuels- in plant control measures, process changes, methods of removal and recycling environmental criteria for setting and industries and green belts.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: Syed Imran

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV CIVIL	I	Environmental Engineering Lab	RT4101L	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
40 Hours	Theory -	Practical 3	3 Hours	Internal 25	External 50	2

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
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11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Evaluate water quality based on chemical analysis of given samples
2. Appraise water quality based on physical analysis of given samples

Course Objectives:

1. Learn the laboratory practices to estimate the chemical properties like pH, alkalinity, acidity, hardness, chlorides, total, suspended and dissolved solids, D.O., B.O.D., COD and residual chlorine present in the water and waste water samples
2. Learn the laboratory practices to estimate the physical properties like turbidity in the water and waste water samples.

SYLLABUS:

List of Experiments

1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil.
2. Determination and estimation of Total Hardness–Calcium & Magnesium.
3. Determination of Alkalinity/Acidity
4. Determination of Chlorides in water and soil
5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone.
6. Determination of Iron.
7. Determination of Dissolved Oxygen with D.O. Meter & Wrinklers Method and B.O.D.
8. Physical parameters – Temperature, Colour, Odour, Turbidity, Taste.
9. Determination of C.O.D.
10. Determination of Optimum coagulant dose..

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: M.Sudhakar

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV CIVIL	I	GIS & CAD LAB	RT4101M	11/06/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
40 Hours	Theory -	Practical 3	3 Hours	Internal 25	External 50	2

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Analyze & Design the concrete beams, frames & Special Structures using structural analysis software.
2. Analyze & Design the steel structures using structural analysis software.
3. Digitize and create thematic map and Apply GIS software various engineering fields.
4. Estimate the different features & obtain model elevation from maps.

Course Objectives:

1. Learn to analyze & design of frames, steel tubular truss, Retaining wall & Simple Tower using structural analysis software.
2. Understand the creation of maps and apply GIS software in various engineering fields.

SYLLABUS:

GIS:

SOFTWARES:

1. Arc GIS 9.0
2. ERDAS 8.7
3. Mapinfo 6.5

Any one or Equivalent.

EXCERCISES IN GIS:

1. Digitization of Map/Top sheet
2. Creation of thematic maps.
3. Estimation of features and interpretation
4. Developing digital Elevation Model
5. Simple applications of GIS in water Resources Engineering & Transportation Engineering.

COMPUTER AIDED DESIGN AND DRAWING:

SOFTWARE:

- STAAD PRO / Equivalent/
- STRAAP
- STUDDS

EXCERCISIES:

1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple Tower Analysis and Design

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech in Civil Engineering Faculty Name: T.S.V.DURGA

Class	Semester	Title of The Paper	Paper Code	W.E.F
II	1I	Building planning & Drawing	R1622011	19-11-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical	3	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:**

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

2. **Problem** research literature, and analyze complex engineering problems reaching substantiated **analysis** Identify, formulate, conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:**

   Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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.

5. **Modern tool usage:**

   Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues

2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1.Explain the objectives of building byelaws and regulations.

2.Illustrate the different rooms and recognize their grouping in Residential building.

3.Paraphrase the Planning & importance of Public Buildings.

4.Sketch the different Sign Conventions & Bonds used in Planning of buildings.

5. Sketch the different types & detailing of Doors, Windows, Ventilators and Roofs.

6. Sketch the Plan, Elevation and sections of a Residential & Public buildings from the given line diagram.

Course Objectives:

1. Recognize the importance of Building Byelaws & Regulations.

2. List the minimum standards of building elements & their grouping.

3. Discuss the Planning of Public Buildings.

4. Identify the Sign Conventions & Bonds used in Drawing.

5. Explain the different types & detailing of Doors, Windows, Ventilators and Roofs

6. Create with Planning and Drawing of Residential & Public Buildings- Plan, Elevation and sections.

UNIT I:
BUILDING BYELAWS AND REGULATIONS
Introduction- terminology- objectives of building byelaws- floor area ratio floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations- height of buildings- wall thickness – lightening and ventilation requirements.

UNIT II:
RESIDENTIAL BUILDINGS
Minimum standards for various parts of buildings- requirements of different rooms and their grouping- characteristics of various types residential buildings.

UNIT III:
PUBLIC BUILDINGS
Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels & motels, buildings for recreation.

UNIT IV :
SIGN CONVENTIONS AND BONDS
Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles. English bond and Flemish bond- odd and even courses for one, one-half, two and two & half brick walls in thickness at the junction of a corner.

UNIT V:
DOORS, WINDOWS, VENTILATORS AND ROOFS
Panelled door, panelled and glassed door, glassed windows, panelled windows, swing ventilators, fixed ventilators, coupled roof, collar roofs. King Post truss, Queen Post truss Sloped and flat roof buildings: drawing plans, Elevations and Cross Sections of given sloped roof buildings

UNIT VI:
PLANNING AND DESIGNING OF BUILDINGS
Draw the Plan, Elevation and sections of a Residential & Public buildings from the given line diagram.

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College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.TECH Faculty Name: S.SNIGDHA

Class	Semester	Title of The Paper	Paper Code	W.E.F
II	II	CONCRETE TECHNOLOGY	RT22014	19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
85 Hours	Theory 5	Practical -	3	Internal 30	External 70	3

PROGRAMME OUTCOMES:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

COURSE OUTCOMES:

1. Assess the ingredients of concrete & admixtures
2. Test the fresh concrete properties
3. Test the properties of hardened concrete
4. Evaluate with various Mechanical properties of concrete
5. Design concrete mix by various methods of mix design
6. Recognize special concrete properties and their applications.

COURSE OBJECTIVES:

1. Explore the ingredients of concrete & admixtures
2. Experiment properties of concrete in fresh state.
3. Examine properties of concrete in hardened state.
4. Familiarize rheological properties of concrete.
5. Design concrete mix using different codes.
6. Contrast special concrete & their applications

SYLLABUS:

UNIT I : Ingredients Of Concrete Cements & Admixtures: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis –

Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size. Quality of mixing water.

UNIT – II, Fresh Concrete: Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of fresh concrete-Workability – Factors affecting workability – Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete, Shotcrete

UNIT – III, Hardened Concrete: Water / Cement ratio – Abram's Law – Gel space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests –Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – IV, Elasticity, Creep & Shrinkage, Modulus of elasticity, Dynamic modulus of elasticity , Poisson's ratio, Creep of concrete, Factors influencing creep, Relation between creep & time, Nature of creep, Effects of creep – Shrinkage –types of shrinkage.

UNIT – V, Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Concepts Proportioning of concrete mixes by various methods – BIS method of mix design.

UNIT – VI, Special Concretes: Ready mixed concrete, Shotcrete, Light weight aggregate concrete, Cellular concrete, No-fines concrete, High density concrete, Fibre reinforced concrete, Different types of fibres, Factors affecting properties of F.R.C, Polymer concrete, Types of Polymer concrete, Properties of polymer concrete, High performance concrete – Self consolidating concrete, SIFCON, self healing concrete.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: K.Prudhvi

Class	Semester	Title of The Subject	Subject Code	W.E.F
II	II	H&HM	R1622013	19-11-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours	06		3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

To study about uniform and non uniform flows in open channel and also to learn about the characteristics of hydraulic jump

• To introduce dimensional analysis for fluid flow problems

• To understand the working principles of various types of hydraulic machines and Pumps.

Course Outcomes:

Solve uniform and non uniform open channel flow problems.

• Apply the principals of dimensional analysis and similitude in hydraulic model testing.

• Understand the working principles of various hydraulic machineries and pumps.

Syllabus Unit Wise:

UNIT – I UNIFORM FLOW IN OPEN CHANNELS:

Types of channels –Types of flows - Velocity distribution – Energy and momentum correction factors – Chezy's, and Manning's formulae for uniform flow – Most Economical sections, Critical flow: Specific energy-critical depth – computation of critical depth

UNIT II NON-UNIFORM FLOW IN OPEN CHANNELS: Steady Gradually Varied flow-Dynamic equation, Mild, Critical, Steep, horizontal and adverse slopes-surface profilesdirect step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT – III HYDRAULIC SIMILITUDE: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT – IV BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat , inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle

UNIT – V HYDRAULIC TURBINES – I: Layout of a typical Hydropower installation – Heads and efficiencies - classification of turbines. Pelton wheel - Francis turbine - Kaplan turbine - working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and efficiency. Governing of turbines-surge tanks-unit

and specific quantities, selection of turbines, performance characteristics-geometric similarity-cavitation.

UNIT – VI CENTRAIFUGAL-PUMPS: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed, multistage pumps-pumps in parallel and series - performance of pumps-characteristic curves-NPSH- Cavitation.

RECIPROCATING PUMPS: Introduction, classification, components, working, discharge, indicator diagram, work done and slip.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name:S.Naga Bhargavi

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	II	Structural Analysis-I	R1622015	19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Evaluate Shear force, bending moment and deflections of propped cantilever beams subjected to various types of loadings.
2. Evaluate Shear force, bending moment and deflections of Fixed beams subjected to various types of loadings.
3. Appraise Shear force and bending moment of Continuous beams subjected to various types of loadings.
4. Formulate and Solve Slope deflection equation for continuous beams.
5. Apply strain energy expressions in linear elastic systems and Estimate deflections of beams and trusses.
6. Examine loads in Pratt and Warren trusses when loads of different types and spans were passing over the truss.

Course Objectives:

1. Familiarize concepts of bending moment, shear force and deflection under various loading conditions in propped cantilever beams.
2. Learn about bending moment, shear force and deflection under various loading conditions in Fixed beams.
3. Study the concepts of bending moment and shear force under various loading conditions in Continuous beams.
4. Learn slope deflection equations & to apply for continuous beams.
5. Study about the strain energy due to axial load, bending moment and shear force in linear elastic systems & to estimate deflections of simple beams and pin jointed trusses.
6. Learn the concepts of moving loads and influence lines for assessment of maximum SF and BM at a given section when loads of varying spans are passing over beams of different spans of Pratt and Warren trusses.

Syllabus:

UNIT – I Propped Cantilevers: Analysis of propped cantilevers-shear force and Bending moment diagrams-Deflection of propped cantilevers.

UNIT – II Fixed Beams – Introduction to statically indeterminate beams with U. D. load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams-Deflection of fixed beams including effect of sinking of support, effect of rotation of a support.

UNIT – III Continuous Beams: Introduction-Clapeyron's theorem of three moments-Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-IV Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT – V Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Deflections of simple beams and pin jointed trusses.

UNIT – VI Moving Loads And Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load, U. D load longer than the span, U. D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

INFLUENCE LINES: Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a sections, single point load, U.D. load longer than the span, U.D. load shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B. Tech in Civil Engineering **Faculty Name:**U.Krishna Sainath

Class	Semester	Title of The Paper	Paper Code	W.E.F
II Year	II Semester	Surveying Field Work-II	R1622018	6

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
48 Hours	Theory -	Practical 3	2	Internal 25	External 50	3

Programme Outcomes:

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

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.

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.

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.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.

2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

The student will:

1. Illustrate with the measurement of angles & distances using Theodolite.
2. Memorize the design of Simple curves using linear methods.
3. Explain the concept of contouring using level
4. Define the functioning of Total Station

Course Outcomes:

At the end of the Course/Subject, the students will be able to:

1. Experiment the method of Theodolite survey to calculate Distances & Areas.
2. Design & setting out of Curve by linear methods.
3. Sketch the Contour plan of an area using level
4. Experiment of angles, heights & distances using Total station.

Course Syllabus:

1. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of repetition method.
2. Theodolite Survey: Finding the distance between two inaccessible points.
3. Theodolite Survey: Finding the height of far object.
4. Tacheomatric survey: Heights and distance problems using tacheomatric principles.
5. One Exercise on Curve setting.
6. One Exercise on contours.
7. Total Station : Introduction to total station and practicing setting up, levelling up and elimination of parallax error.
8. Total Station : Determination of area using total station.
9. Total Station : Traversing
10. Total Station : Contouring
11. Total Station : Determination of Remote height.
12. Total Station : distance between two inaccessible points.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: M Sudhakar

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	II	Strength of Materials- II	R1622012	19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Appraise Principal stresses & Strains analytically, Graphically .
2. Evaluate Shear stress, Torque & Power of circular shafts by using Torsional equation & Deflections of various types of Springs.
3. Examine the Crippling & Safe loads using Euler's & Rankine's theories for the columns with different end conditions & Maximum deflection, Stress & Moment for the struts.
4. Synthesize thestresses for the column under eccentric loads, Dams, Chimneys & Retaining walls & check the stability of structures.
5. Examine Moments of inertia, Stresses &Deflection of beams subjected tounsymmetrical bending
6. Appraise the Forces in members of plane, pin-jointed, perfect trusses by method of Joints& method of Sections

Course Objectives:

1. Enable preliminary concepts of Principal stresses and strainsanalytically as well asgraphically due to stresses acting on the cross section and onany inclined plane. Concepts of failures in the material by different theories.
2. DeriveTorsion equation, andthere by calculate the power transmitted by shafts anddesign the cross section when subjected to loading using differenttheories of failures& deflections of Springs
3. Classify columns and calculation of load carrying capacity usingdifferent empirical formulae and to assess stresses due to axial andlateral loads for different edge conditions
4. Determination of stresses under the combined action of direct loading and Bending Moment.
5. Introduce the concept of unsymmetrical bending in beams Locationof neutral axis Deflection of beams under unsymmetrical bending.
6. Determination of Forces in members of trusses by method of joints& method of sections.

SYLLABUS:

UNIT- I Principal Stresses And Strains And Theories Of Failures: Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.
Theories Of Failures: Introduction – Various Theories of failures like Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

UNIT – II Torsion Of Circular Shafts And Springs: Theory of pure torsion – Derivation of Torsion equations: $T/J = q/r = N\phi/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – III Columns And Struts: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.
Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT – IV Direct And Bending Stresses: Stresses under the combined action of direct loading and B.M. Core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and B.M. about both axis.

UNIT – V Unsymetrical Bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis Deflection of beams under unsymmetrical bending.

UNIT – VI Analysis Of Pin-Jointed Plane Frames: Determination of Forces in members of plane pin-jointed perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses by method of joints, method of sections.
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HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: B.Swetha Malika

Class	Semester	Title of The Subject	Subject Code	W.E.F
II	II	Transportation Engineering -I	R1622016	19-11-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours	06		3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Learn Basic knowledge on various highway developmental engineering surveys, drawings, reports and highway networks.
2. Study the design geometry of highways
3. Learn concepts of conducting traffic surveys and design of intersections & signals
4. Learn various tests conducted on Highway materials like bitumen, aggregates
5. Study the design principles of Highway pavements
6. Learn the construction procedure and maintenance of highways

Course Outcomes:

1. Plan the highway network for a given area based on engineering surveys
2. Design highway geometrics
3. Develop the intersections and signals in required area based on traffic surveys
4. Judge suitability of pavement materials for the construction of roads.
5. Design flexible and rigid pavements
6. Construct & maintain the highways

Course Syllabus Unit Wise:

UNIT - I Highway Planning and Alignment:
Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans – First, second, third road development plans, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys; Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.

UNIT – II Highway Geometric Design:
Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements-Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and Intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening-Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III Traffic Engineering:
Basic Parameters of Traffic-Volume, Speed and Density-Traffic Volume Studies; Speed studies – spot speed and speed & delay studies; Parking Studies; Road Accidents-Causes and Preventive

measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; Road Traffic Signs; Road markings; Types of Intersections; At-Grade Intersections – Design of Plain, Flared, Rotary and Channelized Intersections; Design of Traffic Signals –Webster Method –IRC Method.

UNIT – IV, Highway Materials:

Subgrade soil: classification –Group Index – Subgrade soil strength – California Bearing Ratio – Modulus of Subgrade Reaction. Stone aggregates: Desirable properties – Tests for Road Aggregates – Bituminous Materials: Types – Desirable properties – Tests on Bitumen – Bituminous paving mixes: Requirements – Marshall Method of Mix Design.

UNIT – V, Design of Pavements:

Types of pavements; Functions and requirements of different components of pavements; Design Factors

Flexible Pavements: Design factors – Flexible Pavement Design Methods – CBR method – IRC method – Burmister method – Mechanistic method – IRC Method for Low volume Flexible pavements.

Rigid Pavements: Design Considerations – wheel load stresses – Temperature stresses – Frictional stresses – Combination of stresses – Design of slabs – Design of Joints – IRC method – Rigid pavements for low volume roads – Continuously Reinforced Cement Concrete Pavements – Roller Compacted Concrete Pavements.

UNIT – VI Highway Construction and Maintenance:

Types of Highway Construction – Earthwork; Construction of Earth Roads, Gravel Roads, Water Bound Macadam Roads, Bituminous Pavements and Construction of Cement Concrete Pavements. Pavement Failures, Maintenance of Highways, pavement evaluation, strengthening of existing pavements

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name:S.Naga Bhargavi

Class	Semester	Title of The Paper	Paper Code	W.E.F
II CIVIL	II	FM & HM LAB	R1622017	19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
40 Hours	Theory 0	Practical 3	3 Hours	Internal 25	External 50	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Determine the various coefficients for disparate equipments
2. Determine efficiencies of various turbines & pumps
3. Derive Hydraulic jump& Verify of Bernoulli's Equation

Course Objectives:

1. Familiarize the procedure of finding various coefficients by using disparate equipments
2. Familiarize the procedure of finding efficiencies of various turbines & pumps
3. Study of Hydraulic jump& Verification of Bernoulli's Equation

SYLLABUS:

List of Experiments

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: K.V.Lakshmi Narayana

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV CIVIL	I	Geotechnical engineering -I		19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Describe the concepts of types of soils, soil structures ,clay mineralogy for establishing inter-relationships between mass, volume and density
2. Appraise various index properties of the soils and classification of soils.
3. Identify the importance of permeability, seepage and effective stress concept
4. Evaluate the stress distribution in soil for various shapes of loading
5. Recognize the importance of the engineering property of the soil consolidation and determining them in laboratory
6. Analyse the shear parameters of soil and its importance to find out the shear strength of a soil.

Course Objectives:

1. Gain the basic knowledge of various structures of soil and the clay mineralogy and grain size analysis
2. Determine the index properties of the soil and classification.
3. Understand the concept of seepage of water through soils and determining the discharge of water through soils.
4. Learn the concept of stress distribution in soils, determining the stress intensity for various shapes of loads at different levels.
5. Know the principles of compaction and consolidation of soils , determining the magnitude and the rate of consolidation settlement
6. Understand the concept of shear strength of soils, determining the shear parameters of sands and clays

SYLLABUS:

UNIT – I Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship –Relative density , Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.

UNIT – II Index Properties Of Soils: Grain size analysis – Sieve and Hydrometer methods

– consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

UNIT –III Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition – 2-D flow and Laplace's equation - Seepage through soils – Flow nets: Characteristics and Uses.

UNIT – IV Stress Distribution In Soils: Stresses induced by applied loads - Boussinesq's and Westergaard's theories for point loads and areas of different shapes– Newmark's influence chart – 2:1 stress distribution method.

UNIT – V Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (c_v) - Over consolidated and normally consolidated clays.

UNIT – VI Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination- various drainage conditions.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name:S.Naga Bhargavi

Class	Semester	Title of The Paper	Paper Code	W.E.F
III CIVIL	II	Design & Drawing of Steel Structures		19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Define the basic elements of a steel structure and fundamentals of structural steel fasteners.
2. Design basic elements of steel structures (beams)
3. Design tension members, compression members and Roof trusses.
4. Design columns both laced and battened.
5. Design column bases. (Both gusset and slab bases)
6. Design Plate girder and gantry girder.

Course Objectives:

1. To introduce steel structures and its basic components, and introduce structural steel fasteners like welding and reviting.
2. To design beams (laterally supported, unsupported and build up sections)
3. To design tension members, compression members and roof trusses
4. To design beam-columns both laced and battened
5. To familiarize students with column bases and their design.
6. To familiarize students with Plate girder and Gantry Girder and their Design.

SYLLABUS:

UNIT – I Connections: Introduction: (a) Riveted connections – Definition, rivet strength and capacity- Codal Provisions, (**b) Welded connections**: Introduction, Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds: Permissible stresses – IS Code requirements. Design of fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints.

All units i.e. from unit II to unit-VI to be taught in Limit State Design and in Welded connections only.

UNIT – II Beams: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT –III Tension Members and compression members: General Design of members subjected to direct tension and bending –effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.

Roof Trusses: Different types of trusses – Design loads – Load combinations as per IS Code recommendations, structural details –Design of simple roof trusses involving the design of purlins, members and joints – tubular trusses.

UNIT – IV Design of Columns: Built up compression members – Design of lacings and battens. Design Principles of Eccentrically loaded columns, Splicing of columns.

UNIT – V Design of Column Foundations: Design of slab base and gusseted base. Column bases subjected moment.

UNIT – VI Design of Plate Girder: Design consideration – I S Code recommendations Design of plate girder-Welded – Curtailment of flange plates, stiffeners – splicing and connections.

Design of Gantry Girder: impact factors - longitudinal forces, Design of Gantry girders.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: U.KRISHNA SAINATH

Class	Semester	Title of The Paper	Paper Code	W.E.F
III	II	Environmental Engineering-I		19-11-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical	3	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse

teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Interpret the water quantity for various types of demands
2. Identify the water source and select proper intake structure
3. Get the knowledge on characterization of water
4. Understand the treatment of raw water
5. Describe the miscellaneous treatment methods
6. Impart knowledge on water distribution networks

Course Outcomes:

1. Appraise the quantity of water required for a community
2. List with types of intakes
3. Examine the water characteristics
4. Discuss the Primary treatment of raw water.
5. Identify the Miscellaneous treatments.
6. Describe the distribution network.

Syllabus:

UNIT I

Introduction: Importance and Necessity of Protected Water Supply systems, Water borne diseases, Flow chart of public water supply system, Role of Environmental Engineer, Agency activities.
Water Demand and Quantity Estimation: Estimation of water demand for a town or city, Per capita Demand and factors influencing it - Types of water demands and its variations- factors affecting water demand, Design Period, Factors affecting the Design period, Population Forecasting
UNIT-II

Sources of Water: Lakes, Rivers, Impounding Reservoirs, comparison of sources with reference to quality, quantity and other considerations- Capacity of storage reservoirs, Mass curve analysis. Groundwater sources of water: Types of water bearing formations, springs, Wells and Infiltration galleries, Yields from infiltration galleries.

Collection and Conveyance of Water: Factors governing the selection of the intake structure, Types of Intakes. Conveyance of Water: Gravity and Pressure conduits, Types of Pipes, Pipe Materials, Pipe joints, Design aspects of pipe lines, laying of pipe lines

UNIT-III

Quality and Analysis of Water: Characteristics of water–Physical, Chemical and Biological-Analysis of Water – Physical, Chemical and Biological characteristics. Comparison of sources with reference to quality-I.S. Drinking water quality standards and WHO guidelines for drinking water

UNIT-IV

Treatment of Water: Flowchart of water treatment plant, Treatment methods: Theory and Design of Sedimentation, Coagulation, Sedimentation with Coagulation, Filtration.

UNIT-V

Disinfection: Theory of disinfection-Chlorination and other Disinfection methods, Softening of Water, Removal of color and odours - Iron and manganese removal –Adsorption-fluoridation and deflouridation–aeration– Reverse Osmosis-Iron exchange–Ultra filtration.

UNIT-VI

Distribution of Water: Requirements- Methods of Distribution system, Layouts of Distribution networks, Pressures in the distribution layouts, Analysis of Distribution networks: Hardy Cross and equivalent pipe methods -Components of Distribution system: valves such as sluice valves, air valves, scour valves and check valves, hydrants, and water meters–Laying and testing of pipe lines- selection of pipe materials, pipe joints.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: Syed Imran

Class	Semester	Title of The Paper	Paper Code	W.E.F
III CIVIL	II	Waste Water Managemnt		19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. List the appropriate appurtenances in the sewerage systems
2. Discuss the Pumping of wastewater and design of building drainage system
3. Examine the waste water characteristics &design the preliminary and primary treatment units
4. Describe the secondary treatment of Sewage
5. Identify the Miscellaneous treatments and design the septic and imhoff tanks
6. State the suitable methods for sludge disposal

Course Objectives:

1. Get the knowledge of collection, conveyance and estimation of waste water and sewerage system and it's appurtenances
2. Get the knowledge of pumping and house plumbing systems of waste water and design of drainage
3. Learn the analysis of waste water and design the preliminary & primary treatment units
4. Understand secondary treatment methods of sewage
5. Get the idea about the miscellaneous treatment methods and working principles and design of septic and imhoff tanks
6. Handle the sludge and learn it's safe disposal.

SYLLABUS:

UNIT – I: Introduction to Sanitation – Systems of sanitation – relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems- Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - Hydraulics of sewers and storm drains– design of sewers – appurtenances in sewerage – cleaning and ventilation of sewers

UNIT – II: Pumping of wastewater: Pumping stations – location – components– types of pumps and their suitability with regard to wastewaters.

House Plumbing: Systems of plumbing-sanitary fittings and other accessories– one pipe and two pipe systems – Design of building drainage

UNIT – III: Sewage characteristics – Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations

Treatment of sewage: Primary treatment-Screens-grit chambers-grease traps– floatation– sedimentation – design of preliminary and primary treatment units.

UNIT – IV: Secondary treatment: Aerobic and anaerobic treatment process- comparison.

Suspended growth process: Activated Sludge Process, principles, designs, and operational problems, modifications of Activated Sludge Processes, Oxidation ponds, Aerated Lagoons.

Attached Growth Process: Trickling Filters–mechanism of impurities removal- classification–design-operation and maintenance problems. RBCs, Fluidized bed reactors

UNIT V: Miscellaneous Treatment Methods: Nitrification and Denitrification – Removal of Phosphates –UASB–Membrane reactors-Integrated fixed film reactors. Anaerobic Processes: Septic Tanks and Imhoff tanks- working Principles and Design–Reuse and disposal of septic tank effluent, FAB Reactors.

UNIT – VI: Bio-solids (Sludge) management: Characteristics-SVI, handling and treatment of sludge-thickening – anaerobic digestion of sludge, Sludge Drying Beds. Centrifuge.

Disposal of sewage: Methods of disposal – disposal into water bodies-Oxygen Sag Curve-Disposal into sea, disposal on land- sewage sickness.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: K.Prudhvi

Class	Semester	Title of The Subject	Subject Code	W.E.F
III	II	WRE-1		19-11-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours	06		3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Understand about hydrology, hydrological cycle and components of the hydrological cycle. And learn about types and forms, measurement, presentation, frequency of precipitation.
2. Learn the factors affecting, measurement and different aspects of evaporation, Evapotranspiration and infiltration.
3. Learn the factors affecting, measurement and different aspects of Run-Off and Provide an overview and understanding of Unit Hydrograph theory and its analysis by using different methods.
4. Understand flood frequency analysis by using Gumbels and Log pearson type-III distribution methods .Know the concept ,methods of Flood routing and causes and controlling methods of floods.
5. Understand about groundwater movement and well hydraulics and can determine aquifer parameters and yield of wells.
6. Study Advanced topics in Hydrology such as Rainfall-Runoff Modeling, IUH –Clark and Nash Models and general hydrological models –chow and Kulandaiswamy models

Course Outcomes:

1. Define hydrological cycle and types, forms, measurement and representation of precipitation
2. Appraise the processes of Evaporation, Evapotranspiration and infiltration losses.
3. Examine the knowledge of Run-Off and Hydrograph analysis.
4. Describe floods and carry out flood routing.
5. Appraise the knowledge of groundwater movement and well hydraulics.
6. Discuss the advanced topics in Hydrology.

Syllabus Unit Wise:

UNIT I Introduction: Engineering hydrology and its applications, Hydrologic cycle,

hydrological data-sources of data.

Precipitation: Types and forms, measurement, raingauge network, presentation of rainfall

data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves, Depth-Area-Duration (DAD) curves, Probable Maximum Precipitation (PMP), design storm

UNIT-II Abstractions from Precipitation: Initial abstractions.
Evaporation: factors affecting, measurement, reduction
Evapotranspiration: factors affecting, measurement, control
Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices.
UNIT-III Runoff: Catchment characteristics**,** Factors affecting runoff, components, computation- empirical formulae, tables and curves, stream gauging, rating curve, flow mass curve and flow duration curve.
Hydrograph analysis: Components of hydrograph, separation of base flow, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, derivation of unit hydrograph, unit hydrographs of different durations, principle of superposition and Shydrograph methods, limitations and applications of unit hydrograph, synthetic unit hydrograph.
UNIT-IV Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearson type III distribution methods, Standard Project Flood (SPF) and Probable Maximum Flood (MPF), flood control methods and management.
Flood Routing: Hydrologic routing, channel and reservoir routing-Muskingum and Puls methods of routing.
UNIT-V Groundwater: Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation- steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.
UNIT VI Advanced Topics in Hydrology: Rainfall-runoff Modelling, instantaneous unit hydrograph (IUH) - conceptual models - Clark and Nash models, general hydrological models- Chow - Kulandaiswamy model.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech in Civil Engineering Faculty Name: T.S.V.DURGA

Class	Semester	Title of The Paper	Paper Code	W.E.F
III	II	COMPUTER AIDED ENGINEERING DRAWING		19-11-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
45 Hours	Theory	Practical 3	3	Internal 30	External 70	2

Programme Outcomes:

1. **Engineering knowledge:**

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

2. **Problem** research literature, and analyze complex engineering problems reaching substantiated **analysis** Identify, formulate, conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:**

   Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

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.

5. **Modern tool usage:**

   Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:**

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues

2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

Draw the projections & development of surfaces of solids.

Draw the 3D views in different projections.

Create a plan & modeling of simple solids in CAD software.

Course Objectives:

Learn the projections , development of surfaces of solids and methods of isometric & perspective views.

Know about the CAD software and generation of solid modeling.

Course Syllabus:

UNIT-I

Objective: The knowledge of projections of solids is essential in 3D modelling and animation. The student will be able to draw projections of solids. The objective is to enhance the skills they already acquired in their earlier course in drawing of projection and sections of solids.

Projections Of Planes & Solids : Projections of Regular Solids inclined to both planes - Auxiliary Views. Sections and Sectional views of Right Regular Solids - Prism, Cylinder, Pyramid, Cone - Auxiliary views.

UNIT-II

Objective: The knowledge of development of surfaces of solids is required in designing and manufacturing of the objects. Whenever two or more solids combine, a definite curve is seen at their intersection. The intersection ofsolids also plays an important role in designing and manufacturing. The objective is to impart this knowledge through this topic.

Development And Interpenetration Of Solids: Development of Surfaces of Right Regular Solids - Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids - Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT-III

Objective: Isometric projections provide a pictorial view with a real appearance. Perspective views provides a realistic 3D View of an object. The objective is to make the students learn the methods of Iso and Perspective views.

Isometric Projections : Principles of Isometric Projection - Isometric Scale

- Isometric Views
- Conventions - Isometric Views of Lines, Plane Figures, Simple and Compound Solids - IsometricProjection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

Transformation of Projections: Conversion of Isometric Views to Orthographic Views - Conventions.

Perspective Projections: Perspective View: Points, Lines, Plane Figures and Simple Solids,Vanishing Point Methods(General Method only).

PART- B COMPUTER AIDED DRAFTING

UNIT- IV

Introduction To Computer Aided Drafting: Generation of points, lines, curves, polygons, dimensioning. Types of modelling: object selection commands - edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modelling, 3D wire frame modelling.

UNIT-V

Objective: By going through this topic the student will be able to understand the paper-space environment thoroughly.

View Points And View Ports: view point coordinates and view(s) displayed, examples to exercise different options like save, restore, delete, joint, single option.

UNIT-VI

Computer Aided Solid Modelling: Isometric projections, orthographic projections of isometric projections, Modelling of simple solids, Modelling of Machines & Machine Parts.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.Tech Faculty Name: B.Swetha Malika

Class	Semester	Title of The Subject	Subject Code	W.E.F
III	II	Geotechnical Engineering Lab		19-11-2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
	Theory	Practical		Internal	External	
60 Hours		06	3	30	70	3

Programme Outcomes:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. Familiarize with Classification of soils
2. Test the Index properties of a soil
3. Test the engineering properties of the soil

Course Outcomes:

1. Identify the classification of soil.
2. Appraise the index properties of soil sample
3. Appraise the engineering properties of soil sample

SYLLABUS:

LIST OF EXPERIMENTS

1. Specific gravity, G
2. Atterberg's Limits.
3. Field density-Core cutter and Sand replacement methods
4. Grain size analysis by sieving
5. Hydrometer Analysis Test
6. Permeability of soil - Constant and Variable head tests
7. Compaction test
8. Consolidation test (to be demonstrated)
9. Direct Shear test
10. Triaxial Compression test (UU Test)
11. Unconfined Compression test
12. Vane Shear test
13. Differential free swell (DFS)
14. CBR Test

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: Syed Imran

Class	Semester	Title of The Paper	Paper Code	W.E.F
III CIVIL	I	Environmental Engineering Lab		19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
40 Hours	Theory -	Practical 3	3 Hours	Internal 25	External 50	2

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Evaluate water quality based on chemical analysis of given samples
2. Appraise water quality based on physical analysis of given samples

Course Objectives:

1. Learn the laboratory practices to estimate the chemical properties like pH, alkalinity, acidity, hardness, chlorides, total, suspended and dissolved solids, D.O., B.O.D., COD and residual chlorine present in the water and waste water samples
2. Learn the laboratory practices to estimate the physical properties like turbidity in the water and waste water samples.

SYLLABUS:

List of Experiments

1. Determination of pH and Electrical Conductivity (Salinity) of Water and Soil.
2. Determination and estimation of Total Hardness–Calcium & Magnesium.
3. Determination of Alkalinity/Acidity
4. Determination of Chlorides in water and soil
5. Determination and Estimation of total solids, organic solids and inorganic solids and settleable solids by Imhoff Cone.
6. Determination of Iron.
7. Determination of Dissolved Oxygen with D.O. Meter & Wrinklers Method and B.O.D.
8. Physical parameters – Temperature, Colour, Odour, Turbidity, Taste.
9. Determination of C.O.D.
10. Determination of Optimum coagulant dose..

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: CIVIL Faculty Name: M Sudhakar

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV CIVIL	II	WSM		19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 6	Practical ----	3 Hours	Internal 30	External 70	3

Programme Outcomes:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
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.
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.
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.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Outcomes:

1. Define the concept of watershed .
2. Identify suitable characteristics to take appropriate management action.
3. design control measures against soil erosion.
4. Choose suitable harvesting techniques for better watershed management.
5. Apply land grading techniques for proper land management .
6. Select appropriate models for watershed management**.**

Course Objectives:

1. Introduce the concept of watershed management
2. Understand the watershed characteristics and analyze the watershed parameters.
3. Learn the principles of soil erosion and measures to control erosion
4. Appreciate various water harvesting techniques.
5. Learn land management practices for various land use/land cover
6. Introduce concepts of watershed modelling.

SYLLABUS:

UNIT-I

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development, Integrated and multidisciplinary approach for watershed management.

UNIT-II

Characteristics of Watersheds: Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-III

Principles of Erosion: Types and causes of erosion, factors affecting erosion, estimation of soil loss due to erosion- Universal soil loss equation. Measures to Control Erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, check dams , rock-fill dams, brushwood dam, Gabion.

UNIT-IV

Water Harvesting: Techniques of rain water harvesting- rain water harvesting from roof top, surface flow harvesting, subsurface flow harvesting, stop dams, farm ponds and dugout ponds, percolation tanks.

UNIT-V

Land Management: Land use and Land capability classification, management of forest, agricultural, grassland and wild land, land grading operation, Reclamation of saline and alkaline soils.

UNIT-VI

Watershed Modelling: Data of watershed for modelling, application and comparison of watershed models, model calibration and validation, advances of watershed models.

Prerequisites for the Course: Environmental Engineering, Environmental Science.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
College of Engineering & Technology
Kothapet, VIJAYAWADA-520 001

Program Name: B.TECH Faculty Name: S.SNIGDHA

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV	II	REPAIR AND REHABILITATION OF STRUCTURES	RT42014C	19/11/2018

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
85 Hours	Theory 6	Practical -	3	Internal 30	External 70	3

PROGRAMME OUTCOMES:

PO1: Engineering Knowledge: Apply knowledge of mathematics and science, with fundamentals of Computer Science & Engineering to be able to solve complex engineering problems related to CSE.

PO2: Problem Analysis: Identify, Formulate, review research literature and analyze complex engineering problems related to CSE and reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of solutions: Design solutions for complex engineering problems related to CSE and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety and the cultural societal and environmental considerations.

PO4: Conduct Investigations of Complex problems: Use research–based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, Select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to computer science related complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply Reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the CSE professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the CSE professional engineering solutions in societal and environmental contexts and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply Ethical Principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary Settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large such as able to comprehend and with write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-Long Learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

COURSE OUTCOMES:

1. Explain deterioration of concrete in structures
2. Carryout analysis using NDT and evaluate structures
3. Assess failures and causes of failures in structures
4. Explain different repair materials
5. Explain different repair techniques
6. Carryout Physical evaluation and submit report on condition of the structure.

COURSE OBJECTIVES:

1. Familiarize Students with deterioration of concrete in structures
2. Equip student with concepts of NDT and evaluation
3. Understand failures and causes for failures in structures
4. Familiarize different repair materials
5. Familiarize different techniques for repairs
6. Understand procedure to carryout Physical evaluation of buildings and prepare report.

SYLLABUS:

UNIT I : Stones, Bricks And Tiles Properties of building stones – relation to their structural requirements, classification of stones – stone quarrying – precautions in blasting, dressing of stone, composition of good brick earth, various methods of manufacturing of bricks. Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials

UNIT II: Masonry Types of masonry, English and Flemish bonds, Rubble and Ashlar

Masonry. Cavity and partition walls. Wood: Structure – Properties- Seasoning of timber- Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiber Reinforced Plastics, Steel, Aluminium.

UNIT-III

Failure of buildings: Definition of building failure-types of failures- Causes of Failures- Faulty Design, Accidental over Loading, Poor quality of material and Poor Construction practices- Fire damage - Methodology for investigation of failures-diagnostic testing methods and equipments-repair of cracks in concrete

UNIT-IV

Materials for repair and rehabilitation -Admixtures- types of admixtures- purposes of using admixtures- chemical composition- Natural admixtures- Fibres- wraps- Glass and Carbon fibre wraps- Steel Plates-Concrete behavior under corrosion, disintegrated mechanisms- moisture effects and thermal effects – Visual investigation- Acoustical emission methods- Corrosion activity measurement- chloride content – Depth of carbonation- Impact echo methods- Ultrasound pulse velocity methods- Pull out tests.

UNIT: V

Repair Techniques: Grouting, Jacketing, Shotcreting, externally bonded plates, Nailing, Underpinning and under water repair; Materials, Equipments, Precautions and Processes.

UNIT: VI

Investigation of structures: Distress, observation and preliminary test methods. Case studies: related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion and erosion damaged structures.

Program Name: B. Tech in Civil Engineering **Faculty Name:**U.Krishna Sainath

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV Year	II Semester	Estimating, Specifications & Contracts	RT42011	6

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical -	3	Internal 30	External 70	3

Programme Outcomes:

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

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.

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.

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.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

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11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.

2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

The student will:

1. Learn the General items, standard units and estimates of buildings.
2. Learn the rate analysis of various items of work..
3. Understand the Earthwork for roads & canals and Describe the bar bending schedule.
4. Generalize the types & conditions of contract, and standard specifications for different items of building and their valuation.
5. Interpret the estimation of buildings using individual wall method.
6. Interpret the estimation of buildings using centre line method.

Course Outcomes:

At the end of the Course/Subject, the students will be able to:

1. Recognize the General items and the standard units of works.
2. Value the rates for construction items.

3. Evaluate the earthwork for roads & canals and recognize the concept of bar bending schedule.
4. Discuss the conditions of contract and value the property.
5. Estimate the quantities and cost of a building using individual wall method.
6. Guesstimate the quantities and cost of a building using centre line method.

UNIT I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates –Approximate method of Estimating.

UNIT-II

Rate Analysis – Working out data for various items of work over head and contigent charges.

UNIT-III

Earthwork for roads and canals, Reinforcement bar bending and bar requirement schedules.

UNIT-IV

Contracts – Types of contracts – Contract Documents – Conditions of contract, Valuation of buildings Standard specifications for different items of building construction.

UNIT-V

Detailed Estimation of Buildings using individual wall method.

UNIT-VI

Detailed Estimation of Buildings using centre line method.

HOD CIVIL DEPT.
Potti Sriramulu Chalavadi Mallikharjuna Rao
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Program Name: B.Tech Faculty Name: B.SWETHA MALIKA

Class	Semester	Title of The Paper	Paper Code	W.E.F
IV	II	Traffic Engineering	RT42012E	6

SYLLABUS

Total No.of Hours for Teaching-Learning	Instructional Hours for Week		Duration of semester End Examination in Hours	Max Marks		Credits
60 Hours	Theory 4	Practical	3	Internal 30	External 70	3

Programme Outcomes:

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

teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
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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.

Programme Specific Outcomes:

1. Knowledge of contemporary issues in the civil engineering industry to solve societal issues.
2. Qualify in competitive examinations for higher education and employment.

Course Objectives:

1. To know various components and characteristics of traffic.
2. To know various traffic control devices and principles of highway safety.
3. To understand the detrimental effects of traffic on environment
4. To know highway capacity and level of service concepts.
5. To learn about intelligent vehicle highway systems.

Course Outcomes:

1. Determine traffic speed, volume, travel time and density.
2. Design traffic signals
3. Determine highway capacity.
4. Design Intersections and prepare traffic management plans.
5. Apply the gained knowledge to techniques on safety Environment.

Syllabus:

UNIT I

Components Of The Traffic System: Human-Vehicle–Environment System; characteristics of Road users, Vehicles, Highways and their classification; Traffic Studies:Inventories; Volume studies; Speed, Travel time and Delay studies; Intersection studies; Pedestrian studies; Parkingstudies; Accident studies.

UNIT-II

Traffic Characteristics: Microscopic and macroscopic flow characteristics: Time headways; Temporal, spatial and model flow patterns; Interrupted and Un interrupted traffic. Microscopic and macroscopic speed characteristics: Vehicular speed Trajectories; Speed characteristics – Mathematical distribution; Speed and

travel time variations; Travel time and delay studies. Microscopic and Macroscopic density characteristics: Distance headway characteristics; Car-following theories; Density measurement techniques; Density contour maps.

UNIT-III

Traffic Control Devices & Highway Safety: Traffic signs & Markings; Signal Warrants; Signal phasing and Development of phase plans; Fixed and Vehicle activated signals; Webster method; ARRB method; Drew‟s Method; IRC method; Signal coordination; Area Traffic control. Accident characteristics – Road – Driver – Vehicle; Accident recording and Analysis; Highway Safety Improvement Program; Safety Audit.

UNIT-IV

Environmental Considerations: Air pollution: Kinds of pollutants; Air pollution standards; Measures of air quality; modelling and control. Noise pollution: Measurement of sound levels; Acceptable limits, Prediction of noise levels, Traffic noise control.

UNIT-V

Highway Capacity And Level Of Service: Capacity and level of service; Factors affecting Capacity and LOS; Capacity of Rural Highways, Capacity of Urban Roads; HCM and IRC standards.

UNIT-VI

Intelligent Vehicle – Highway Systems: Traffic surveillance and monitoring; IVHS programs, Role of IVHS, IVHS categories, Benefits and Costs of IVHS.

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