

B. Tech. (Civil Engineering) : Syllabus Revision in 2017-18.

| S. No | Course Code | Session 2016-17 | Session 2017-18 | Remark Syllabus Change/ new course |
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| 1 | BT 101 | <p>Engineering Physics-I UNIT-I Atomic Structure and Solid State: Atomic energy levels and electronic configuration, Intermolecular forces and binding, phases of matter, crystal structure simple cubic , body centered cubic and face centered cubic structures, energy bands in solids , band structure of metals, semiconductors and insulators.</p> <p>UNIT-II Semiconductor Physics: Extrinsic and intrinsic semiconductors, Fermi levels of undoped and doped semiconductors, p-n junction, depletion region, forward and reverse biased p-n junction, volt-Ampere characteristics of a diode , effect of temperature on diode characteristics, Zener diode , tunnel diode, photodiode and LEDs , their structure and characteristics.</p> <p>UNIT-III Theory of Relativity : Absolute and relative frames of reference, Galilean transformations, importance of Michelson-Morley experiment, postulates of special theory of relativity, Lorentz transformations, time dilation and length contraction, velocity addition , mass-energy relationship, elementary ideas about general theory of relativity.</p> <p>UNIT-IV Elementary Quantum Mechanics: Wave particle duality, deBroglie waves, experimental evidence of wave nature of matter, Schrodinger wave equation in One dimension, eigen values and eigen functions, physical interpretation of wave</p> | <p><u>ENGINEERING MATHEMATICS-I</u> Unit-I Differential Calculus: Asymptotes (Cartesian coordinates only), concavity, convexity and point of inflection, Curve tracing (Cartesian and standard Polar curves- Cardioids, Lemniscates of Bernoulli, Limacon, Equiangular Spiral only).</p> <p>Unit-II Limit, continuity and differentiability of functions of two variables, Partial differentiation, Euler's theorem on homogeneous functions, change of variables, chain rule.</p> <p>Unit-III Taylor's theorem (two variables), approximate calculations, Jacobian, maxima & minima of two and more independent variables, Lagrange's method of multipliers.</p> <p>Unit-IV Integral Calculus: Double integral, change of order of integration, Double integral by changing into Polar form, Applications of Double integrals for evaluating areas & volumes, triple integral; Beta function and Gamma function (simple properties).</p> <p>Unit-V Vector Calculus: Scalar and vector field, differentiation & integration of vector functions: Gradient, Directional derivative, Tangent planes and Normals. Divergence, Curl and Differential Operator; Line, Surface and Volume integrals; Green's theorem in a plane, Gauss's and Stoke's theorem (without proof) and their applications.</p> | Syllabus change Title Change Code Change |

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| | | <p>function, Heisenberg uncertainty principle, tunneling phenomenon.</p> <p>UNIT-V</p> <p>Oscillation & Waves : Simple harmonic oscillator with example, energy of oscillator, Damping oscillator, viscous & solid friction damping, Quality factor, Resonance standing waves, elastic waves.</p> | | |
| 2 | BT102 | <p><u>INTRODUCTION TO COMPUTER FUNDAMENTAL AND IT</u></p> <p>UNIT-I</p> <p>Computer System: Basics of computer systems, history, types and Generation of computer, capability and limitations of computer systems. Hardware organization: Anatomy of a digital computer, CPU. Internal architecture of CPU. Memory Units: Memory Hierarchy, Primary Memory, Secondary Memory, cache memory. Storage Devices, Input and Output Devices.</p> <p>UNIT-II</p> <p>Operating Systems: DOS Internal, External commands, Windows (2000 and NT) , Overview of architecture of Windows, tools and system utilities including registry , partitioning of hard disk , Overview of Linux architecture , File system , file and permissions , concept of user and group , installation of rpm and deb based packages.</p> <p>UNIT-III</p> <p>Number system & Conversions: decimal, binary, octal and hexadecimal number systems and their inter conversions, 1's</p> | <p><u>COMMUNICATION SKILLS</u></p> <p>Unit-I Communication: Meaning, Importance and Cycle of Communication, Media and Types of Communication, Formal and Informal Channels of Communication, Barriers to Communication, Division of Human Communication and Methods to Improve Interpersonal Communication, Qualities of Good Communication.</p> <p>Unit-II Grammar: Passive Voice, Indirect Speech, Conditional Sentences, Modal Verbs, Linking Words.</p> <p>Unit-III Composition: Curriculum Vitae Writing, Business Letter Writing, Job Application Writing, Paragraph Writing, Report Writing.</p> <p>Unit-IV Short Stories: 'The Luncheon' by Somerset Maugham, 'How much Land does a Man Need?' by Leo Tolstoy, 'The Night Train at Deoli' by Ruskin Bond.</p> <p>Unit-V Poems: 'No Men are Foreign' by James Kirkup, 'If' by Rudyard Kipling, 'Where the Mind is without Fear' by Rabindranath Tagore.</p> | <p>Syllabus change Title change Code change</p> |

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| | | <p>and 2's complement representation, negative numbers and their representation, BCD, EBCDIC , ASCII and Unicode. Binary Arithmetic operations: addition, subtraction, multiplication, division.</p> <p>UNIT-IV</p> <p>Networking Basics - Uses of a Network and Common types of Networks, Network topologies and protocols, Network media and hardware, Overview of Database Management System.</p> <p>UNIT-IV</p> <p>Data Processing: Introduction to MS office, MS-Power Point and MS-Excel, Introduction to Electronic Spreadsheets, Applications of Electronic Spreadsheets, Types of Spreadsheets, Features of MS-Excel, Starting MS-Excel, Contents of the MS-Excel window, Cell Referencing, Ranges and Functions, Formatting Worksheets and Creating Charts, Data Forms and Printing</p> <p><i>Introduction to MS-PowerPoint :</i> Introduction to MS-PowerPoint, What is a Presentations?, Slides, Working with Slides, Slides Show and Printing Presentation</p> | | |
| 3 | <u>BT103</u> | <p><u>Applied Mathematics I</u></p> <p>UNIT-I</p> <p>Functions of variables: Geometric representation, limit, continuity and differentiability of functions of several variables , partial and full derivatives,</p> | <p><u>ENGINEERING PHYSICS</u></p> <p>Unit-I</p> <p>Interference of light: Michelson's Interferometer: Production of circular & straight line fringes; Determination of wavelength of light; Determination of wavelength separation of two nearby wavelengths. Optical technology: Elementary idea of anti-reflection coating and interference filters.</p> | Syllabus change Code change |

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| | <p>derivatives of composite functions, Euler's theorem on homogeneous functions, harmonic functions, directional derivatives, Taylor's formula, maxima and minima of functions, Lagrange's multipliers.</p> <p>UNIT-II</p> <p>Asymptotes and curvature: Rolle's Theorem, Cauchy's mean value theorem, Taylor and Maclaurin theorems, concavity and convexity of a curve, points of inflexion, asymptotes and curvature.</p> <p>UNIT-III</p> <p>Analytical functions: Limit, continuity and differentiability of analytic functions, Cauchy-Reimann equations, complex functions, line integrals, Cauchy's integral theorem, Cauchy's integral formula, power series, zeroes and singularity, residue theorem.</p> <p>UNIT-IV</p> <p>Integral calculus: Definite integral as limit of sum, properties of definite integrals, mean value theorem, fundamental theorem, evaluation of definite integrals, reduction formula.</p> <p>UNIT-V</p> <p>Differential equations: Order and degree of a differential equation, general and particular solutions, solution of differential equations by separation of variables method, integrating factor method, homogeneous differential equations of first order and their solutions, solution of linear differential equation $dy/dx+f(x)y=Q(x)$ and their application in electrical, nuclear</p> | <p>Unit-II</p> <p>Diffraction and Polarization of light: Fraunhofer Diffraction at Single Slit. Diffraction grating: Construction, theory and spectrum; Determination of wavelength of light. Resolving power: Raleigh criterion; Resolving power of diffraction grating and telescope. Plane, circularly and elliptically polarized light on the basis of electric (light) vector: Malus law; Double Refraction; Phase retardation plates and their use in production and detection of circularly and elliptically polarized light; Optical activity and laws of optical rotation; specific rotation and its measurement using half-shade device.</p> <p>Unit-III</p> <p>Elements of Material Science: Bonding in solids; covalent bonding and Metallic bonding; Classification of solids as Insulators, Semiconductors and Conductors; X-Ray diffraction and Bragg's Law. Hall Effect: Theory, Hall Coefficient and applications.</p> <p>Unit-IV</p> <p>Quantum Mechanics: Compton effect & quantum nature of light; Derivation of time dependent and time independent Schrodinger's Wave Equation; Physical interpretation of wave function and its properties; boundary conditions; Particle in one dimensional box.</p> <p>Unit-V</p> <p>Coherence and Optical Fibers: Spatial and temporal coherence; Coherence length; Coherence time and 'Q' factor for light; Visibility as a measure of Coherence and spectral purity; Optical fiber as optical wave guide; Numerical aperture; Maximum angle of acceptance and applications of optical fiber.</p> <p>Laser and Holography: Theory of laser action; Einstein's coefficients; Components of laser; Threshold conditions for laser action; Theory, Design and applications of He-Ne and semiconductor lasers; Holography versus photography, Basic theory of holography; basic requirement of a Holographic laboratory; Applications of Holography in microscopy and interferometry.</p> | |
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| | | and mechanical systems. | | |
| 4 | BT104 | <p style="text-align: center;"><u>Introduction to Electrical and Electronic Engineering</u></p> <p>UNIT-I</p> <p>Basic Electrical Quantities: Electromotive force, Electric Power, Charge, current, voltage, Energy, Electric potential and field, magnetic flux, resistance, capacitance and inductance. Ohm's law, Voltage and current sources.</p> <p>UNIT-II</p> <p>Network analysis: Circuit principles, Kirchoff's Laws, Node Voltage and Mesh Current Analysis; Delta-Star and Star-Delta Transformation, Source Conversion. Classification of Network Elements, Superposition Theorem, Thevenin's Theorem. Norton Theorem., Maximum Power Transfer Theorems.</p> <p>UNIT-III</p> <p>AC circuits: Alternating Quantities, Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System. Power in a circuit, reactive power, power factor, impedance in ac circuit, series and parallel resonance, Q factor, Introduction to 3-Phase AC System.</p> <p>UNIT-IV</p> <p>Transformers: Faraday's Law of</p> | <p style="text-align: center;"><u>COMPUTER PROGRAMMING-I</u></p> <p>Unit-I Computer Fundamentals: Flow chart, pseudocode, binary, octal and hexadecimal number system. ASCII, EBCDIC and UNICODE. boolean operations,</p> <p>Unit-II primary and secondary memory. Difference among low-level & high-level languages.</p> <p>Unit-III C Programming: Structure of a 'C' program, Data types, enumerated, assignment statements, input output statements,</p> <p>Unit-IV If statement, for loops, while loops, do-while loops, switch statement, break statement, continue statement. Datatype conversion.</p> <p>Unit-V Functions & program structure (function call and return), scope of variables, parameter passing methods, recursion v/s iteration.</p> | <p>Syllabus change Title change Code change</p> |

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| | | <p>Electromagnetic Induction Basic principle of operation of transformer, construction, working, voltage and current relations, Phasor Diagram of Ideal Transformer.open circuit and short circuit test, transformer losses and efficiency, ferrite core transformers. Electrical DC Machine: Principle of DC Machines, Types, Different Parts ofDC Machines</p> <p>UNIT-V</p> <p>Power Supplies: Half wave, full wave and bridge rectifiers, ripple factor and reduction by use of inductor,capacitor, L and pie section filters, voltage regulation using Zener diode.</p> | | |
| 5 | BT105 | <p>English and Communication Skills</p> <p>UNIT –I</p> <p><u>Grammar and Vocabulary:</u> Basic sentence pattern, use of tense, modals, active and passive voice, Direct and Indirect Speech, One word substitution, Synonyms and Antonyms and Common Erros in English.</p> <p>UNIT-II</p> <p><u>Phonetics:</u> IPA symbols, Correct pronunciation of commonly used words, sounds (vowel and consonants)</p> <p>UNIT-III</p> <p><u>Literature</u> : Poetry : where the mind is without fear – Rabindra Nath Tagore, Mending wall – Robert Frost, Night of Scorpion – Nissim Ezekiel</p> <p><u>Essays:</u> of studies: Francis Bascon, what is science? George Orwell.</p> <p>UNIT-IV</p> <p><u>Writing skills</u> : Paragraph writing, Letter writing, covering letter and C.V., Writing E-mails.</p> | <p>ENVIRONMENTAL ENGINEERING AND DISASTER MANAGEMENT</p> <p>Unit-I Basics of Environment: Environmental Pollution, Environmental Acts and Regulations, Ecosystem, Hydrological and chemical cycles, Energy flow in ecosystems. Biodiversity, population dynamics.</p> <p>Unit-II Water Pollution: Water pollutants, effects of oxygen demand, water quality in lakes, reservoirs and groundwater, contaminant transport, self cleaning capacity of streams and water bodies, water quality standards, Waste water management, Treatment & disposal of wastewater. Rain water harvesting: Reuse and saving in use of water, methods of rain water harvesting.</p> <p>Unit-III Solid Waste Management: Classification of solid waste, Collection, transportation, treatment, and disposal of solid waste. Economic recovery of solid waste. Sanitary landfill, on site sanitation. Energy interaction from solid waste.</p> <p>Unit-IV Air and Noise Pollution: Primary and Secondary air pollutants, Air Pollution, Harmful effects of Air Pollution, Control of Air Pollution. Noise Pollution, Harmful effects of noise pollution, control of noise pollution,</p> | New Course |

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| | | <p>UNIT-V</p> <p><u>Fundamentals of Communication:</u> (A) Communication: definition and meaning of communication, functions of communication, process of communication.</p> <p>(B) Types of communication: Verbal and Non verbal communication, Formal and informal communication.</p> <p>(C) Barriers to communication, qualities of good communication, the art of listening.</p> | <p>Global warming, Acid rain, Ozone depletion, Green House effect</p> <p>Unit-V</p> <p>Natural Disasters: Hydro-meteorological Based Disasters like Flood, Flash Flood, Cloud Burst, Drought, Cyclone, Forest Fires; Geological Based Disasters like Earthquake, Tsunami, Landslides, Volcanic Eruptions. Man made Disasters: Chemical Industrial Hazards, Major Power Break Downs, Traffic Accidents, Fire Hazards, Nuclear Accidents.</p> <p>Disaster profile of Indian continent. Study of recent major disasters. Disaster Management Cycle and its components.</p> <p>Disaster Management: Understanding Disasters and Hazards and related issues social and environmental. Risk and Vulnerability. Types of Disasters, their occurrence/ causes, technical terminology involved, impact and preventive measures.</p> | |
| | <p>BT106</p> | <p><u>Engineering Chemistry</u></p> <p>UNIT -I</p> <p>Water: The sources of water, common Impurities, soft and hard water, Hardness of water, degrees of hardness and its effects, determination of hardness by various techniques, Municipal Water supply, requisites of drinking water, purification of water by sedimentation, filtration, reverse osmosis (RO), sterilization, chlorination. Water for boilers, corrosion, sludge and scale formation, caustic embitterment, treatment by preheating, lime-soda process, permutit de-ionizer or demineralization.</p> <p>UNIT- II</p> <p>Electrochemistry: Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its</p> | | <p>Syllabus change Code change</p> |

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| | <p>application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells; corrosion.</p> <p>Analysis: Volumetric Analysis, Types of titrations, Theory of indicators.</p> <p>Spectral Analysis: Electromagnetic radiation, Lambert-Beer's Law, UV-VIS, IR, NMR instrumentation & applications.</p> <p>Thermal Methods of Analysis: principle, working and applications of Thermogravimetry, Differential thermal analysis and Differential scanning calorimetry.</p> <p>UNIT- III</p> <p>Fuels: The need of fuel, origin and classification of fuels, Solid fuels, coal and its constituents, calorific value and its determination, coke: carbonization process, various types of coke ovens.</p> <p>Liquid Fuels: advantages, petroleum and its refining, synthetic petrol, reforming of gasoline, knocking, octane number and anti knocking agents, cracking. Gaseous Fuels advantages, composition and calorific value of coal gas and oil gas and its determination.</p> <p>Lubricants: Need of Classification, types of lubricants, their properties and uses, lubricants, viscosity and viscosity index and flash points, cloud and pour point, emulsification</p> <p>UNIT- IV</p> <p>Phase Rule: Statement, definition of terms involved, application to one component system (water-sulphur system), two component systems (Ag-Pb systems).</p> <p>Polymers: Plastics, preparation, properties and uses of polyethylene, bakelite, terylene and nylon, Rubber; natural rubber, synthetic rubber such as butyl and neoprene rubbers, vulcanization process</p> | | |
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| | | <p>and its advantages.</p> <p>Corrosion: its significance, theories of corrosion, Galvanic cell and concentration cell, pitting and stress corrosion, protection techniques.</p> <p>UNIT-V</p> <p>Explosives: Introduction, classification of explosives, preparation of commercially important explosives, blasting fuses, uses and abuses of explosives.</p> <p>Cement: properties, Portland cement and its manufacture, chemistry of setting and hardening of cement, RCC structures.</p> <p>Refractories: definition, classification, properties of silica and fireclay refractories, Glass: preparation, properties and uses.</p> | | |
| 6 | BT107 | <p>Electrical and Electronics Lab-I</p> <p>List of Experiments</p> <p>1. Identification, Study & Testing of various electronic components:</p> <p>(a) Resistances-Variety types, Colour coding (b) Capacitors-Variety types, Coding, (c) Inductors</p> <p>(d) Diodes (e) Transistors (f) SCRs (g) ICs (h) Photo diode (i) Photo transistor (j) LED (k) LDR</p> <p>(l) Potentiometers.</p> <p>2. Study of symbols for various Electrical & Electronic Components, Devices, Circuit functions etc.</p> <p>3. Study of Analog & digital multi-meters.</p> <p>4. Study of Function/ Signal generators.</p> <p>5. Study of Regulated d. c. power supplies (constant voltage and constant current operations).</p> <p>6. Study of analog CRO, measurement</p> | <p>COMMUNICATION SKILLS LAB</p> <ol style="list-style-type: none"> 1. Phonetic Symbols and Transcriptions 2. Extempore 3. Group Discussion 4. Dialogue Writing 5. Listening Comprehension 6. Word Formation 7. Synonyms and Antonyms 8. Affixes <p>(Note: Wherever appropriate, Language Lab Software is to be used to improve listening comprehension and speaking skills.)</p> | <p>Syllabus change Title change Code change</p> |

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| | | <p>of time period, amplitude and frequency.</p> <p>7. Perform half wave rectifier experiment and effect of filters on output.</p> <p>8. Perform bridge rectifier experiment and measure the effect of filter output.</p> <p>9. Application of diode as clipper and clamper.</p> <p>10. Soldering & desoldering practice.</p> | | |
| 7 | BT108 | <p><u>Engineering Physics Lab-I</u></p> <p><u>List of Experiments</u></p> <ol style="list-style-type: none"> To study the charging of a condenser to plot a graph of voltage (V) across it against time (T) and to determine the time constant from this graph To study the discharging of a condenser to plot a graph of voltage (V) across it against time (T) and to determine the time constant from this graph. To determine the specific resistance of a material and difference between two small resistances using “Carey Foster’s Bridge “. To determine band gap of a semiconductor- diode. To study the Zener diode as a constant voltage regular. To verify Malus Law (Cosine square law) for plane polarized light with the help of a Photo voltaic cell. To determine the transmission coefficient by using Lummer Brodhum Photometer. | <p><u>ENGINEERING PHYSICS LAB</u></p> <ol style="list-style-type: none"> To determine the wave length of monochromatic light with the help of Michelson’s interferometer. To determine the wave length of sodium light by Newton’s Ring. To determine the specific rotation of glucose (sugar) solution using polarimeter. To determine the wave length of prominent lines of mercury by plane diffraction grating with the help of spectrometer. To study the variation of a semiconductor resistance with temperature and hence determine the band gap of the semi conductor in the form of reverse biased P-N junction diode. To determine the height of water tank with the help of sextant. To determine the dispersive power of material of a prim for violet and yellow colour’s of mercury light with the help of spectrometer. To study the charge and discharge of a condenser and hence determine the same constant (both current and voltage graphs are to be plotted). To verify the expression for the resolving power of a Telescope. To determine the coherence length and coherence time of laser using He – Ne laser. To determine the specific resistance of the material of a wire by Carey Froster’s bridge. | Syllabus change |

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| | | <ol style="list-style-type: none"> 8. To determine minimum deviation angle for different light using prism and spectrometer. 9. To determine the profile of He - Ne Laser beam. 10. To study the variation of thermo e.m.f. of iron copper thermo couple with temperature. 11. To determine the wavelength of sodium light using Michelson Interferometer. 12. To determine the curie temperature of Monel metal 13. The determination of viscosity. | | |
| 8. | <u>BT109</u> | <p style="text-align: center;"><u>IT FUNDAMENTAL LAB</u> <u>LIST OF EXPERIMENTS</u></p> <ol style="list-style-type: none"> 1. Dismantling a PC Part -1. 2. Dismantling a PC Part -2. 3. Internal and External commands of DOS. 4. System utilities of windows. 5. Understanding and Working knowledge of Linux/Unix OS. 6. Understanding of File system of Linux. 7. Creating user and group. 8. Understanding and Working knowledge of MS Office, Power Point and Excel: Editing and Reviewing, Drawing, Tables, Graphs, Templates. | <p style="text-align: center;"><u>COMPUTER PROGRAMMING LAB</u></p> <p>The programs shall be developed in C language related with the following concepts:</p> <ol style="list-style-type: none"> 1. Eight programs using input output statements, if statement, for loops, while loops, do-while loops, switch statement, break statement, continue statement, datatype conversion etc. 2. Check a number- palindrome, prime, etc. 3. Eight programs using functions. 4. Two programs using recursion and Iteration. | <p>Syllabus change Code change</p> |
| 9 | <u>BT110</u> | <p style="text-align: center;"><u>Engineering Chemistry Lab</u></p> <p>List of Experiments</p> <ol style="list-style-type: none"> 1. To determine the strength of a given unknown copper sulphate solution | <p style="text-align: center;"><u>COMPUTER AIDED ENGINEERING GRAPHICS</u></p> <p>1. Projections of Point & Lines: Positions of Point, Notation system, systematic Approach for projections of points, Front view & Top view of point, Positions of straight lines, line parallel to Both the RPs, Line perpendicular to either of the RPs, Line inclined to one RP and</p> | <p>Title change Code change</p> |

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| | <p>(Iodometrically) with titrate Hypo (sodium thio sulphate) solution.</p> <ol style="list-style-type: none"> 2. To determine the strength of a given unknown FAS solution with titrate potassium dichromate solution using N-phenyl anthranilic acid (internal indicator). 3. To determine the strength of a given unknown potassium dichromate solution (Iodometrically) with titrate Hypo (sodium thio sulphate) solution. 4. Determine the percentage of available chlorine in a given sample of bleaching powder. 5. Determine the amount of free chlorine in a given water sample. 6. To determine the viscosity and viscosity index of a given sample of lubricating oil using Redwood viscometer No.1 7. To determine the flash and fire point of a given sample of lubricating oil using Pensky Marten's apparatus. 8. Determine the cloud and pour point of a given sample of lubricating oil. 9. Determination of hardness of water by complexometric method (using EDTA). 10. Determine the pH of an acid (strength of an acid) pH – metrically. 11. Determine the strength of a given unknown HCl solution by titrating it against NaOH solution (Conductometric analysis). 12. To estimation the amount of sodium hydroxide and sodium carbonate in the given alkali mixture solution (or in | <p>parallel to the other, Line Inclined to Both the RPs, Traces of a line (One drawing sheet, one assignment in sketch book)</p> <ol style="list-style-type: none"> 2.Projections of planes: Positions of planes, Terms used in projections of planes, plane parallel to RP, plane inclined to one RP and perpendicular to the other RP, plane perpendicular to Both the RPs, plane Inclined to Both RPs, True shape of the plane, Distance of a point from plane, Angle between two planes (no drawing sheet required, only assignment in sketch book) 3.Projection of solids: Basic solids, Frustums and truncated solids, Positions of the solids, solid with Axis perpendicular to an RP, solid with axis inclined to one RP and parallel to the other solid with axis Inclined to Both the RPs Solid with Axis parallel to Both the RPs (One drawing sheet, one assignment in sketch book) 4.Section of solids: Theory of sectioning, section of prisms and cubes, sections of pyramids and Tetrahedron section of Cylinders, Section of cones, Section of spheres (One drawing sheet, one assignment in sketch book) 5.Development of surfaces: Methods of development, parallel line developments, Radial line Development, Anti- Development (One drawing sheet, one assignment in sketch book) 6.Isometric Projection: Principle of Isometric Projection Isometric scale, Isometric projections and Isometric Views, Isometric Views of standard shapes, Isometric views of standard solids (One drawing sheet, one assignment in sketch book) 7.Computer Aided Drafting: Introduction to CAD, Advantages of CAD software's, Auto CAD, Auto CAD Commands and tool bars, Creating the Drawing, Changing properties, Dimensioning other object, Text editing, Isometric drawing (Four assignments on the computer) | |
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| | | water sample) by titrating against an intermediate hydrochloric acid using phenolphthalein and methyl orange indicator. | | |
| 10 | BT111 | <p align="center"><u>(Engineering workshop)</u></p> <p>FITTING AND SHEET METAL SHOP</p> <ol style="list-style-type: none"> 1. Finishing of two sides of a square piece by filing and to cut a Square notch using hacksaw. 2. To drill three holes and Tapping on the given specimen. 3. Tin smithy for making mechanical joint and soldering of joint <p>WELDING SHOP</p> <ol style="list-style-type: none"> 4. To prepare Lap Joint with the help of Arc welding 5. To prepare Butt Joint with the help of arc Welding 6. Gas welding practice by students on mild steel flat <p>MACHINE SHOP PRACTICE</p> <ol style="list-style-type: none"> 7. Job on lathe M/C with centering and one step turning 8. Job on lathe M/C with grooving and chamfering operations | <p align="center"><u>MECHANICAL WORKSHOP PRACTICE</u></p> <ol style="list-style-type: none"> 1. Carpentry Shop: <ol style="list-style-type: none"> 1. T – Lap joint 2. Bridle joint 2. Foundry Shop: <ol style="list-style-type: none"> 1. Mould of any pattern 2. Casting of any simple pattern 3. Welding Shop: <ol style="list-style-type: none"> 1. Lap joint by gas welding 2. Butt joint by arc welding 3. Lap joint by arc welding 4. Demonstration of brazing, soldering & gas cutting 4. Machine Shop Practice: <ol style="list-style-type: none"> 1. Demonstration of various machine tools such as Lathe, Shaper, Milling, Grinding and Drilling 5. Fitting Shop <ol style="list-style-type: none"> 1. Finishing of two sides of a square piece by filing 2. Making mechanical joint and soldering of joint on sheet metal 3. To cut a square notch using hacksaw and to drill a hole and tapping 6. Sheet Metal Shop <ol style="list-style-type: none"> Making of Funnel using sheet metal | Title change |
| 11 | BT201 | <p align="center"><u>Engineering Physics II</u></p> <p>UNIT-I</p> | <p align="center"><u>ENGINEERING MATHEMATICS-II</u></p> <p>Unit-I</p> | <p>Syllabus change</p> <p>Title change</p> <p>Code change</p> |

Electric and Magnetic Fields :Coulomb's law, Gauss's law, electrostatic potential and field due to discrete and continuous charge distributions, dipole and quadrupole moments, dielectric polarization, electrostatic energy, conductors and capacitors, Biot-Savart law, Ampere's law, magnetic induction due to current carrying conductors, force on a charged particle in electric and magnetic field, Faraday's law of electromagnetic induction.

UNIT-II

Thermodynamics: Work- Thermodynamic definition of work, examples, displacement work, path dependence of displacement work, thermal equilibrium, Zeroth law, definition of temperature, heat/work interaction systems, First law and its consequences, isothermal and adiabatic processes, reversible, irreversible and quasi-static processes. Second law and entropy. Carnot engine and cycle. Absolute temperature scale.

UNIT-III

Optical phenomena : Principle of superposition, coherent and incoherent sources, temporal and spatial coherence, interference phenomena(Newton's ring and Michelson interferometer), diffraction of waves, diffraction from single and diffraction grating, polarization : types of polarization, Malus law, quarter and half wave plates, optical activity, specific rotation.

UNIT-IV

Lasers and Holography : Spontaneous and stimulated emission (Einstein A and B coefficients), population inversion, basic principles of operation of He-Ne, Ruby and

Linear Algebra:
Rank of a matrix, Normal forms, consistency of systems of linear simultaneous equations and its solutions, Linear dependence and independence of vectors, Eigen values and Eigen vectors, Cayley-Hamilton theorem (without proof), orthogonal matrices, diagonalization of matrix.

Unit-II

Fourier Series:

Orthogonal functions, periodic functions, Fourier series of periodic functions, Euler formula, change of intervals, Even and Odd functions, half range Fourier sine and cosine series; Harmonic analysis.

Unit-III

Differential Equations:

Linear differential equations of first order, Reducible to linear form, Exact differential equations, reducible to exact form; Linear Differential Equations of Higher order with constant coefficients, Simultaneous linear differential equations.

Unit-IV

Second order linear ODE with variable coefficients, Homogenous and exact forms, Change of dependent and independent variables; Variation of parameters, Method of Undetermined coefficients, Euler-Cauchy equations.

Unit-V

Partial Differential Equations: Order and Degree, Formation; Linear partial differential equations of first order: Lagrange's form, Standard forms, Charpit's method.

Solutions of PDE of Second order using separation of variable method.

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| | <p>semiconductor lasers. Optical Fibers : Types of optical fibers and their characteristics, characteristics of step, graded , mono mode and multi mode fibers, numerical aperture and its measurement, fiber optical communication. Principles and applications of holography</p> <p>UNIT-V</p> <p>Magnetic Materials: Magnetization- origin of magnetic moment, classification of magnetic materials- die, Para and ferromagnetism, hysteresis curve, soft and hard magnetic materials. Superconductivity: General properties of superconductors, Meissonier effect, penetration depth, type I and Type II superconductors, flux quantization, magnetic levitation, high temperature superconductors, superconducting materials, Cooper pairs and postulates of BCS theory.</p> | | |
| BT202 | <p><u>INTRODUCTION TO COMPUTER PROGRAMMING</u></p> <p>UNIT I Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC) , Assembler, linker and loader , Structure of a simple Hello World Program in C ,Overview of compilation and execution process in an IDE (preferably Code Block)</p> <p>UNIT II</p> | <p><u>HUMAN VALUES</u></p> <p>Unit-I Course Introduction - Need, Basic Guidelines, Content and Process for Value Education Understanding the need, basic guidelines, content and process for Value Education Self Exploration–what is it? - its content and process; ‘Natural Acceptance’ and Experiential Validation- as the mechanism for self exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority</p> | New course |

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| | <p>Programming using C: Preprocessor Directive, C primitive input output using get char and put char , simple I/O Function calls from library , data type in C including enumeration , arithmetic, relational and logical operations, conditional executing using if, else, switch and break .Concept of loops , for, while and do-while , Storage Classes: Auto, Register, Static and Extern</p> <p>UNIT III</p> <p>Arrays and Strings: Declaring an array, Initializing arrays, accessing the array elements, working with multidimensional arrays, declaring and initializing string variables, arithmetic operations on characters.</p> <p>Pointers: Declaring and initializing pointers, pointer expressions, pointer increment and scale factor, pointers and arrays, pointers and strings.</p> <p>UNIT IV</p> <p>Functions: Defining functions, passing arguments to functions, returning values from functions, reference arguments, variables and storage classes, static functions, pointers and functions.</p> <p>Structures: Declaring and initializing a structure, accessing the members of a structure, nested structures, array of structures, using structures in functions, pointers and structures.</p> | <p>Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario Method to fulfill the above human aspirations: understanding and living in harmony at various levels</p> <p>Unit-II</p> <p>Understanding Harmony in the Human Being - Harmony in Myself Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer) Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure Sanyam and Swasthya</p> <p>Unit-III</p> <p>Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship Understanding harmony in the Family- the basic unit of human interaction Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship Understanding the meaning of Vishwas; Difference between intention and competence Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!</p> <p>Unit-IV</p> <p>Understanding Harmony in the Nature and Existence - Whole existence as Co-existence Understanding the harmony in the Nature Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation innature Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space Holistic perception of harmony at all levels of existence Implications of the above Holistic Understanding of Harmony on</p> | |
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| | <p>UNIT V: File Handling in C Using File Pointers, fopen(), fclose(), Input and Output using file pointers, Character Input and Output with Files , String Input / Output Functions , Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files , Positioning the File Pointer.</p> | <p>Professional Ethics Natural acceptance of human values Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order</p> <p>Unit-V</p> <p>Competence in Professional Ethics: a) Ability to utilize the professional competence for augmenting universal human order, b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models Case studies of typical holistic technologies, management models and production systems Strategy for transition from the present state to Universal Human Order: a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers</p> | |
| BT203 | <p><u>ENGINEERING MECHANICS</u></p> <p>Unit I Force System: Introduction, force, principle of transmissibility of force, resultant of a force system, resolution of a force, moment of force about a line. Varignon's theorem, couple, resolution of force into force and a couple, properties of couple and their application to engineering problems. Lami's theorem. Force body diagram.</p> <p>Unit II Centroid & Moment of Inertia: Location of centroid and center of gravity, Moment of inertia, Parallel axis and perpendicular axis theorem, Radius of gyration, M.I of composite section, Polar Moment of inertia, Lifting Machines: Mechanical advantage, Velocity Ratio, Efficiency of machine, Ideal machine, Ideal effort and ideal load, Reversibility of machine, Law of machine, Lifting</p> | <p><u>ENGINEERING CHEMISTRY</u></p> <p>Unit-I Water: Common natural impurities, hardness, determination of hardness by complexometric (EDTA method), degree of hardness. Municipal water supply, requisite of drinking water, purification of water, sedimentation, filtration, sterilization, breakpoint chlorination. Water for steam making and boiler troubles, formation of solids (Scale and Sludge formation), carryover (Foaming and Priming), boiler corrosion and caustic embrittlement, Methods of boiler water treatment(water softening) preliminary treatments, preheating, Lime-Soda process, Zeolite (Permutit) process, Deionization (Demineralization) process. Numerical problems based on hardness, Lime-Soda and zeolite process.</p> <p>Unit-II Organic Fuels: Origin and classification of fuels. Solid fuels-, coal, classification of coal, significance of constituents, proximate and ultimate analyses of coal, gross and net calorific value, determination of calorific value of coal by Bomb Calorimeter. Metallurgical coke, carbonization processes- Beehive coke oven and Hoffmann Oven (by-products oven) method. Liquid fuels- Advantages of liquid fuels, petroleum and refining of petroleum, reforming, cracking, synthetic petrol, knocking, octane number, anti-knocking agents. Gaseous</p> | <p>Syllabus change Code change</p> |

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| | <p>machines; System of Pulleys, Wheel and differential axle, differential pulley Block,</p> <p>Unit III</p> <p>Friction: Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge,</p> <p>Belt Friction. Belt Drive: Types of belts, Types of belt drives, Velocity ratio, Effect of slip on Velocity ratio, Length of belt, Ratio of tensions and power transmission by flat belt drives.</p> <p>Unit IV</p> <p>Kinematics of Particles and Rigid Bodies: Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular Acceleration, Radial and transverse velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion. Newton's laws, Equation of motion in rectangular Coordinate, radial and transverse components, Equation of motion in plane for a rigid body, D'Alembert principle.</p> <p>Unit V</p> <p>Work, Energy and Power: Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Nonconservative Force, Conservation of energy.</p> <p>Impulse and Momentum: Linear and angular momentum, Linear and angular impulse, Principle</p> | <p>fuels-advantages, manufacture, composition and uses of coal gas and oil gas, determination of calorific value of gaseous fuels by Junker's calorimeter, flue gas analysis by Orsat's apparatus.</p> <p>Numerical problems based on determination of calorific value (bomb calorimeter/Junkers calorimeter/Dulong's formula, proximate analysis & ultimate and combustion of fuel.</p> <p>Unit-III Polymers: Classification, constituents, general properties of polymers and their uses. Preparation properties and uses of polyethylene, polyethylene terephthalate (PET), nylon 6, nylon 66, nylon 6, 10, Kevlar, Bakelite. Elastomers – natural rubber and vulcanization, synthetic rubbers viz. Buna-S, Buna -N, Butyl and Neoprene Rubbers. Conducting polymers-.</p> <p>Unit-IV Lubricants: Classification, types of lubrication, properties and uses. Viscosity and viscosity index, flash and fire point, cloud and pour point. Emulsification and steam emulsion number.</p> <p>Corrosion and its control: Definition and its significance. Mechanism of chemical (dry) and electrochemical (wet) corrosion, galvanic corrosion, concentration type corrosion and pitting corrosion. Protection from corrosion- protective coatings- galvanization and tinning, cathodic protection, sacrificial anode and modifications in design.</p> <p>Unit-V Inorganic Engineering Materials: Cement: Manufacture of Portland cement. Rotary kiln technology. Chemistry of hardening and setting of cement. Role of gypsum. Refractories: Definition properties and classification. Silica and fire clay refractories. Glass: Definition, type and properties of glasses. Manufacture of glass, annealing of glass. Optical fibre grade glass.</p> | |
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| | <p>of momentum for a particle and rigid body, Principle of linear impulse and momentum for a</p> <p>Particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular</p> | | |
| <p>BT204</p> | <p align="center"><u>Digital Electronics</u></p> <p>UNIT I BASIC LOGIC GATES & BOOLEAN ALGEBRA: Features of logic algebra, postulates of Boolean algebra. Theorems of Boolean algebra. Boolean function. Derived logic gates: Exclusive-OR, NAND, NOR gates, their block diagrams and truth tables. Logic diagrams from Boolean expressions and vice-versa. Converting logic diagrams to universal logic. Positive, negative and mixed logic. Logic gate conversion.</p> <p>UNIT II DIGITAL LOGIC GATE CHARACTERISTICS: TTL logic gate characteristics. Theory & operation of TTL NAND gate circuitry. Open collector TTL. Three state output logic. TTL subfamilies. MOS & CMOS logic families. Realization of logic gates in RTL, DTL, ECL, C-MOS & MOSFET. Interfacing logic families to one another.</p> <p>UNIT III MINIMIZATION TECHNIQUES: Minterm, Maxterm, Karnaugh Map, K map upto 4 variables. Simplification of logic functions with K-map, conversion of truth tables in POS and SOP form. Incomplete specified functions. Variable mapping. Quinn-Mc Klusky minimization techniques.</p> <p>UNIT IV COMBINATIONAL SYSTEMS:</p> | <p>COMPUTER PROGRAMMING-II</p> <p>Unit-I Computer System Fundamentals: System software, firmware, freeware/open-source, loader, compiler, peripherals.</p> <p>Unit-II Computer Programming: one-dimensional arrays, multi-dimensional arrays, character arrays and strings,</p> <p>Unit-III Pointers ,Pointers arithmetic, Dynamic memory allocation: functions like malloc, calloc, free.</p> <p>Unit-IV Preprocessor, command line arguments, difference between macro and inline function. Structure & Union, typedef.</p> <p>Unit-V File operations and multi-file handling, scanf()/sprintf(). Graphics using C.</p> | <p>Syllabus change Code change</p> |

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| | | <p>Combinational logic circuit design, half and full adder, subtractor. Binary serial and parallel adders. BCD adder. Binary multiplier. Decoder: Binary to Gray decoder, BCD to decimal, BCD to 7-segment decoder. Multiplexer, demultiplexer, encoder. Octal to binary, BCD to excess-3 encoder. Diode switching matrix. Design of logic circuits by multiplexers, encoders, decoders and demultiplexers.</p> <p>UNIT V</p> <p>SEQUENTIAL SYSTEMS: Latches, flip-flops, R-S, D, J-K, Master Slave flip flops. Conversions of flip-flops. Counters : Asynchronous (ripple), synchronous and synchronous decade counter, Modulus counter, skipping state counter, counter design. Ring counter. Counter applications, Registers: buffer register, shift register.</p> | | |
| | <p>BT 205</p> | <p><u>Applied Mathematics II</u></p> <p>UNIT I</p> <p>Vector spaces, linear dependence of vectors, basis and linear transformations, scalar and vector fields, level surfaces, directional derivatives, gradient, divergence and curl of fields, Green, Gauss and Stokes theorems.</p> <p>UNIT II</p> <p>Matrix algebra, rank of a matrix, adjoint and inverse of a matrix, Solution of algebraic equations using matrix algebra , consistency conditions, eigenvalues and eigenvectors , Hermitian matrices.</p> <p>UNIT III</p> <p>Numerical solution of matrix equations using Gauss, Gauss-Seidel, LU decomposition and other iterative methods.</p> <p>UNIT IV</p> <p>Convergence of improper integrals, tests of</p> | <p><u>BT 205.A BASIC ELECTRICAL AND ELECTRONICSENGINEERING</u></p> <p>Unit-I</p> <p>Basic Concepts of Electrical Engineering: Electric Current, Electromotive force, Electric Power, Ohm's Law, Basic Circuit Components, Faraday's Law of Electromagnetic Induction, Lenz's Law, Kirchhoff's laws, Network Sources, Resistive Networks, Series- Parallel Circuits, Node Voltage Method, Mesh Current Method, Superposition, Thevenin's, Norton's and Maximum Power Transfer Theorems.</p> <p>Unit-II</p> <p>Transformers: Construction, EMF equation, ratings, phasor diagram on no load and full load, equivalent circuit, regulation and efficiency calculations, open and short circuit tests, auto-transformers</p> <p>Unit-III</p> <p>Alternating Quantities: Introduction, Generation of AC Voltages, Root Mean Square and Average Value of Alternating Currents and Voltages, Form Factor and Peak Factor, Phasor Representation of Alternating Quantities, Single Phase RLC Circuits, Introduction to 3-Phase AC System.</p> | <p>Syllabus change Title change Code change</p> |

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| | | <p>convergence, elementary properties of beta and gamma functions, differentiation under integral sign, Leibnitz rule, integrals dependent on a parameter, trapezoidal and Simpson's integration rules, applications in engineering.</p> <p>UNIT V</p> <p>Numerical methods; round off and truncation errors, approximations, order of convergence, Newton's forward and backward interpolation formula, central difference interpolation, solutions of polynomial equations using bisection, Newton-Raphson and Regula-falsi methods.</p> | <p>Unit-IV Rotating Electrical Machines; DC Machines: Principle of Operation of DC Machine as Motor and Generator, EMF Equation, Applications of DC Machines. AC Machines: Principle of Operation of 3-Phase Induction Motor, 3-Phase Synchronous Motor and 3-Phase Synchronous Generator (Alternator), Applications of AC Machines.</p> <p>Unit-V Basic Electronics: Conduction in Semiconductors, Conduction Properties of Semiconductor Diodes, Behaviour of the PN Junction, PN Junction Diode, Zener Diode, Photovoltaic Cell, Rectifiers, Bipolar Junction Transistor, Field Effect Transistor, Transistor as an Amplifier. Digital Electronics: Boolean algebra, Binary System, Logic Gates and Their Truth Tables. Electrical Measuring Instruments: DC PMMC instruments, shunt and multipliers, multimeters, Moving iron ammeters and voltmeters, dynamometer, wattmeter, AC watt-hour meter, extension of instrument ranges.</p> | |
| | | | <p>BT-205.B BASIC CIVIL ENGINEERING</p> <p>Unit-I Introduction: Specialization of Civil Engineering, scope of Civil Engineering, Role of civil Engineer in Society, Impact of infrastructural development on economy of country.</p> <p>Surveying: Object & principles of Surveying.</p> <p>Unit-II Linear measurements: Direct measurements- Tape & Chain, Ranging out survey lines, taking measurements of sloping ground. Tape correction, conventional symbols. Introduction to Compass Surveying & Leveling. Introduction to total station.</p> <p>Unit-III Building & Building materials: Construction materials: Stone, Brick, Cement, Mortar, Concrete, Steel – their properties & uses.</p> <p>Unit-IV Selection of site for Buildings, types of buildings, plinth area, carpet area, floor space index, Introduction to building byelaws, concept of sun light and ventilation. Components of Buildings & their functions, Basic concept of R.C.C., Introduction to types of foundation.</p> <p>Unit-V</p> | <p>New course</p> |

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| | | | <p>Transportation, Traffic and Road Safety: Types and characteristics of various modes of transportation, various road traffic signs, causes of accidents and road safety measures.</p> | |
| | | | <p><u>BT-205.C BASIC MECHANICAL ENGINEERING</u></p> <p>Unit-I Fundamentals: Introduction to mechanical engineering, concepts of thermal engineering, mechanical machine design, industrial engineering and manufacturing technology. Steam Boilers, Steam Turbines and Power Plants: Introduction, classification and types of steam boilers and steam turbines. Discuss working of steam boilers and steam turbines. Introduction and Classification of power plants.</p> <p>Unit-II Pumps and IC Engines: Applications and working of Reciprocating and Centrifugal pumps. Introduction, Classification of IC Engines, Main Components of IC Engines, Working of IC Engines and its components.</p> <p>Unit-III Refrigeration and Air Conditioning: Introduction, classification and types of refrigeration systems and air-conditioning. Applications of refrigeration and Air-conditioning.</p> <p>Transmission of Power: Introduction and types of Belt and Rope Drives. Introduction to Gears and Gear Trains.</p> <p>Unit-IV Primary Manufacturing Processes: Metal Casting Process: Introduction to Casting Process, Patterns, Molding, Furnaces. Metal Forming Processes: Introduction to Forging, Rolling, Extrusion, Drawing. Metal Joining Processes: Introduction to various types of Welding, Gas Cutting, Brazing, and Soldering. Metal Removal or Machining Processes: Introduction to machining process and various machine tools.</p> <p>Unit-V Engineering Materials and Heat Treatment of Steel: Introduction to various engineering materials and their properties. Introduction to Heat Treatment and types of Heat Treatment Processes. Introduction to CAD, CAM, FMS, MEMS</p> | <p>New Course</p> |

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| | | | and CIM:Introduction to modern manufacturing systems and their applications. | |
| | | | <p><u>BT-205.D ENGINEERING MECHANICS</u></p> <p>Unit-I</p> <p>Statics of particles and rigid bodies: Fundamental laws of mechanics, Principle of transmissibility, System of forces, Resultant force, Resolution of force, Moment and Couples, Resolution of a force into a force and a couple, Free body diagram, Equilibrium, Conditions for equilibrium, Lami's theorem.</p> <p>Centroid & Moment of inertia (M.I): Location of centroid, Moment of inertia (mass and area), Parallel axis and perpendicular axis theorems, M.I of composite section, M.I. of solid bodies, Polar moment of inertia.</p> <p>Unit-II</p> <p>Virtual work: Principle of Virtual Work, Active forces and active force diagram, Stability of equilibrium.</p> <p>Friction: Types of Friction, Laws of friction, Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction.</p> <p>Unit-III</p> <p>Kinematics of particles and rigid bodies: Velocity, Acceleration, Types of Motion, Equations of Motion, Rectangular components of velocity and acceleration, Angular velocity and Angular acceleration, Radial and transverse velocities and accelerations, Projectiles motion on plane and Inclined Plane, Relative Motion.</p> <p>Kinetics of particles and rigid bodies: Newton's second law, Equation of motion in rectangular coordinate, Equation of motion in radial and transverse components, Equation of motion in plane for a rigid body, D'Alembert principle.</p> <p>Unit-IV</p> <p>Work, Energy and Power: Work of a force, weight, spring force and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservative and Non-conservative Force,</p> | Code change |

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| | | | <p>Conservation of energy.</p> <p>Unit-V</p> <p>Impulse and Momentum: Linear and angular momentum, Linear and angular impulse, Principle of momentum for a particle and rigid body, Principle of linear impulse and momentum for a particle and rigid body, Principle of angular momentum and Impulse, Conservation of angular momentum, Angular momentum of rigid body, Principle of impulse and momentum for a rigid body, Central impact, System of variable mass.</p> | |
| | <p>BT206-</p> | <p align="center"><u>Environmental Sciences</u></p> <p>UNIT I</p> <p>Ecosystem and Biodiversity: Components and types of ecosystem, Structure and functions of Ecosystem, Values, Type and levels of Biodiversity, Causes of extension, and Conservation methods of biodiversity.</p> <p>UNIT II</p> <p><u>Air Pollution:</u> Definition, different types of Sources, effects on biotic and abiotic components and Control methods of air pollution.</p> <p>UNIT III</p> <p><u>Water pollution:</u> Definition, different types of Sources, effects on biotic and abiotic components and treatment technologies of water pollution.</p> <p>UNIT IV</p> <p><u>Noise Pollution:</u> Introduction of noise pollution, different Sources, effects on abiotic and biotic environment and Control measures.</p> <p>UNIT V</p> <p><u>Non Conventional energy sources:</u> Introduction, Renewable Sources of Energy: Solar energy, wind energy, Energy from ocean, energy from biomass, geothermal energy and Nuclear Energy.</p> | <p>BT- 206 HUMAN VALUES: ACTIVITIES</p> <p>PS 1:</p> <p>Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your salient achievements and shortcomings in your life ? Observe and analyze them.</p> <p>PS 2:</p> <p>Now-a-days, there is a lot of talk about many technogenic maladies such as energy and material resource depletion, environmental pollution, global warming, ozone depletion, deforestation, soil degradation, etc. - all these seem to be manmade problems, threatening the survival of life Earth - What is the root cause of these maladies & what is the way out in opinion?</p> <p>On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, breakdown of relationships, generation gap, depression & suicidal attempts etc. - what do you think, is the root cause of these threats threats to human happiness and peace - what could be the way out in your opinion?</p> <p>PS 3:</p> <p>1. Observe that each of us has the faculty of ‘Natural Acceptance’, based on which one can verify what is right or not right for him. (As such we are not properly trained to listen to our ‘Natural Acceptance’ and may a time it is also</p> | <p>New course</p> |

clouded by our strong per-conditioning and sensory attractions).

Explore the following:

- (i) What is 'Naturally Acceptable' to you in relationship the feeling of respect or disrespect for yourself and for others?
- (ii) What is 'naturally Acceptable' to you - to nurture or to exploit others?

Is your living in accordance with your natural acceptance or different from it?

2. Out of the three basic requirements for fulfillment of your aspirations - right understanding, relationship and physical facilities - observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your daily routine.

PS 4:

list down all your important desires. Observe whether the desire is related to Self (I) or the Body. If it appears to be related to both, visualize which part of it is related to Self (I) and which part is related to Body.

1. a. Observe that any physical facility you use, follows the given sequence with time:

Necessary and tasteful - unnecessary but still tasteful - unnecessary and tasteless - intolerable

b. In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If not acceptable, you want it continuously and if not acceptable, you do not want it any moment!

2. List down all your important activities. Observe whether the activity is of 'I' or of Body or with the participation of both or with the participation of both 'I' and Body.

3. Observe the activities within 'I'. Identify the object of your attention for different moments (over a period of sy

5 to 10 minutes) and draw a line diagram connecting these points. Try observe the link between any two nodes.

PS 6:

1. Chalk out some programs towards ensuring your harmony with the body - in terms of nurturing, protection and right utilisation of the body.
2. Find out the plants and shrubs growing in and around your campus, which can be useful in curing common diseases.

PS 7:

Form small groups in the class and make them carry out a dialogue focusing on the following eight questions related to 'TRUST';

- 1a. Do I want to make myself happy? 2a. Do I want to make the other happy?
3a. Does the other want to make himself/herself happy? 4a. Does the other want to make me happy? What is the answer?

Intention (Natural Acceptance)

- 1b. Am I able to always make myself happy? 2b. Am I able to always make the other happy?
3b. Is the other able to always make himself/herself happy? What is the answer?

Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate yourself and others on the basis of intention/competence.

PS 8:

1. Observe, on how many occasions, you are able to respect your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under-evaluation, over-evaluation or otherwise evaluation.
2. Also, observe whether your feeling of respect is based on treating the other as you would treat yourself or on differentiations based on body, physical facilities or beliefs.

PS 9:

1. Write a narration in the form of a story, poem, skit or essay to clarify a salient

Human Value to the children.

2. Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation.

PS 10:

List down some common units (things) of Nature which you come across in your daily life and classify them in the four orders of Nature. Analysis and explain the aspect of mutual fulfillment of each unit with other orders.

PS 11:

Make a chart to show the whole existence as co-existence. With the help of this chart try to identify the role and the scope of some of the courses of your study. Also indicate the areas which are being either over-emphasized or ignored in the present context.

PS 12:

Identify any two important problems being faced by the society today and analyze the root cause of these problems. Can these be solved on the basis of natural acceptance of human values. If so, how should one proceed in this direction from the present situation?

PS 13:

1. Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order.
2. Propose a broad outline for humanistic Constitution at the level of Nation.

PS 14:

The course is going to be over now. It is time to evaluate what difference in your thinking it has made. Summarize the core message of this course grasped by you. How has this affected you in terms of;

- a. Thought
 - b. Behavior
 - c. Work and
 - d. Realization
3. What practical steps are you able to

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| | | | <p>visualize for the transition of the society from its present state.</p> <p>4.</p> <p>5.</p> <p>6. Project:</p> <p>7.</p> <p>8. Every student required to take-up a social project e.g. educating children in needy/weaker section, services in hospitals, NGO's and other such work</p> | |
| BT207 | <p><u>Electrical and Electronics Lab-II</u> <u>List of Experiment:</u></p> <ol style="list-style-type: none"> To verify the truth tables of basic logic gates: AND, OR, NOR, NAND, NOR. Also to verify the truth table of Ex-OR, Ex-NOR. To verify the truth table of OR, AND, NOR, Ex-OR, Ex-NOR realized using NAND & NOR gates. To realize an SOP and POS expression. To realize adder and Subtractor using universal gates. To verify the truth table of Encoder and decoder. To verify the truth table of multiplexer and demultiplexer. To study and perform Various types of Flip-Flops. To study and perform various types of counters. To study and perform various types of shift registers. To study and perform various types of Multivibrators. To study and perform Schmitt Trigger. | <p><u>ENGINEERING CHEMISTRY LAB</u></p> <ol style="list-style-type: none"> To determine the hardness of water by HCL method. To determine the hardness of water by EDTA method Measurement of conductivity of a given sample by conductivity meter. Study of BombCalorimeter. To determine the strength of Ferrous Ammonium sulphate solution with the help of K₂Cr₂O₇ solution. To determine the strength of CuSO₄ solution with the help of hypo solution. To determine the strength of NaOH and Na₂CO₃ in a given alkali mixture. To determine the flash and fire point of a given lubricating oil. To determine the viscosity of a given lubricating oil by Redwood viscometer. To determine cloud and pour point of lubricating oil. | Syllabus change Code change | |
| BT208 | <p><u>Engineering Physics Lab-II</u> <u>List of Experiments:</u></p> <ol style="list-style-type: none"> Conversion of a Galvanometer in to an ammeter and calibrate it. Conversion of a Galvanometer in | <p><u>COMPUTER PROGRAMMING-II LAB</u> The programs shall be developed in C language related with the following concepts:</p> <ol style="list-style-type: none"> Input roll numbers of your friends in an array & print in reverse order. | Syllabus change Code change | |

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| | | <p>to voltmeter and calibrate it.</p> <ol style="list-style-type: none"> 3. To determine the value of “g” by using compound pendulum. 4. To determine Plank’s constant using LED. 5. To measure the Numerical Aperture (NA) of an optical fiber. 6. To determine the profile of He-Ne Laser beam. 7. To determine the wavelength of different lights using diffraction grating and spectrometer. 8. To determine the wavelength of sodium light by Newton’s ring method. 9. To determine the specific rotation of glucose using Polarimeter. 10. To determine minimum deviation angle for different light using prism and spectrometer. 11. To study of detergent on surface tension of water by observing capillary rise 12. To determine the speed of sound in air at room temperature using a resonance tube by two resonance position. | <ol style="list-style-type: none"> 2. Input names of your friends in an array & print in reverse order. 3. Input two matrices and output third matrix after performing add/subtract the corresponding elements. 4. Four programs using malloc, calloc, free & scanf()/sprintf() functions. 5. Two programs using macro and online functions. 6. Two programs using structure & union. 7. Two programs using pointers. 8. Three programs belonging to file operations and multi-file handling. 9. Three programs belonging to graphics using C. | |
| | BT209 | <p><u>COMPUTER PROGRAMMING LAB</u> <u>LIST OF EXPERIMENTS</u></p> <ol style="list-style-type: none"> 1 Write a program to calculate the area & perimeter of rectangle. 2 Write a program to calculate the area and circumference of a circle for a given radius. 3 Write a program to calculate simple interest for a given principal/amount. 4 Write a program to convert temperature given in °C to temperature in °F. 5 Write a program to find profit and loss (in percentage) of a given cost price and selling price. 6 Write a program to find out the maximum among the three given numbers. 7 Write a program to calculate the factorial of a given number. 8 Write a program to print the list of first 100 odd number. 9 Write a program to calculate the sum of the digits of a number and display it | <p><u>COMPUTERS AIDED MACHINE DRAWING</u></p> <ol style="list-style-type: none"> 1.Introduction: Principles of drawing, conventional representation of machine components and materials, lines, types of lines, dimensioning types, rules of dimensioning. 2.Conversion of pictorial views into orthographic views: (1 drawing sheet) Introduction to orthographic projection, concept of first angle and third angle projection, drawing of simple machine elements in first angle projection, missing view problems. 3.Sectional view : (1 drawing sheet) Introduction, cutting plane line, type of sectional views-full section, half section, partial or broken section, revolved section, removed section, offset section, sectioning conventions- spokes, web, rib, shaft, pipes, different types of holes, conventions of section lines for different metals and materials. 4.Fasteners: (1 drawing sheet) Temporary and permanent fasteners, thread nomenclature and forms, thread series, designation, representation of threads, bolted joints, locking arrangement of | New course |

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| | <p>in reverse order.</p> <p>10 Write a program to generate a Fibonacci series.</p> <p>11 Write a program to generate the following series:</p> <pre> 1 2 1 2 3 1 2 3 4 1 2 3 4 5 </pre> <p>12 Write a program to generate the following series:</p> <pre> 0 1 0 1 0 0 1 0 1 0 1 0 1 0 </pre> <p>13 Write a program using a function to check whether the given number is prime or not.</p> <p>14 Write a program to check whether the given string is a palindrome or not.</p> <p>15 Write a program to find the length of a string, reverse the string and copy one string to another by using library function.</p> <p>16 Write a program to swap two variables a & b using pointers.</p> <p>17 Write a program to enter a line of text from keyboard and store it in the file. User should enter file name.</p> <p>18 Write a recursive program for tower of Hanoi problem</p> <p>19 Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices</p> <ul style="list-style-type: none"> • Addition of two matrices • Subtraction of two matrices • Finding upper and lower triangular matrices • Transpose of a matrix • Product of two matrices. <p>20 Write a program to copy one file to other, use command line arguments.</p> <p>21 Write a program to perform the following operators on Strings without using String functions</p> <ul style="list-style-type: none"> • To find the Length of String. • To concatenate two string. • To find Reverse of a string. • To Copy one string to another string. <p>22 Write a Program to store records of an student in student file. The data must be stored using Binary File. Read the record stored in "Student.txt" file in Binary code. Edit the record stored in</p> | <p>nuts, screws, washers, foundation bolts etc., keys, types of keys, cotter and knuckle joints. Riveted joints, rivets and riveting, types of rivets, types of riveted joints etc.</p> <p>5.Assembly drawing: (1 drawing sheet) Introduction to assembly drawing, assembly drawing of simple machine elements; like rigid or flexible coupling, muff coupling, plumber block, footstep bearing, bracket etc.</p> <p>6.Free hand sketching: Need for free hand sketching, Free hand sketching of conventional representation of materials, screw fasteners, foundation bolts, studs.</p> <p>7.Bearing: Ball, roller, needle, foot step bearing.</p> <p>8.Coupling: Protected type, flange, and pin type flexible coupling.</p> <p>9.Other components: Welded joints, belts and pulleys, pipes and pipe joints, valves etc.</p> <p>10.Computer aided drafting: Concepts of computer aided 2D drafting using any drafting software like AutoCAD/ Solid works/Creo/Catia etc., basic drawing and modify commands, making 2D drawings of simple machine parts.</p> | |
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| | | <p>Binary File.Append a record in the Student file.</p> <p>23 Write a programmed to count the no of Lowercase, Uppercase numbers and special Characters presents in the contents of File.</p> | | |
| | <u>BT210</u> | <p><u>Engineering Drawing</u></p> <p>Sheet 1 Orthographic Projections (3 Problems)</p> <p>Sheet 2 Riveted joints: Lap joints, butt joints, chain riveting, zig-zag riveting</p> <p>Sheet 3 Screw fasteners, different threads, Nuts & bolts locking devices, set screws,</p> <p>Sheet 4 Scale, plain scales, diagonal scales, scale of chords</p> <p>Sheet 5 Conic Sections: Construction of ellipse, parabola and hyperbola</p> <p>Sheet 6 Engineering Curves: Cycloid, Epicycloids, Hypo-cycloid, Involute, Archimedian and logarithmic spirals</p> <p>Sheet 7 Projection of points and lines, True inclinations and true length of straight lines, Traces of straight lines</p> <p>Sheet 8 Projection of planes and solids: Projection of planes, Projection of polyhedra, Pyramids.</p> | | Title change Code change |
| | <u>BT211</u> | <p><u>Communication Skills Lab</u></p> <ol style="list-style-type: none"> 1. Introducing yourself. 2. Role Plays. 3. Word Formation. 4. Listening and Speaking Skills. 5. Words often mis-spelt and Mis-Pronounced. 6. One word for many. 7. Synonyms and Antonyms. 8. Seminar Presentation. 9. Group Discussion. 10. Job Interview. | | Code change |
| 1 | BTCE301 | <p>BTCE 301 Advanced Engineering Mathematics</p> <p>UNIT 1</p> <p>Fourier Series & Z Transform – Expansion of simple functions in fourier series. Half range series, Change of intervals, Harmonic analysis. Introduction, Properties, Inverse Z Transform.</p> | <p>BTCE 301: ADVANCE ENGINEERING MATHEMATICS-I</p> <p>UNIT 1: Numerical Methods – 1: Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Gauss's forward and backward interpolation formulae. Stirling's Formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae. Numerical Differentiation,</p> | New Course |

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| | | <p>UNIT 2 Laplace Transform - Laplace transform with its simple properties. Unit step function, Dirac delta function their Laplace transforms, Inverse Laplace, transform – convolution theorem, applications to the solution of ordinary and partial differential equations having constant coefficients with special reference to wave and diffusion equations</p> <p>UNIT 3 Fourier Transform - Complex form of Fourier Transform and its inverse, Fourier sine and cosine transform and their inversion. Applications of Fourier Transform to solution of partial differential equations having constant co-efficient with special reference to heat equation and wave equation.</p> <p>UNIT 4 Numerical Analysis: Difference operation Forward backward and central, shift and average operators and relation between them. Newton’s forward and backward differences interpolation formulae. Sterling’s formulae, Lagrange’s interpolation formula. Numerical differentiation and integration. Trapezoidal rule, Simpson's one third and one eighth rule</p> <p>UNIT 5 Numerical integration: Numerical integration of ordinary differential equations of first order, Picards method, Euler's method & Modified Euler's Method, Mille's method and Ranga Kutta fourth order method</p> | <p>Numerical integration: Trapezoidal rule and Simpson’s 1/3rd and 3/8 rules. UNIT 2: Numerical Methods – 2: Numerical solution of ordinary differential equations: Taylor’s series, Euler and modified Euler’s methods. Runge-Kutta method of fourth order for solving first and second order equations. Milne’s and Adam’s predictor-corrector methods. Solution of polynomial and transcendental equations-Bisection method, Newton-Raphson method and Regula-Falsi method UNIT3: Laplace Transform: Definition and existence of Laplace transform, Properties of Laplace Transform and formulae, Unit Step function, Dirac Delta function, Heaviside function, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace transforms method. UNIT 4: Fourier Transform: Fourier Complex, Sine and Cosine transform, properties and formulae, inverse Fourier transforms, Convolution theorem, application of Fourier transforms to partial ordinary differential equation (One dimensional heat and wave equations only). UNIT 5: Z-Transform: Definition, properties and formulae, Convolution theorem, inverse Z-transform, application of Z-transform to difference equation.</p> | |
| 2 | BTCE3 02 | <p>BTCE 302 STRENGTH OF MATERIALS– I</p> <p>UNIT 1 Simple Stresses and Strains: Concept of stress and strain in three dimensions and generalized Hooke’s law; Young’s modulus; Tension test of mild steel and other materials: true and apparent stress, ultimate strength, yield stress and permissible stress; Stresses in prismatic & non prismatic members and in composite members; Thermal stresses; Shear stress, Shear strain, Modulus of rigidity, Complementary shear stress; Poisson’s ratio, Volumetric strain, Bulk modulus, relation between elastic constants; Stresses in composite members, Compatibility condition</p> | <p>BTCE 302: TECHNICAL COMMUNICATION / MANAGERIAL ECONOMICS AND FINANCIAL ACCOUNTING</p> <p>UNIT 1: Basic economic concepts-Meaning, nature and scope of economics, deductive vs inductive methods, static and dynamics, Economic problems: scarcity and choice, circular flow of economic activity, national income-concepts and measurement. UNIT 2: Demand and Supply analysis-Demand-types of demand, determinants of demand, demand function, elasticity of demand, demand forecasting – purpose, determinants and methods, Supply-determinants of supply, supply function, elasticity of supply. UNIT 3: Production and Cost analysis-Theory of production- production function, law of variable proportions, laws of returns to scale, production</p> | New Course |

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| | | <p>UNIT 2 Compound Stress: Two dimensional stress system: stress resultant, principal planes and principal stresses, state of pure shear maximum shear stress, Mohr's circle & its application. Moment of Inertia: Polar and product moment of inertia, Principal axes and principal moment of inertia UNIT 3 Columns: Short and long columns, slenderness ratio, crushing and buckling of column, short column subjected to axial and eccentric loads; Euler's theory and its limitation, concept of effective length of columns; Rankine & Secant formulae. Membrane Analysis: Stress and strain in thin cylindrical & spherical shells under internal pressures. UNIT 4 Bending of Beams: Types of supports, support reactions, determinate and indeterminate structures, and static stability of plane structures. Bending moment, Shear force and Axial thrust diagrams for statically. Determinate beams subjected to various types of loads and moments, Point of Contra-flexure, relation between load, SF and BM UNIT 5 Theory of simple bending: Distribution of bending and shear stresses for simple and composite sections</p> | <p>optimization, least cost combination of inputs, isoquants. Cost concepts explicit and implicit cost, fixed and variable cost, opportunity cost, sunk costs, cost function, cost curves, cost and output decisions, cost estimation UNIT 4: Market structure and pricing theory- Perfect competition, Monopoly, Monopolistic competition, Oligopoly. UNIT 5: Financial statement analysis- Balance sheet and related concepts, profit and loss statement and related concepts, financial ratio analysis, cash flow analysis, funds-flow analysis, comparative financial statement, analysis and interpretation of financial statements, capital budgeting techniques.</p> | |
| 3 | BTCE303 | <p>BTCE 303 CIVIL ENGINEERING MATERIALS</p> <p>UNIT 1 Stones: Source and types of stones, various standard test on building stones including compressive strength, water absorption, durability, impact value, tensile strength. Identification, Selection criteria and uses of common building stones. Dressing of stones. UNIT 2 Clay Products : Manufacturing of Bricks. Types and properties of bricks and their determination as per IS code such as water absorption, compressive strength, effloresces, dimension and tolerance test. Types of Tiles, Standard tests for tiles as per IS code such as water absorption, tolerance, impact value, glazing. Fly Ash: Properties, classification, use of fly-ash in manufacturing of bricks & cement. UNIT 3 Cement & Lime: Raw materials, chemical composition and manufacturing process of cement. Basic compounds (Bouge's</p> | <p>BTCE 303: ENGINEERING MECHANICS</p> <p>UNIT 1: Statics of particles and rigid bodies: Fundamental laws of mechanics, Principle of transmissibility, System of forces (conservative and non conservative), Resultant force, Resolution of force, Moment and Couples, Resolution of a force into a force and a couple, Free body diagram, Equilibrium, Conditions for equilibrium, Lami's theorem UNIT 2: Plane trusses: Types of structures, Trusses, Support Conditions, Types of Loadings, Classification of trusses, Determinacy of trusses, Basic assumptions of truss analysis (zero force member, tension or compression member), Method of joints, Method of sections. Centroid & Moment of inertia (M.I.): Location of centroid, Moment of inertia (mass and area), Parallel axis and perpendicular axis theorems, M.I. of composite section, M.I. of solid bodies, Polar moment of inertia, principle axis and principle moment of inertia. UNIT 3: Virtual work: Principle of Virtual Work, Active forces and active force diagram, Stability of equilibrium. Work, Energy and Power: Work of a force, weight and couple, Power, Efficiency, Energy, Kinetic energy of rigid body, Principle of work and energy, Conservation of energy. UNIT 4: Friction: Types of Friction, Laws of friction,</p> | New Course |

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| | | <p>compounds) of cement and their role, types of cement. Setting and hardening of cement, physical properties of cement, various standard tests on Portland cements, as per IS code including consistency, setting time, fineness, soundness and strength</p> <p>Lime: Classification as per IS, Manufacturing process, properties, standard tests of lime. Use of lime in construction. Gypsum, properties and use, Plaster of Paris.</p> <p>UNIT 4</p> <p>Mortar and Plaster: types of sand, bulking of sand, tests for sand, classification, mortar preparation methods: Functions and tests & their uses in various types pointing & plastering.</p> <p>Timber & Steel: Definitions of related terms, classifications and properties, defects in wood, conversion of wood, seasoning, preservation, fire proofing, Plywoods, fiber boards,. Steel: properties, types mild steel and HYSD steel and their use, common tests on steel various types of paints and Varnishes; white wash and distempers and their application. .</p> <p>UNIT 5</p> <p>Environmental friendly Building material: Concept of embodied energy of materials, energy used in transportation and construction process. Natural material like bamboo, rammed earth, stones, stabilized blocks; supplementary cementitious materials like blast furnace slag, silica fume, rice husk ash,; building materials from agro and industrial wastes.</p> <p>Miscellaneous: Properties, types and uses of glass, aluminum, Asbestos, G.I., plastics in construction.</p> | <p>Angle of friction, Angle of repose, Ladder, Wedge, Belt Friction. Springs: Stiffness of springs, springs in series and parallel, Introduction to laminated plate springs, leaf spring, close coiled helical springs, open coiled springs.</p> <p>UNIT 5: Simple Stresses and Strains: Concept of stress and strain in three dimensions and generalized Hooke's law; Young's modulus, Shear stress, Shear strain, Modulus of rigidity, Complementary shear stress; Poisson's ratio, Volumetric strain, Bulk modulus, relation between elastic constants, Stress and strain thin cylinder and spherical cell under internal pressure.</p> | |
| 4 | BTCE3 04 | <p>BTCE 304 ENGINEERING GEOLOGY</p> <p>UNIT 1</p> <p>General Geology: Branches and Scope of Geology, Internal Structure of the Earth, Types of Weathering & Geological work of natural agencies like River& Wind. Geological Time Scale. Physical Properties of Minerals.</p> <p>UNIT 2</p> <p>Petrology: Formation, Texture, Structure and Classification of Igneous, Sedimentary and Metamorphic Rocks. Engineering Properties of Rocks for Building & Road Material. Laboratory and Field & in-situ Test for Site Construction.</p> <p>Structural Geology: Causes, Terminology, Classification, Recognition,</p> | <p>BTCE 304: SURVEYING</p> <p>UNIT 1: LINEAR AND ANGULAR MEASUREMENTS Method of linear measurements, Correction to length measured with a chain/tape, Ranging a survey line; direct and indirect Angular measurement by compass, Designation of bearing, Traversing with tape And compass, Correction to measured bearing, Angular measurement by theodolite; Temporary adjustments, Method of horizontal angle measurement and vertical angle, Traverse computation, plotting of traverse and determining the closing error, Balancing traverse.</p> <p>UNIT 2: LEVELLING Measurements of elevations methods of levelling; direct/differential, Indirect/Trigonometrical, and Profile/Cross sectional levelling. Digital and Auto level, Errors in levelling, contours and contour lines; methods of contouring; direct and indirect, characteristics, uses, area and vol. measurements.</p> | New Course |

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| | | <p>UNIT 3 Effects and Engineering consideration of Fold, Fault, Joints and Unconformities. Dip & Strike Problems.</p> <p>UNIT 4 Engineering Geology: Geophysical methods as applied to Civil Engineering for Subsurface Analysis (Electrical and Seismic methods). Terminology, Types and Geological consideration for site selection of Dam & Tunnel.</p> <p>UNIT 5 Remote Sensing & GIS: Remote Sensing & GIS System, Nature of Electromagnetic Radiation, Electromagnetic Spectrum, Energy Interactions with Earth's Surface Materials, Remote Sensing Platforms & Sensor's Characteristics. Application, Advantages and Limitations of Remote Sensing and GIS in Various fields of Civil Engineering.</p> | <p>UNIT 3: CURVE SURVEYING Elements of simple and compound curves, Types of curves, Elements of circular, reverse, and transition curves. Method of setting out simple, circular, transition and reverse curves, Types of vertical curves, length of vertical curves, setting out vertical curves. Tangent corrections.</p> <p>UNIT 4: TACHEOMETRY AND PHOTOGRAMMETRY SURVEYING Advantages of tacheometric surveying, different systems of tacheometric measurements, Stadia system of tacheometry, distance elevation formulae for horizontal sights. Determination of tacheometric constants, distance and elevation formulae for inclined sights with staff vertical. Introduction to basic concepts perspective geometry of aerial photographs, relief and tilt displacements, Terrestrial Photogrammetry, flight planning</p> <p>UNIT 5: SETTING OUT WORKS & MODERN FIELD SURVEY SYSTEMS Instruments and methods for laying out buildings, setting out culverts, setting out sewer lines. Principle of E.D.M. (Electronic Distance Measurements), Modulation, Types of E.D.M., Distomat, Total station, parts of total station, advantages and application.</p> | |
| 5 | BTCE3 05 | <p>BTCE 305 CONSTRUCTION TECHNOLOGY</p> <p>UNIT 1 Requirements & Construction System: Building components, their functions and requirements, types of construction, load bearing construction and framed structure construction. Lift slab construction. Prefabricated/precast construction; advantages & disadvantage of prefabrication. Temporary structures: Types & methods of shoring, underpinning and scaffolding. Foundation & Site Preparation: Purpose, types of foundation, depth of foundation, Sequence of construction activity and co-ordination, site clearance, marking, foundation plan, Brick and Stone Masonry : Basic principle of sound masonry work, different types of bonds, relative merits merit and demerits of English, single Flemish and double Flemish bond. Comparison between stone and brick masonry. General principles, classification of stone masonry</p> <p>UNIT 2 Damp Proofing: Causes of dampness, effects of dampness methods and material for damp proofing DPC treatment in buildings, methods and materials for anti termite treatment. Joints : Requirements, types and material used,</p> | <p>BTCE 305: FLUID MECHANICS</p> <p>UNIT 1: Fluids: Definition, Type of fluids, Ideal fluids, real fluids, Newtonian and non-Newtonian fluids. Properties of Fluids: Units of measurement, Mass density, Specific weight, Specific volume, Specific Gravity, Viscosity, Surface tension and Capillarity, Compressibility and Elasticity.</p> <p>UNIT 2: Principles of Fluid Statics: Basic equations, Pascal Law, Type of pressure:-atmospheric pressure, Gauge pressure, vacuum pressure, absolute pressure, manometers, Bourdon pressure gauge</p> <p>UNIT 3: Buoyancy; Forces acting on immersed plane surface. Centre of pressure, forces on curved surfaces. Conditions of equilibrium for floating bodies, meta-centre and analytical determination of meta centric height.</p> <p>UNIT 4: Kinematics of Flow: Visualisation of flow, Types of flow: Steady and unsteady, uniform and non-uniform, rotational and irrotational flow, Laminar and turbulent flow, streamline, path line, streak line, principle of conservation of mass, equation of continuity, acceleration of fluid particles local and convective, velocity, acceleration, velocity potential and stream function, elementary treatment of flow net, vorticity, circulation, free and forced vortex. Fluid mass subject to horizontal and vertical acceleration and uniform rotation</p> <p>UNIT 5: Fluid Dynamics: Control volume approach, Euler's equation, Bernoulli's equation and its applications, venture-meter, orificemeter, orifices & mouthpieces, time of emptying of tanks by orifices,</p> | Course Code Changed and Content Changed |

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| | <p>construction details. Grouting of Joints of Precast reinforced Concrete Structures.</p> <p>Arches and Lintels : Terms used, types of arches and their construction detail, types of lintels and constructions. thin precast RCC lintels in Brick walls. Partition Wall : Types, purpose and use of partition wall.</p> <p>Stairs : Terms used, requirements of good staircase, classification, construction details and suitability of different types of stairs, lifts and lamps.</p> <p>UNIT 3 Fabrication and Erection Work : Fabrication of Structural steel at slopes and sites, Handling and transportation of units to be erected, Erection of Fabricated steel structures, Prefabricated/precast construction; relative advantages & disadvantage and various precast units & Erection of Precast reinforced Concrete Structures. Ground & Upper floors : Floor components and their junctions, selection of flooring and floor types, construction details of ground and upper floors, merits and demerits Roof and Roof Covering : Purposes, classification of roofs, terms used, types of pitched roofs, trussed roofs specially king port, queen port, steel roof trusses, details of steel roof trusses, method of construction, roof covering materials for pitched roofs. Thin R.C. ribbed slab for floors & roofs. Precast R.C. plank flooring/roofing.</p> <p>UNIT 4 Advance Construction Equipments :Different types of construction equipments viz. Earth moving equipments & their outputs, Dewatering equipments, Pumping equipments, Grouting equipments, Pile Driving equipments, Compaction equipments, Concreting equipments.</p> <p>UNIT 5 Equipment Management in Construction Projects:Forecasting equipment requirements, Output and capacity of equipments, Selection of equipments, Spare-parts management, Owning Costs-investment costs, depreciation, major repair cost, Operation Cost & It types. Investment Cost, Cost of Repairs, Overheads Cost accounting Break-even point theory, Replacement of equipment. Maintenance management-types of maintenance, breakdown maintenance, preventive maintenance & its functions.</p> | <p>momentum and angular momentum equations and their applications, pressure on flat plates and nozzles.</p> <p>Laminar Flow through Pipes: Laminar flow through pipes, Relation between shear & pressure gradient. Flow between plates & pipes. Hagen- Poiseuille equation, Equations for velocity distribution, pressure difference velocity distribution over a flat plate and in a pipe section,</p> <p>Darcy-Weisbach equation, friction factor , minor losses, pipe networks</p> | |
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| 6 | BTCE3 06 | <p align="center">BTCE 306 FLUID MECHANICS</p> <p>UNIT 1 Fluids: Definition, Ideal fluids, real fluids, Newtonian and non-Newtonian fluids. Properties of Fluids: Units of measurement, Mass density, Specific weight, Specific volume, Specific Gravity, Viscosity, Surface tension and Capillarity, Compressibility and Elasticity.</p> <p>UNIT 2 Hydrostatics : Pressure at a point in a static fluid; pressure variation in an incompressible static fluid; atmospheric pressure, Gauge pressure, vacuum pressure, absolute pressure, Manometers Bourdon pressure gauge. Buoyancy: Forces acting on immersed plane surface. Centre of pressure, forces on curved surfaces. Conditions of equilibrium for floating bodies, meta-centre and met centric height experimental and analytical determination of met centric height.</p> <p>UNIT 3 Equilibrium of Fluid particles and flow: Fluid mass subjected to horizontal and vertical acceleration and uniform rotation. Hydro-kinematics : Types of Flows : Steady and unsteady, uniform and non-uniform, stream lines, path lines, stream tubes, principles of conservation of mass, equation of continuity, acceleration of fluid particles local and connective, Rotational and irrotational motions, free and forced vortex, circulation and voracity velocity potential and stream function, elementary treatment of flow net. Euler's equations of motion and integration of Euler's equations, Bernoulli's equation for incompressible Fluids, assumptions in Bernoulli's equation, Energy correction factor.</p> <p>UNIT 4 Applications of Bernoulli's equation: Pitot tube, Venturimeter, orifice meter, orifices & mouth pieces, time of emptying of tanks by orifices, sharp edged rectangular, triangular and trapezoidal notches, Francis formula. Velocity of approach. End contractions Cippoletti Weir, time of emptying reservoirs by weirs. Momentum Equation and its Application: Development of momentum equation by control volume concept, Momentum correction factor, applications– Borda's mouth pieces, sudden enlargement of flow, pressure on flat plates, Nozzles.</p> <p>UNIT 5 Flow Through Pipes: Laminar flow, Reynolds experiment, transition from laminar to turbulent flow. Turbulent Flow : Laws of fluid friction, friction factor</p> | <p align="center">BTCE 306: BUILDING MATERIALS AND CONSTRUCTION</p> <p>UNIT1: Basic Civil Engineering Materials (Properties, Types and Uses): Stone: Compressive strength, Water absorption, Durability, Impact value, Tensile strength; Bricks: Water absorption, Compressive strength, Effloresces, Dimension and Tolerance; Tiles: Water absorption, Tolerance, Impact value and Glazing; Light weight concrete blocks. Lime: classification as per IS, properties, standard tests and uses in construction. Fly-ash: Properties and Use in manufacturing of bricks & cement; Miscellaneous: Gypsum, Plaster of Paris, PVC materials, Paints, Varnish and Distemper.</p> <p>UNIT 2: Timber & Steel: Timber: Definitions of related terms, Classifications and Properties, Defects in Conversion of wood, Seasoning wood, Preservation, Fire proofing, Ply woods, Fibre boards; Steel: Mild steel and HYSD steel, Properties and their use, common tests on steel. Mortar and Plaster: Mortar preparation methods: Functions and tests & their uses in various types of pointing & plastering</p> <p>UNIT 3: (A) Brick and Stone Masonry: Basic principle of masonry work, different types of bonds, relative merits and demerits of English, Single Flemish and Double Flemish bond. Comparison between stone and brick masonry. General principles, classification of stone masonry and their relative merits and demerits. (B): Building Requirements & Construction System: Building components, their functions and requirements. Types of construction: load bearing and framed structure construction, RCC beam, column and slab construction, Precast and In-situ construction, Relative merits and demerits. Fire resistance construction, FRC. Ground & Upper floors: Floor components and their functions, Floor types and Selection of flooring, construction details of ground and upper floors, merits and demerits.</p> <p>UNIT 4(A): Foundation & Site Preparation: Purpose, types of foundation: like shallow, deep, pile, raft, grillage foundation and their suitability. Depth of foundation, Sequence of construction activity and co-ordination, site clearance, layout of foundation plan. Temporary structures: Types & methods of shoring, underpinning and scaffolding. (B) Damp Proofing: Causes and Effects of dampness, Methods and materials for damp proofing, Methods and materials for anti-termite treatment. Construction and Expansion Joints: Requirements, Types material used, Construction details.</p> <p>UNIT 5(A): Arches and Lintels: Terms used, types of arches and their construction detail, types of lintels and constructions.</p> | New Course |
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| | | <p>Moodys diagram, loss of head due to friction and other causes. Hydraulic gradient, total energy line Chezy's, Darcy's and Manning's formula, flow through parallel pipes and pipes in series, flow through branched pipes. Flow along a bypass. Power transmission through pipe, condition for maximum power. Elementary water hammer concept.</p> | <p>Partition Wall: Types, purpose and use of partition wall. Stairs: Terms used, requirements of good staircase, classification, construction details and suitability of different types of stairs, Lifts and Ramps. (B): Roof and Roof Covering: Purposes, classification of roofs, terms used. Introduction to Solid slab, Flat slab, Shell Roofs and Pitched roofs, and their constructional features. Types of pitched roofs and Trusses, typical constructional details; Roof covering materials, types and typical constructional details.</p> | |
| 7 | BTCE3 07 | <p>BTCE 307 CIVIL ENGINEERING MATERIAL LAB Identification of Materials by Visual Inspection</p> <ol style="list-style-type: none"> To determine Normal Consistency, Initial & Final setting time, Specific Gravity, fineness & compressive strength of Cement (IS: 269-1967) To Study the Utilization of Fly Ash To Study the Procedure for Testing of Stone To Study the Fiber Reinforced Concrete To Study the Properties and Use Of Different Glasses To Study the Different Aluminum and Steel Sections To Study the Manufacture and Use of Concrete Hollow Blocks To Determine Compressive and Tensile Strength of Timber Parallel and Perpendicular to Grain To Study the Properties and Uses of Kota Stone To determine the Water Absorption and Tolerance Limit of Bricks | <p>BTCE 307: ENGINEERING GEOLOGY UNIT 1: General Geology: Branches and Scope of Geology, Types of Weathering & Geological work of natural agencies like River & Wind. Geological Time Scale. Physical Properties of Minerals.</p> <p>UNIT 2: Petrology: Formation, Texture, Structure and Classification of Igneous, Sedimentary and Metamorphic Rocks. Engineering Properties of Rocks for Building & Road Material. Laboratory and Field & in-situ Test for Site Construction.</p> <p>UNIT 3: Structural Geology: Causes, Terminology, Classification, Recognition, Effects and Engineering consideration of Fold, Fault, Joints and Unconformities.</p> <p>UNIT 4: Engineering Geology: Geophysical methods as applied to Civil Engineering for Subsurface Analysis (Electrical and Seismic methods). Terminology, Types and Geological consideration for site selection of Dam & Tunnel.</p> <p>UNIT 5: Remote Sensing & GIS: Application of Remote Sensing and GIS in Various fields of Civil Engineering.</p> | Course Code Changed |
| 8 | BTCE3 08 | <p>BTCE308 ENGINEERING GEOLOGY LAB</p> <ol style="list-style-type: none"> Physical Properties of Minerals Physical Properties of Rocks Identification of Minerals in Hand Specimen Identification of Rocks in Hand Specimen. Identification of Geological Features through wooden models <ol style="list-style-type: none"> Structural Geological Diagrams. Petrological Diagrams Engineering Geological Diagrams Interpretation of Geological Map (10 Nos.) Dip & Strike Problems (8 Nos.) | <p>BTCE 308: SURVEYING LAB Linear Measurement by Tape: a. Ranging and Fixing of Survey Station. b. Plotting Building Block by offset with the help of cross staff. 2. Compass Survey: Using Surveyor's and Prismatic compass a. Measurement of bearing of lines b. Adjustment of included angles of compass traverse. 3. Levelling: Using Tilting/ Dumpy/ Automatic Level a. To determine the reduced levels in closed circuit. b. To carry out profile levelling and plot longitudinal and cross sections for road. 4. Theodolite Survey: Using Vernier Theodolite a. To carryout temporary adjustment of Theodolite & Measurement of horizontal and vertical angle: by method of repetition and method of Reiteration.</p> | Course Code Changed & Content Changed |

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| | | | <p>b. To measure and adjust the angles of a braced quadrilateral.</p> <p>5. Trigonometric Levelling: To determine the Height of an object by Trigonometric levelling:</p> <p>a. By using Instruments in same vertical plane. b. By using Instruments in different vertical planes.</p> <p>6. Tacheometry Survey:</p> <p>a. To determine the tachometric constant. b. To determine the horizontal and vertical distance by tachometric survey.</p> <p>7. To study the various electronic surveying instruments like EDM, Total Station etc.</p> <p><i>One-week Survey Camp for topographic/ project survey/Contouring be arranged before or after Term End Exam.</i></p> | |
| 9 | BTCE3 09 | <p>BTCE 309 BUILDING DRAWING- I</p> <p>Building Components –</p> <p>1. Drawing of walls</p> <p>i. Brick and Stone masonry</p> <p>1. Partition wall, cavity wall and cross section of external wall</p> <p>2. Pointing, Arches, Lintels and Floors</p> <p>3. Doors and Windows</p> <p>4. Stairs, Cross section of Dog legged stairs</p> <p>5. Roofs: Flat and Inclined (Steel)</p> <p>6. Foundations for Masonry Structures and Framed Structures, Provision of Damp Proof Course</p> <p>Building Planning –</p> <p>1. Development of Front Elevation and Sectional Elevation from a given plan</p> <p>2. Development of Plan, Front Elevation and Sectional Elevation from line diagram</p> | <p>BTCE 309: FLUID MECHANICS LAB</p> <p>1. To study the various pressure measuring devices</p> <p>2. To verify the Bernoulli's theorem.</p> <p>3. To calibrate the Venturi-meter.</p> <p>4. To calibrate the Orifice-meter.</p> <p>5. To determine Metacentric Height.</p> <p>6. To determine C_c, C_v, C_d of an orifice.</p> <p>7. To determine C_d of a mouthpiece.</p> <p>8. To determine C_d of a V-notch.</p> <p>9. To determine viscosity of a given fluid.</p> <p>10. To study the velocity distribution in pipes.</p> | Course code Changed and Content Changed |
| 10 | BTCE3 10 | <p>BTCE 310 FLUID MECHANICS LAB.</p> <p>1. To verify the Bernoulli's theorem.</p> <p>2. To calibrate the Venturimeter.</p> | <p>BTCE 310: COMPUTER AIDED CIVIL ENGINEERING DRAWING</p> <p>To study and draw the labelled sketch of different Building Components on sheets with exposure to CAD:</p> <p>1. Drawing of walls</p> | Course code Changed and Content Changed |

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| | | <ol style="list-style-type: none"> 3. To calibrate the Orificemeter. 4. To determine Metacentric Height. 5. To determine Cc, Cv, Cd of an orifice. 6. To determine Cd of a mouthpiece. 7. To determine Cd of a V-notch. 8. To determine viscosity of a given fluid. 9. Bye Pass. | <ol style="list-style-type: none"> a. Brick and Stone masonry b. Cross section of external wall from foundation to parapet c. Partition wall, cavity wall and <ol style="list-style-type: none"> 2. Pointing, Arches, Lintels and Floors 3. Doors and Windows 4. Stairs, Cross section of Dog legged stairs 5. Roofs: Flat and Pitched roof (Steel truss) 6. Development of Front Elevation and Sectional Elevation from a given plan 7. Development of Plan, Front Elevation and Sectional Elevation from line Diagram | |
| 11 | BTCE311 | <p>BTCE 311 MORAL VALUES, PROFESSIONAL ETHICS AND DISASTER MANAGEMENT HUMAN VALUES:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Effect of Technological Growth and Sustainable Development. <input type="checkbox"/> Profession and Human Values: Values crisis in contemporary society. Nature of values. Psychological Values, Societal Values and Aesthetic Values. Moral and Ethical values. <p>PROFESSIONAL ETHICS:</p> <ol style="list-style-type: none"> 1. Professional and Professionalism- Professional Accountability, Role of a professional, Ethic and image of profession. 2. Engineering Profession and Ethics- Technology and society, Ethical obligations of Engineering professionals, Roles of Engineers in industry, society, nation and the world. 3. Professional Responsibilities- Collegiality, Loyalty, Confidentially, Conflict of Interest, Whistle Blowing. <p>DISASTER MANAGEMENT: Understanding Disasters and Hazards and related issues social and environmental. Risk and Vulnerability. Types of Disasters, their occurrence/ causes, impact and preventive measures:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Natural Disasters- Hydro-meteorological Based Disasters like Flood, Flash Flood, Cloud Burst, Drought, Cyclone, Forest Fires; Geological Based Disasters like Earthquake, Tsunami, Landslides, Volcanic Eruptions. <input type="checkbox"/> Man made Disasters: Chemical Industrial Hazards, Major Power Break Downs, Traffic Accidents, Fire Hazards, Nuclear Accidents. Disaster profile of Indian continent. Case studies. Disaster Management Cycle and its components. | <p>BTCE 311: CIVIL ENGINEERING MATERIALS LAB</p> <ol style="list-style-type: none"> 1. To determine properties of following materials: <ol style="list-style-type: none"> A. STONE: <ol style="list-style-type: none"> a. Compressive strength, b. Water absorption, c. Impact value, d. Tensile strength; B. Bricks: <ol style="list-style-type: none"> a. Water absorption, b. Compressive strength, c. Dimension and Tolerance; C. Tiles: <ol style="list-style-type: none"> a. Water absorption, b. Tolerance, c. Impact value D. Timber: Compressive and Tensile Strength of Timber across and along the Grain 2. To Study the Properties & Utilization of Fly Ash in Construction 3. To Study the Different Aluminum and Steel Sections 4. To Study the Manufacturing and Use of Concrete Hollow Blocks | Course code Changed and Content Changed |
| | | | BTCE 312: GEOLOGY LAB | Course code |

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| 12 | BTCE3 08 / BTCE3 12 | | 1. Physical Properties of Minerals 2. Physical Properties of Rocks 3. Identification of Minerals in Hand Specimen 4. Identification of Rocks in Hand Specimen 5. Identification of Geological features through wooden Models a. Structural Geological Diagrams b. Petrological Diagrams c. Engineering Geological Diagrams 6. Interpretation of Geological Map (10 Nos.) 7. Dip & Strike Problems (8 Nos.) | Changed |
| 13 | BTCE4 01 | <p style="text-align: center;">BTCE 401 STRENGTH OF MATERIALS–II</p> <p>UNIT 1 Deflection of Beams: Differential relation between load, shear force, bending moment, slope deflection. Slope & deflection in determinate beams using double integration method, Macaulay's method, area moment method and conjugate beam method.</p> <p>UNIT 2 Analysis of prop cantilever structures, Analysis of Indeterminate Structure using Area moment method, Conjugate beam method Combined direct and bending stress, middle third rule, core of a section, gravity retaining wall</p> <p>UNIT 3 Fixed Beams & Continuous Beams: Analysis of fixed beams & continuous beams by three moments Theorem and Area moment method.</p> <p>UNIT 4 Torsion: Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion; Springs: Stiffness of springs, springs in series and parallel, laminated plate springs, leaf spring, close coiled helical springs, open coiled springs.</p> <p>UNIT 5 Vibrations: Elementary concepts of structural vibration, Mathematical models, basic elements of vibratory system. Degree of freedom. Equivalent Spring stiffness of springs in parallel and in series. Simple Harmonic Motion: vector representation, characteristic, addition of harmonic motions, Angular oscillation. Undamped free vibration of SDOF system: Newton's law of motion, D'Almbert's principle, deriving equation of motions, solution of differential equation of motion, frequency & period of vibration, amplitude of motion; Introduction to damped and forced vibration.</p> | <p style="text-align: center;">BTCE 401 ADVANCE ENGINEERING MATHEMATICS-II</p> <p>UNIT 1 Introduction: Objective, scope and outcome of the course. Probability: Basic concepts of probability, conditional probability,</p> <p>UNIT 2 Baye's theorem. Random variable: Discrete and Continuous random variables, Joint distribution, Marginal distribution, Probability distribution function, Conditional distribution.</p> <p>UNIT 3 Mathematical Expectations: Moments, Moment Generating Functions, variance and correlation coefficients, Chebyshev's Inequality, Skewness and Kurtosis. Binomial, Poisson and Normal distribution and their properties.</p> <p>UNIT 4 Applied Statistics: Basic concept of variance, Correlation and regression – Rank correlation. Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves.</p> <p>UNIT 5 Test of significance: Large sample test for single proportion, difference of proportions, single mean, difference of means, and difference of standard deviation</p> | New Course |

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| 14 | BTCE4 02 | <p align="center">BTCE 402 CONCRETE TECHNOLOGY</p> <p>UNIT 1 Ingredients of concrete: Cement: hydration of cement and its basic compounds, structure of hydrated cement, C-S-H gel, heat of hydration, gel-space ratio and its significance. Aggregates: types, physical properties and standard methods for their determination.</p> <p>Concrete : Grade of concrete, proportioning of ingredients, water content and its quality for concrete, water/cement ratio and its role, Properties of fresh concrete including workability, air content, Flow ability, Segregation, Bleeding and Viscosity etc. - Factors affecting, methods of determination.</p> <p>UNIT 2 Properties of hardened concrete such as strengths, permeability, creep, shrinkage, factors influencing, Standard tests on fresh and hardened concrete as per IS code. Aggregate-cement interface, maturity concept. NDT: Introduction and their importance. Application & use of Rebound Hammer, Ultrasonic pulse velocity meter, Rebar & Cover meter, half cell potential meter, corrosion resistivity meter, core sampling.</p> <p>UNIT 3 Concrete Handling in Field: Batching, mixing, placing and transportation of concrete, equipments for material handling, various methods their suitability and precautions. Compaction of concrete: methods & equipments. Curing of concrete: various methods their suitability. Durability of concrete.</p> <p>UNIT 4 Concrete mix design (ACI, IS method), quality control for concrete. Admixture in</p> | <p align="center">BTCE 402: Managerial Economics & Financial Accounting/ Technical Communication</p> <p>UNIT1 Introduction to Technical Communication- Definition of technical communication, Aspects of technical communication, forms of technical communication, importance of technical communication, technical communication skills (Listening, speaking, writing, reading writing), linguistic ability, style in technical communication.</p> <p>UNIT 2 Comprehension of Technical Materials/Texts and Information Design & development- Reading of technical texts, Reading and comprehending instructions and technical manuals, Interpreting and summarizing technical texts, Note-making. Introduction of different kinds of technical documents, Information collection, factors affecting information and document design, Strategies for organization, Information design and writing for print and online media.</p> <p>UNIT 3 Technical Writing, Grammar and Editing- Technical writing process, forms of technical discourse, Writing, drafts and revising, Basics of grammar, common error in writing and speaking, Study of advanced grammar, Editing strategies to achieve appropriate technical style, Introduction to advanced technical communication. Planning, drafting and writing Official Notes, Letters, E-mail, Resume, Job Application, Minutes of Meetings.</p> <p>UNIT4 Technical Reports, types of technical reports, Characteristics and formats and structure of technical reports. Technical Project Proposals, types of technical proposals,</p> <p>UNIT 5 Advanced Technical Writing- Characteristics and formats and structure of technical proposals. Technical Articles, types of technical articles, Writing strategies, structure and formats of technical articles.</p> | New Course |
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| | | <p>concrete: Chemical and mineral admixtures, their types and uses: water reducers, accelerator, retarders, water-proofing plasticizers, super plasticizers, air-entraining agents. Use of fly ash and silica fume in concrete, their properties and effect.</p> <p>UNIT 5 Form work: Requirements, their types and codal guidelines for the design. Typical formworks and shuttering/centering for Columns, beams, slabs, walls, arches and staircase. Slip and moving formwork. Special types of concrete: Introduction to high strength concrete, high performance concrete, sulphate resisting concrete, under water concreting, self compacting concrete, pumpable concrete: their salient properties and application.</p> | | |
| 15 | BTCE403 | <p>BTCE 403 HYDRAULICS AND HYDRAULIC MACHINES</p> <p>UNIT 1 Dimensional Analysis & Models: Dynamical Similarity and Dimensional Homogeneity Model experiment, geometric, Kinematic and Dynamic similarity. Reynold's, froudes, Weber's, Euler and Mach numbers. Distorted river models and undistorted models, proper choice of scale ratios. Scale effect. Principle of dimensional analysis Rayleigh method, Buckingham theorem, applications of dimensional analysis to pipe Friction problems, resistance to motion of partially and fully submerged bodies and other simple problems. Ship model experiments.</p> <p>UNIT 2 Laminar Flow: Relation between shear & pressure gradient. Flow between plates & pipes. Equations for velocity distribution, pressure difference.</p> | <p>BTCE403: BASIC ELECTRONICS FOR CIVIL ENGINEERING APPLICATIONS</p> <p>UNIT1 Basic Electronics: Number systems & Their conversion used in digital electronics, Demorgan's theorem, Logic Gates, half and full adder circuits, R-S flip flop, J-K flip flop.</p> <p>UNIT 2 Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations.</p> <p>UNIT 3 Instrumentation: mechanical, electrical, electronic system and their calibration, Use of automatic and digital levels, electronic theodolites, total stations; Control surveys using GNSS, Total station and traversing methods (adjustment and computations of coordinates).</p> <p>UNIT 4 Measurement errors: Gross error and systematic errors, absolute and relative errors, accuracy, precision, resolution and significant figures. Full-field measurements;</p> <p>UNIT 5 Data acquisition system and data processing: analog systems, digital systems using personal computers, dynamic measurement, numerical and graphical data processing and archiving.</p> <p>UNIT 6 Sensors & Transducers: various types of sensors for displacement, velocity, acceleration, pressure, loads, strains, Displacement sensors, Mass & Piezolectric, strain gauges, Temperature sensors</p> | New Course |

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| | <p>Turbulent Flow in pipes: Theories of Turbulence, Nikuradse's Experiments.</p> <p>Hydro dynamically smooth & rough boundaries. Laminar, Sub layer, Equations of velocity distribution and friction coefficient. Stanton Diagram, Moody's diagram.</p> <p>UNIT 3 Flow through channels: Uniform, Non-Uniform and variable flow. Resistance equations of Chezy, Manning and Bazin. Section factor for uniform flow. Most Efficient rectangular, triangular and trapezoidal sections. Equations of gradually varied flow in Prismatic channels. Limitation of its applicability and assumption made in its derivation. Specific energy of flow. Critical depth in prismatic channels. Alternate depths. Rapid, critical and sub critical Flow Mild, steep and Critical Slopes. Classification of surface curves in prismatic channels and elementary computation .</p> <p>UNIT 4 Rapidly varied flow: Hydraulic jump or standing wave in rectangular channels. Conjugate or sequent depths Losses in jump, location of jump. Broad crested weirs for channel flow: Measurement, velocity distribution in open channels, parshall flume. Impact of free Jets: Impact of a jet on a flat or a curved vane, moving and stationary vane, flow over radial vanes.</p> <p>UNIT 5 Centrifugal pumps and turbines: Volute and whirlpool chambers, Loses of head due to variation of discharge Manometric and Hydraulic efficiencies, Description of single and multistage pumps. Specific speed, characteristic curves. Model Test. Reaction and Impulse turbines, specific speed,</p> | <p>thermocouple, flow sensors : Ultrasonic, electromagnetic, laser and thermal</p> <p>UNIT 7 Sensor types characteristics: types of resolution, FOV, IFOV, PSF; Geometric and radiometric distortions, Geo-referencing, re-sampling methods; Atmospheric errors and removal; Satellite orbits and characteristics; Applications of optical and microwave remote sensing techniques in Civil Engineering.</p> <p>UNIT 8 Digital Image Processing: Digital image, introduction to digital image processing, pre-processing, enhancement, classification, accuracy assessment.</p> | |
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| | | <p>Mixed flow turbines. Pelton wheel turbine, Francis turbine, propeller turbine and Kaplan turbine Efficiency, Characteristics of turbines. Basic principles of governing of turbines, Draft-tube, Selection of turbines, model tests.</p> | | |
| 16 | BTCE4 04 | <p>BTCE 404 SURVEYING – I</p> <p>UNIT 1 Introduction: Importance of surveying to engineers, Plane and geodetic surveying, methods of location of points, principle of surveying from whole to part, conventional signs. Measurement of Distances: Different types of chains, tapes and their uses. Sources of error and precautions, corrections to tape measurements. Field problems in distance measurement. Advance techniques of distance measurements.</p> <p>UNIT 2 Measurement of Angles & Direction: Different types of direction measuring instruments and their uses. Reference meridians, Bearing and azimuths, magnetic declination and its variation. Use and adjustment of surveyors and prismatic compass. Vernier and micro-optic theodolite, temporary and permanent adjustment of vernier theodolite. Measurement of horizontal and vertical angle by different methods. Application of theodolite in field problems.</p> <p>UNIT 3 Traversing: Different methods of traversing; chain traverse, chain & compass traverse, transit-tape traverse. Methods of computations and adjustment of traverse; transit rule, Bowditch rule, graphical method, axis method. Gales traverse table.</p> <p>UNIT 4 Leveling: Definitions of various terms in leveling. Different types of</p> | <p>BTCE 404: STRENGTH OF MATERIALS</p> <p>UNIT1 Simple Stresses and Strains in different members: Stresses in prismatic & non prismatic members and in composite members; Thermal stresses; Stresses in composite members, Compatibility condition. Compound Stress: Two dimensional stress system: stress resultant, principal planes and principal stresses, state of pure shear maximum shear stress, Mohr's circle & its application. Introduction to theories of failures.</p> <p>UNIT2 Bending of Beams: Bending moment, Shear force and Axial thrust diagrams for statically determinate beams subjected to various types of loads and moments, Point of Contra-flexure, relation between load, SF and BM. Theory of simple bending: Distribution of bending and shear stresses for simple and composite sections, Combined direct and bending stress,</p> <p>UNIT3 Torsion: Elementary concepts of torsion, shear stress in solid and hollow circular shafts, angle of twist, power transmitted by a shaft, combined bending and torsion;</p> <p>UNIT 4Columns: Short and long columns, slenderness ratio, crushing and buckling of column, short column subjected to axial and eccentric loads; Euler's theory and its limitation, concept of effective length of columns; Rankine & Secant formulae, middle third rule, core of a section.</p> <p>UNIT 5Deflection of Beams: Differential relation between load, shear force, bending moment, slope deflection. Slope & deflection in determinate beams using double integration method, Macaulay's method, area moment method and conjugate beam method and their application to statically determinate prismatic beams.</p> | New Course |

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| | | <p>leveling, sources of errors in leveling curvature and refraction corrections. Temporary and permanent adjustment of dumpy and tilting levels. Computation and adjustment of levels. Profile leveling; L-Section and cross-sections.</p> <p>Plane Table Surveying: Elements of plane table survey working operations methods of plane table survey; intersection, traversing and resection, two point and three point problems.</p> <p>UNIT 5 Contouring: Characteristics of contours, contour interval, contour gradient, Methods of locating contours, uses of contour maps.</p> | | |
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| 17 | BTCE4 <u>05</u> | <p style="text-align: center;">BTCE 405 BUILDING PLANNING</p> <p>UNIT 1 Introduction: Types of buildings, Classification of buildings by occupancy, Multi storey building, criteria for location and site selection, site plan and its detail. Sun Consideration: Different methods of drawing sun chart, sun shading devices, design of louvers, energy conservation in buildings, passive solar cooling and heating of buildings.</p> <p>UNIT 2 Climatic and comfort Consideration: Elements of climate, global climate, climatic zones of India, comfort conditions, biclimatic chart, climate modulating devices. Orientation: Meaning, factors affecting orientation, orientation criteria for tropical climate. Building Bye Laws and NBC Regulations: Objective of by-laws, Regulation regarding; means of access, lines of building frontages, covered area, floor area ratio, open spaces around buildings, height & sizes of rooms, plinth regulation and sanitation provisions.</p> <p>UNIT 3 Principles of Planning: Different factors affecting planning viz-aspect, prospect, furniture requirement, roominess, grouping, circulation, elegance, privacy etc. Vastu Shastra In Modern Building planning: Factors considered in Vastu, site selection, orientation, planning and design of residential buildings, office buildings.</p> <p>UNIT 4 Functional design and Accommodation requirements of (A) Residential Buildings: Anthrometry, activities</p> | <p style="text-align: center;">BTCE 405: HYDRAULICS ENGINEERING</p> <p>UNIT 1 Dimensional Analysis & Models: Dynamical Similarity and Dimensional Homogeneity Model experiment, geometric, Kinematic and Dynamic similarity. Reynold's, froudes, Weber's, Euler and Mach numbers. Distorted river models and undistorted models, proper choice of scale ratios. Scale effect. Principle of dimensional analysis Rayleigh method, Buckingham theorem.</p> <p>UNIT 2 Turbulent flow, Reynolds equations, Prandtl's mixing length theory, Equations of velocity distribution and friction coefficient Boundary Layer Theory: Concept of boundary layer, laminar and turbulent boundary layers, boundary layer thickness, von Karman integral equation, laminar sub-layer, hydro-dynamically smooth and rough boundaries, separation of flow and its control, cavitation. Open channel Flow Uniform, Non-Uniform and variable flow. Resistance equations of Chezy and Manning. Section factor for uniform flow. Most Efficient rectangular, triangular and trapezoidal sections. Velocity distribution in open channels.</p> <p>UNIT3 Gradually varied flow in Prismatic channels. Specific energy of flow. Critical depth in prismatic channels. Alternate depths. Rapid, critical and sub critical Flow Mild, steep and Critical Slopes. Classification of surface curves in prismatic channels and elementary computation Rapidly varied flow: Hydraulic jump or standing wave in rectangular channels. Conjugate or sequent depths Losses in jump, location of jump. velocity distribution in open channels. Energy correction factor. Moment correction factor</p> <p>UNIT4 Impact of free Jets: Impact of a jet on a flat or a curved vane, moving and stationary vane. Introduction of Hydraulic machine – Type of pumps and turbine and its brief description. Draft tube and its principle Hydrology: Definition, Hydrologic cycle, Application to Engineering problems, measurement of rainfall, rain gauge, peak flow, flood frequency method, catchment area formulae, Flood-hydrograph, Rainfall analysis, Infiltration, Run off, Unit hydrograph and its determination, Estimation of runoff.</p> <p>UNIT5 Ground Water: Aquifers and its types, Confined and unconfined aquifer, Darcy's Law, hydraulic conductivity, transmissivity, well hydraulics. Canal Hydraulics: Types of canals, parts of canal irrigation system, channel alignment, assessment of water requirements, estimation of channel losses, design of channels, regime and semi theoretical approaches (Kennedy's Theory, Lacey's Theory), cross section of channels, Silt control in canals.</p> | New Course |
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| | | <p>and their spatial requirements; Area planning, living area, sleeping area, service area; Bubble diagram showing sequence of arrangement of area, plan, elevation, sectional elevation.</p> <p>(B) Non Residential Buildings: viz-school buildings, rest house, primary health centers, post office, bank, College library, cinema theatres etc.</p> <p>UNIT 5 Services in Buildings (A) Lighting and ventilation, doors and windows, lifts. (B) Acoustics, sound insulation and noise control. (C) Fire fighting provisions.</p> | | |
| 18 | <u>BTCE4</u> <u>06</u> | <p>BTCE 406 QUANTITY SURVEYING & VALUATION</p> <p>UNIT 1 Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.</p> <p>UNIT 2 Rate Analysis: Task for</p> | <p>BTCE 406: BUILDING PLANNING</p> <p>UNIT1 Introduction: Types of buildings, criteria for location and site selection, site plan and its detail. Sun Consideration : Different methods of drawing sun chart, sun shading devices, design of louvers.</p> <p>UNIT 2 Climatic and comfort Consideration: Elements of climate, global climate, climatic zones of India, thermal comfort, bicultural chart, Orientation: Meaning, factors affecting orientation, orientation criteria for tropical climate.</p> <p>UNIT3 Building Bye Laws and NBC Regulations: Objective of by-laws, regulation regarding; means of access, lines of building frontages, covered area, floor area ratio, open spaces around buildings, height & sizes of rooms, plinth regulation. Principles of Planning: Different factors affecting planning viz-aspect, prospect, furniture requirement, roominess, grouping, circulation, elegance, privacy etc.</p> | Course code Changed and Content Changed |

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| | | <p>average artisan, various factors involved in the rate of an item, material and labor requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)</p> <p>UNIT 3 Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts, Services for building such as water supply, drainage and electrification.</p> <p>UNIT 4 Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building.</p> <p>UNIT 5 Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.</p> | <p>UNIT4 Vastu Shastra In Modern Building planning: Factors considered in Vastu, site selection, orientation, planning and design of residential buildings, school/hospital</p> <p>UNIT5 Functional Design And Accommodation Requirements Of Non Residential Buildings: viz-school buildings, rest house, primary health centers, post office etc.</p> <p>Services in Buildings (A) Lighting and ventilation, doors and windows, lifts. (B) Acoustics, sound insulation and noise control. (C) Fire fighting provisions</p> | |
| 19 | BTCE4 07 | <p>BTCE 407 CONCRETE TECHNOLOGY LAB.</p> <ol style="list-style-type: none"> To determine the fineness of Cement by sieving through a 90 micron I.S. Sieve. To determine the flexural strength of Concrete. To determine Soundness of cement by Le-chatelier apparatus. To determine the specific gravity of fine aggregate (sand) by Pycnometer. To determine the bulking of fine aggregate and to draw curve between water content and bulking. To determine the fineness modulus of coarse aggregates and fine aggregates by sieve analysis. To determine the workability of given concrete mix by slump test. To determine the workability o | <p>BTCE407: CONCRETE TECHNOLOGY</p> <p>UNIT1 Ingredients of concrete: Cement: hydration of cement and its basic compounds, structure of hydrated cement, C-S-H gel, heat of hydration, gel-space ratio etc. Aggregates: types, physical properties and standard methods for their determination, including Grading of aggregates as per IS. Manufactured sand- properties and IS Specifications for use in concrete.</p> <p>UNIT2 Concrete: Grade of concrete, proportioning of ingredients, water content and its quality, water/cement ratio and its role, Properties of fresh concrete including workability, air content, Flow ability, Segregation, Bleeding and Viscosity etc. Factors affecting, methods of determination. Properties of hardened concrete such as strengths, permeability, creep, shrinkage,factors influencing, Standard tests on fresh and hardened concrete as per IS code. Aggregate- cement interface, its effect on properties of concrete. Concrete mix deign (IS method)- with and without water reducing admixtures</p> <p>Unit 3 NDT: Introduction and their importance.</p> | Course code Changed |

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| | | <p>given fresh concrete mix by compaction factor test.</p> <ol style="list-style-type: none"> 9. To determine the optimum dose of super plastisizers by by Flow table test. 10. To design concrete mix of M-20 grade without admixture in accordance with I S recommendations. 11. To design concrete mix of M-40 grade with admixture in accordance with I S recommendations. 12. To determine the Elstic Modulus of Concrete. 13. To determine the Permeability of Conerte. 14. NDT | <p>Application & use of Rebound Hammer, Ultra-sonic pulse velocity meter, Rebar & Cover meter, half-cell potential meter, corrosion resistivity meter, core sampling. Interpretation of their results,</p> <p>UNIT 4 Concrete Handling in Field: Batching, mixing, placing and transportation of concrete, equipments for material handling, various methods their suitability and precautions. Compaction of concrete: methods & equipments. Curing of concrete: various methods their suitability.</p> <p>Durability of concrete. Causes of deterioration, Carbonation, Tests for durability assessment</p> <p>Admixture in concrete: Chemical and mineral admixtures, their types and uses: accelerator, retarders, water-proofing, plasticisers, super plasticizers-types, their suitability. Fly ash-properties for use in concrete, specifications of flyash as per IS 3812, and effect on properties of concrete. GGBFS, Microsilica and metakaolin- propertie, specifications and utility in concrete.</p> <p>UNIT5 Form work: Requirements, their types. Typical formworks and shuttering/centering for Columns, beams, slabs, walls, etc. Slip and moving formwork.</p> <p>Special types of concrete: Sulphate resisting concrete, under water concreting, pumpable concrete: methods and issues in making, salient properties and applications. Concretes with tailored properties-including high performance concrete, with specific properties in fresh and hardened states, self-compacting concrete-materials, mix proportioning, test methods, use and applications with case studies.</p> | |
| 20 | <u>BTCE4</u> <u>08</u> | <p>BTCE 408 HYDRAULICS LAB.</p> <ol style="list-style-type: none"> 1. To determine the minor losses. 2. To determine the friction factor. 3. To determine Cd of Broad crested wier. 4. To verify the momentum equation. 5. To determine the discharge of venturimeter. 6. To determine Manning's & Chezy's coefficient of roughness for the bed of a given flume. 7. To plot characteristics curve of hydraulic jump. 8. To plot characteristics curve of Pelton Wheel. 9. To plot characteristics curve of Centrifugal Pump. | <p>BTCE 408: MATERIAL TESTING LAB</p> <ol style="list-style-type: none"> 1. Tests on Mild steel and HYSD Bar –To determine compressive and tensile strength, yield strength, percentage elongation etc. 2. Tests on Cement and concrete cubes/ core to establish their strength 3. Hardness Test – Rockwell Hardness and Brinell Hardness 4. Impact Test – Izod and Charpy 5. Modulus of Rupture of Wooden Beam 6. Fatigue Test 7. Spring Test 8. Torsion Test | Course code Changed |
| 21 | <u>BTCE4</u> <u>09</u> | <p>BTCE 409 SURVEYING LAB. I</p> <ol style="list-style-type: none"> 1. Ranging and Fixing of Survey Station. 2. Plotting Building Block by offset with the help of cross staff. 3. To determine the magnetic bearing of a line <ol style="list-style-type: none"> a. Using surveyor's compass b. Using prismatic compass 4. Measurement and adjustment of | <p>BTCE 409: HYDRAULICS ENGINEERING LAB</p> <ol style="list-style-type: none"> 1. To determine the minor losses. 2. To determine the friction factor. 3. To determine Cd of Broad crested weir. 4. To verify the momentum equation. 5. To determine the discharge of venturimeter. 6. To determine Manning's & Chezy's coefficient of roughness for the bed of a given Channel. 7. To study and plot characteristics curve of hydraulic | Course code Changed and Content Changed |

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| | | <p>included angles of traverse using prismatic compass.</p> <ol style="list-style-type: none"> 5. To determine the reduced levels using Tilting Level/Automatic Level. 6. To determine the reduce levels in closed circuit using Dumpy Level. 7. To carry out profile leveling and plot longitudinal and cross sections for road <p>8. To carryout temporary adjustment of Theodolite & Measurement of horizontal angle. a. By method of repetition. b. By method of Reiteration</p> <p>9.To determine the horizontal and vertical distance by tachometric survey 10. To study the various minor instrument.</p> | <p>jump. 8. To study velocity distribution in open channel flow.</p> | |
| 22 | BTCE4 10 | <p>BTCE 410 BUILDING DRAWING- II</p> <p>1.To plan and draw working drawing of a Residential building with following detail.</p> <ol style="list-style-type: none"> (a) Site plan (b) Foundation plan (c) Plan (d) Two sectional elevations (e) Front elevation (f) Furniture plan (g) Water supply and sanitary plan (h) Electric fitting plan <p>2- To design and draw a Primary Health Center 3- To design and draw a Primary School 4- To design and draw a Rest House 5- To design and draw a Post Office 6- To design and draw a Bank 7- To design and draw a College Library 8- To design and draw a Cinema Theatre</p> | <p>BTCE 410: BUILDING DRAWING</p> <p>1- To plan and draw working drawing of a Residential building with following detail.</p> <ol style="list-style-type: none"> (a) Site plan (b) Foundation plan (c) Plan (d) Two sectional elevations (e) Front elevation (f) Furniture plan (g) Water supply and sanitary plan (h) Electric fitting plan <p>2- To design and draw a Primary Health Center 3- To design and draw a Primary School 4- To design and draw a Rest House 5- To design and draw a Post Office 6- To design and draw a Bank 7- To design and draw a College Library 8- To design and draw a Cinema Theatre</p> | Course code Changed |
| 23 | BTCE4 11 | <p>BTCE 411 MATERIAL TESTING LAB.</p> <ol style="list-style-type: none"> 1. Tensile Strength Test – Mild Steel and HYSD bar 2. Compressive Strength Test – Mild Steel and Cast Iron 3. Compressive Strength Test – Cement Cubes and Concrete Cubes 4. Compressive Strength Test – Bricks 5. Compressive Strength Test – Wooden Blocks 6. Hardness Test – Rockwell Hardness and | <p>BTCE 411: ADVANCED SURVEYING LAB</p> <ol style="list-style-type: none"> 1. To measure the horizontal and vertical angles by Theodolite. 2. To determine the Height of an object by trigonometric leveling (Instruments in same vertical plane). 3. To determine the Height of an object by trigonometric leveling (Instruments in different vertical planes). 4. Measurement of angles, length of survey line using Total Station, finding the coordinate of station | Course code Changed & content changed |

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| | | <p>Brinell Hardness 7. Impact Test – Izod and Charpy 8. Modulus of Rupture of Wooden Beam 9. Fatigue Test 10. Spring Test 11. Torsion Test</p> | <p>5. To measure and adjust the angles of a braced quadrilateral. 6. To prepare the map of given area by plane tabling. 7. Measurement of area of a traverse by Total Station</p> | |
| 24 | <p>BTCE4 <u>07</u> / BTCE4 12</p> | | <p>BTCE 412: CONCRETE LAB 1. To determine the fineness of Cement by Blaine's air permeability test. 2. To determine the flexural strength of Concrete. 3. To determine Soundness of cement by Le-chatelier apparatus. 4. To determine the specific gravity of fine aggregate (sand) by Pycnometer. 5. To determine the bulking of fine aggregate and to draw curve between water content and bulking. 6. Sieve analysis of coarse aggregates and fine aggregates. 7. To determine the workability of given concrete mix by slump test. 8. To determine the optimum dose of super plastisizers by Flow table test. 9. To design concrete mix of M-20 grade in accordance with I S 10262. 10. To design concrete mix of M-40 grade with super plasticizer in accordance with I S 10262. 11. To determine the Permeability of Concrete. 12. Study of Core cutter, UPV & Rebound Hammer equipment.</p> | <p>Course code Changed and Content Changed</p> |
| 25 | <p>BTCE5 01</p> | <p>BTCE501 THEORY OF STRUCTURES –I UNIT 1 Introduction to scope, objective and outcome of subject, Introduction to Indeterminate structures, Degrees of freedom per node, Static and Kinematic indeterminacy (i.e. for beams, frames & portal with & without sway etc.), Releases in structures, Maxwell's reciprocal theorem and Betti's theorem, Analysis of Statically Indeterminate Structures using Slope deflection method</p> <p>UNIT 2 Analysis of structures using Moment-distribution method applied to continuous beams and portal frames with and without inclined members</p> <p>UNIT 3 Unit load method & their</p> | <p>BTCE 501 CONSTRUCTION TECHNOLOGY AND EQUIPMENT Unit- I Introduction: Objective, scope and outcome of the course. Engineering Economy: Principle of Engineering Economy, Minimum cost point analysis, Breakeven point analysis, Depreciation and depletion Unit- II Safety in construction: Causes, classification, cost and measurement of an accident, safety programme for construction, protective equipment, accident report, Unit- III Safety measure: (a) For storage and handling of building materials.(b) Construction of elements of a building (c) In demolition of buildings; Safety lacuna in Indian scenario. Fire safety provisions as per NBC. Unit- IV Construction Planning: Need of construction planning, Constructional Resources, construction team, stages in construction, preparation of construction schedule, Job layout, inspection and quality control; Materials Management: Objective and functions of material management</p> | <p>New Course</p> |

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| | | <p>applications: deflection of determinate beams and frames, analysis of determinate and redundant frames up to two degree of redundancy, lack of fit in redundant frames.</p> <p>Introduction to Energy Methods: Strain energy for gradually applied, suddenly applied and impact loads, Strain energy due to axial loads, bending, shear and torsion;. Castiglione's theorems & their applications in analysis of determinate and redundant frames up to two degree of redundancy and trussed beams; Stresses due to temperature& lack of fit in redundant frames; deflection of determinate beams, frames using energy methods</p> <p>UNIT 4</p> <p>Column Analogy method for indeterminate structures, determination of carry over factor for non-prismatic section. Kani's Method: Analysis of beams and frames with & without sway by Kani's method</p> <p>UNIT 5</p> <p>Approximate methods for lateral loads: Analysis of multistory frames by portal method, cantilever method & factor method. Analysis of determinate space trusses by tension coefficient method.</p> | <p>Unit- V Construction Equipment and Management: Earth Moving Equipment-Bull dozers tractor pulled scrapers Power shovels Draglines clamshells; cranes; Hoes, Trenching machine types Hauling Equipment; Drilling, Blasting and Tunnelling Equipment; Pile Driving Equipment</p> | |
| 26 | BTCE5 <u>02</u> | <p>BTCE502 ENVIRONMENTAL ENGINEERING –I</p> <p>UNIT- I Introduction to scope, objective and outcome of subject. General: Environment and its components, Importance of water, Role of an Environmental Engineer, Historical overview. Water Demand: Design flow, design periods, design population, factors affecting water consumption, variation in water demand, design capacities for various</p> | <p>BTCE 502 STRUCTURE ANALYSIS-I</p> <p>Unit- I Introduction: Objective, scope and outcome of the course.</p> <p>Introduction to Indeterminate structures, Degrees of freedom per node, Static and Kinematic indeterminacy (i.e. for beams, frames & portal with & without sway etc.), Releases in structures, Maxwell's reciprocal theorem and Betti's theorem.</p> <p>Unit- II Analysis of prop cantilever structures, Analysis of Indeterminate Structure (fixed and continues beams) using Area moment method.</p> <p>Unit- III Analysis of Indeterminate Structure (fixed and</p> | New Course |

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| | | <p>water supply components.</p> <p>UNIT- II Source of water and collection works: Alternative sources i.e. rain, surface and ground water, Assessment of yield and development of the source. Quality of water: The hydrological cycle and water quality, physical, chemical and biological water quality parameters, water quality requirements, Indian Standards.</p> <p>UNIT- III Transmission of water: Hydraulics of conduits, selection of pipe materials, pipe joints, pumps, pumps station. Preliminary Treatment of Water: Historical overview of water treatment, water treatment processes (theory and application): aeration, solids separation, settling operations, coagulation, softening,</p> <p>UNIT- IV Advanced Treatment of Water: filtration, disinfection, other treatment processes, dissolved solids removal, treatment plant design, preparation of hydraulic profiles.</p> <p>UNIT- V Distribution of water: Method of distributing water, distribution reservoirs, distribution system, distribution system components, capacity and pressure requirements, design of distribution systems, hydraulic analysis of distribution systems, pumping required for water supply system. Plumbing of Building for water supply: Service connections, fixture units, ultaneous flow, design of plumbing system.</p> | <p>continues beams) using Conjugate beam method, Three moments Theorem.</p> <p>Unit- IV Analysis of Statically Indeterminate Structures using Slope deflection method and Moment distribution method applied to continuous beams and portal frames with and without inclined members</p> <p>Unit- V Vibrations: Elementary concepts of structural vibration, Mathematical models, basic elements of vibratory system. Degree of freedom. Equivalent Spring stiffness of springs in parallel and in series. Simple Harmonic Motion: vector representation, characteristic, addition of harmonic motions, Angular oscillation. Undamped free vibration of SDOF system: Newton's law of motion, D Almbert's principle, deriving equation of motions, solution of differential equation of motion, frequency & period of vibration, amplitude of motion; Introduction to damped and forced vibration.</p> | |
| 27 | <u>BTCE5</u> <u>03</u> | <p style="text-align: center;">BTCE503 GEOTECHNICAL ENGINEERING –I</p> <p>UNIT-I</p> | <p style="text-align: center;">BTCE 503 DESIGN OF CONCRETE STRUCTURES</p> <p>Unit- I</p> | <p>Course code Changed and Content Changed</p> |

Introduction to scope, objective and outcome of subject.

Soil and soil-mass constituents, water content, specific gravity, void ratio, porosity, degree of saturation, air void and air content, unit weights, density index etc. Inter-relationships of the above. Determination of index properties of soil: water content, specific gravity, particle size distribution, sieve and sedimentation analysis, consistency limits, void ratio and density index. Classification of soil for general engineering purposes: particle size, textural, H.R.B. Unified and I.S. Classification systems.

UNIT-II

Clay mineralogy: Soil structure; single grained, honeycombed, flocculent, and dispersed, structure of composite soils, clay structure; basic structure, mineral structures, structures of Illite Montmorillonite and kaolinite and their characteristics.

Soil water absorbed, capillary and free water, Darcy's law of permeability of soil and its determination in laboratory. Field pumping out tests, factors affecting permeability, permeability of stratified soil masses.

UNIT-III

Stresses in soil mass: total, effective and neutral pressure, calculation of stresses, influence of water table on effective stress, quicksand phenomenon Seepage and Seepage Pressure, Laplace's equation for seepage. Flow net and its construction. Uplift pressure, piping, principle of drainage by electro Osmosis, phreatic line, Flow net through earth dam.

UNIT-IV

Mohr's circle of stress, shearing strength of soil,

Introduction: Objective, scope and outcome of the course.

Fundamental concepts of design of RC members, assumptions. Types and function of reinforcement. Introduction to various related IS codes, Characteristic load and characteristic strength.

Working Stress Method: Working stress design philosophy. Analysis and Design of singly reinforced rectangular beam section for flexure.

Limit State Design: Limit state design philosophy. Assumptions, Analysis and design of singly reinforced, doubly reinforced rectangular beams and flanged beams for flexure using codal provisions for simply supported, cantilever, fixed and continuous beams.

Unit- II

Limit state of serviceability for deflection: control of deflection as per codal provisions of empirical coefficients.

Limit state of collapse in shear: Types of shear reinforcement and its detailing, analysis and design of shear reinforcement for prismatic sections.

Limit state of collapse in bond: concept of bond stress, anchorage length and development length. Detailing and curtailment of reinforcement as per codal provisions.

Unit- III

Slabs: Analysis and design of one way and two way slabs using LSM, Detailing of reinforcement. Check for shear and deflection.

Unit- IV

Columns: Short and long columns, their structural behaviour. Analysis and design of axially loaded short columns, using LSM. Analysis of eccentrically loaded short columns. Introduction to Pu- Mu interaction curves and their use for eccentrically loaded columns.

Unit- V

Footings: Analysis and design of Isolated column footing for axial load. Introduction to combined footing for two columns (without central beam) for axial loads using LSM.

Torsion: Analysis and Design of beams for torsion as per codal method.

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| | | <p>parameters of shear strength, Coulomb's failure envelope, determination of shear parameters by Direct Shear Box. Triaxial and unconfined compression test apparatuses. Typical stress-strain curves for soils. Typical failure envelopes for cohesion less soils and normally consolidated clay soils.</p> <p>UNIT-V</p> <p>Principles of soil compaction, laboratory compaction tests; Proctor's test Modified Proctor tests, Measurement of field compaction, field methods of compaction and its control, dry and wet of optimum, factors affecting compaction, compaction equipments. Soil stabilization, Mechanical Stabilization. Stabilization with cement, lime and bitumen.</p> | | |
| 28 | BTCE504 | <p>BTCE504 SURVEYING –II</p> <p>UNIT-I Introduction to scope, objective and outcome of subject. Trigonometric Leveling: Trigonometric leveling, Objects accessible and non accessible, Determination of levels object- when two instrument positions in same and different vertical planes. Curvature, Refraction and Axis Signal corrections, Determination of difference in elevations of points by trigonometric leveling by single observation method (angle of elevation, angle of depression), reciprocal method.</p> <p>UNIT-II Curve Surveying: Elements of circular (Simple, compound and reverse) curves, transition curves, degrees of curve, Linear and angular Methods of setting out circular and transition curves.</p> | <p>BTCE504 GEOTECHNICAL ENGINEERING</p> <p>Unit- I</p> <p>Introduction: Objective, scope and outcome of the course.</p> <p>Soil and soil-mass constituents, water content, specific gravity, void ratio, porosity, degree of saturation, air void and air content, unit weights, density index etc. Inter-relationships of the above. Determination of index properties of soil: water content, specific gravity, particle size distribution, sieve and sedimentation analysis, consistency limits, void ratio and density index. Mineral structures, structures of Illite Montmorillonites and kaolinite and their characteristics. Darcy's law of permeability of soil and its determination in laboratory. Stresses in soil mass: total, effective and neutral pressure, calculation of stresses, influence of water table on effective stress, quicksand phenomenon. Classification of soil for general engineering purposes : particle size and I.S. Classification systems.</p> <p>Unit- II Mohr's circle of stress, shearing strength of soil, parameters of shear strength, Coulomb's failure envelope, determination of shear parameters by Direct Shear Box. Tri-axial and unconfined compression test apparatuses. Principles of soil compaction, laboratory compaction tests; Proctor's test, Stresses in Soil under surface loading: Bossinesq's and Westergaard's</p> | Course code Changed and Content Changed |

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| | | <p>UNIT-III Triangulation: Merits and demerits of traversing, triangulation and trilateration. Grades of triangulation, Strength of figure, field procedure of triangulation. Reconnaissance and selection of triangulation stations. Indivisibility of stations and calculation of the heights of towers. Equipment needed for base line measurement, corrections to base line. Satellite station and base line extension.</p> <p>UNIT-IV Errors in Surveying: Classification of errors in surveying. The probability curve, its equation and properties, theory of least squares, weight, most probable value, probable errors, standard errors. Normal equation correlates.</p> <p>Adjustment of Triangulation Figures: Adjustment of levels. Adjustment of triangulation figures, Braced quadrilateral Triangle with central station. Approximate and method of least squares for figure adjustment, Trilateration.</p> <p>UNIT-V Field Astronomy: Definitions of terminology used in Astronomy, Co-ordinate Systems. Relationships between different Co-ordinate systems. Astronomical Triangle, Napier's Rule. Different methods of determination of Azimuth. Electronic distance measurement and use of Total station.</p> | <p>analysis for vertical pressure and its distribution in a soil mass. Vertical stresses due to concentrated loads, Isobar diagram, Vertical stress distribution on a horizontal plane. Influence diagram, Vertical stresses at a point under circular and rectangular loaded area. Approximate methods of obtaining vertical pressure due to surface loading. Newmark's chart,</p> <p>Unit- III</p> <p>Compressibility and Consolidation: Introduction to consolidation, comparison of compaction and consolidation, Spring Analogy Terzaghi's one dimensional consolidation theory, Degree of consolidation, consolidation test, Compressibility parameters, coefficient of consolidation. Pre-consolidation pressure and its determination. Normally, over and under consolidated soils. Methods of predicting Settlement and its rate. Total and differential Settlement.</p> <p>Unit- IV</p> <p>Stability of Slopes: Classifications of slopes, Stability analysis of infinite slopes. Stability of finite slopes by Swedish and Friction circle method. Stability analysis by Taylor's stability number, Taylor's stability number curves. Bishop's method of stability analysis. Earth Pressure: Active, passive and earth pressure at rest. Rankine's and Coulomb's theories. Rebhann's and Culman's graphical methods for active earth pressure for vertical and inclined back retaining walls, horizontal and inclined cohesion less back fill.</p> <p>Unit- V</p> <p>Bearing Capacity of Soils: Terminology related to bearing capacity, Common types of foundations. Terzaghi and Meyerhoff's theory for bearing capacity. Rankine's method for minimum depth of foundation. Skempton's method. Effect of eccentricity and water table on bearing capacity. IS code method, Plate load and penetration tests for determining bearing capacity. Introduction to pile.</p> <p>Site Investigations: Methods of explorations. Planning of Investigations, Depth of exploration, Number of boreholes, Undisturbed and Disturbed samples. Types of samplers. Brief description of procedures of sampling, Transportation and Storage of samples.</p> | |
| 29 | BTCE505 | <p>BTCE 505 BUILDING DESIGN</p> <p>UNIT-I Introduction to scope, objective and outcome of subject.</p> | <p>BTCE505 WATER RESOURCE ENGINEERING</p> <p>Unit- I</p> <p>Introduction: Objective, scope and outcome of the course.</p> | Course code Changed |

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| | | <p>Design Loads: Design loads for different types of buildings. (IS-875 part 1 &2). Load distribution & concept of load flow to different structural components.</p> <p>Structural Systems: Assumption of integrity aspect ratios & over turning resistance, strength & stiffness of buildings, symmetry and Asymmetry in building forms, Vertical and lateral load resting elements, shear walls, framed tubes and various multistory configurations.</p> <p>UNIT-II Lateral loads: Wind loads & calculation of wind load on structures (IS: 875- Part 3).</p> <p>UNIT-III Lateral loads: Earthquake loads & calculations of earthquake loads on buildings masonry & framed structures. (IS: 1893 – Part 1).</p> <p>UNIT-IV Masonry and Framed Buildings: Design of masonry buildings and framed buildings, Earthquake resistant construction of buildings, and various provisions as per IS codes; IS-4326, IS-13827, IS-13828, IS-13920, IS-13935.</p> <p>UNIT-V Mass Housing: Prefabricated construction for mass housing. Special Roofs: Introduction to folded plates, cylindrical shells, north-light shell roofs, grid and ribbed floors.</p> | <p>Introduction: Definitions, functions and advantages of irrigation, present status of irrigation in India, classification for agriculture, soil moisture and crop water relations, Irrigation water quality. Consumptive use of water, principal Indian crop seasons and water requirements.</p> <p>Unit- II Canal Irrigation: Types of canals, design of channels, regime and semi theoretical approaches (Kennedy’s Theory, Lacey’s Theory) Diversion Head works: Design for surface and subsurface flows, Bligh’s and Khosla’s methods.</p> <p>Unit- III Embankment Dams: Suitable sites, causes of failures, stability and seepage analysis, flow net, principles of design of earth dams. Gravity Dams: Force acting on a gravity dam, stability requirements.</p> <p>Unit- IV Well Irrigation: Open wells and tube wells, types of tube wells, duty of tube well water. Cross-Drainage Structure: Necessity of Cross drainage structures, their types and selection, comparative merits and demerits.</p> <p>Unit- V Hydrology: Definition, Hydrologic cycle, measurement of rainfall, Flood hydrograph, Rainfall analysis, Infiltration, Run off, Unit hydrograph and its determination.</p> | |
| 30 | BTCE506A | <p>BTCE506A GROUND IMPROVEMENT TECHNIQUES</p> <p>UNIT-I Introduction to scope, objective and outcome of subject. Introduction: Formation of soil, major soil types, collapsible soil, expansive</p> | <p>BTCE506A AIR & NOISE POLLUTION AND CONTROL</p> <p>Unit- I Introduction: Objective, scope and outcome of the course.</p> <p>Air Pollution: Air pollutants, Sources, classification, Combustion Processes and pollutant emission, Effects</p> | New Course |

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| | <p>soil, reclaimed soil, sanitary land fill, ground improvements; objective, potential.</p> <p>General principles of compaction: Mechanics, field procedure, quality control in field.</p> <p>UNIT-II Ground Improvement in Granular soil: In-place densification by (a) Vibro floatation, (b) Compaction piles in sand (c) Vibro compaction piles(d)Dynamic compaction (e) Blasting</p> <p>UNIT-III Ground improvement in cohesive soil: Preloading with or without vertical drains. Compressibility vertical and radial consolidation, Rate of consolidation, Preloading methods. Types of drains, Design of vertical drains, Construction techniques. Stone column: Function, Design principles, load carrying capacity, construction techniques, settlement of stone column foundation.</p> <p>UNIT-IV Ground Improvement by Grouting & Soil Reinforcement: Grouting in soil: Types of grout, desirable characteristics, Grouting pressure, Grouting methods. Soil Reinforcement – Mechanism, Types of reinforcing elements, Reinforcement- Soil interaction, Reinforced soil application beneath roads, foundation and retaining walls</p> <p>UNIT-V Soil Stabilization: Lime Stabilization – Base Exchange mechanism, Pozzolonic reaction, lime-soil interaction, lime columns, Design of foundation on lime column. Cement stabilization- Mechanism, amount, Age and curing. Fly ash-Lime stabilization Soil bitumen stabilization</p> | <p>on Health, vegetation, materials and atmosphere, Reactions of pollutants in the atmosphere and their effects-Smoke, smog and ozone layer disturbance, Greenhouse effect.</p> <p>Unit- II Air sampling and pollution measurement methods, principles and instruments, Ambient air quality and emission standards, Air pollution indices, Air Act, legislation and regulations, control principles.</p> <p>Unit- III Removal of gaseous pollutants by adsorption, absorption, reaction and other methods. Particulate emission control, settling chambers, cyclone separation, Wet collectors, fabric filters, electrostatic precipitators and other removal methods like absorption, adsorption, precipitation etc. Biological air pollution control technologies, Indoor air quality.</p> <p>Unit- IV Noise pollution: Basics of acoustics and specification of sound; sound power, sound intensity and sound pressure levels; plane, point and line sources, multiple sources; outdoor and indoor noise propagation; psychoacoustics and noise criteria.</p> <p>Unit- V Effects of noise on health, annoyance rating schemes; special noise environments: Infrasound, ultrasound, impulsive sound and sonic boom; noise standards and limit values; noise instrumentation and monitoring procedure. Noise indices. Noise control methods.</p> | |
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| 31 | BTCE5 06B | <p style="text-align: center;">BTCE506B ADVANCE CONCRETE TECHNOLOGY</p> <p>UNIT-I Introduction to scope, objective and outcome of subject. Concrete Production: Difference in mix proportioning for vibrator compacted concrete, pumpable and roller compacted concrete. Considerations in a plant operations in ready mixed concrete (RMC). Different types of mixers, transportation systems and pumps in RMC Rheology of Concrete: Flow ability, Segregation, Bleeding and Viscosity etc. - Factors affecting, related standards including slump flow test, v funnel test, U box test, J Ring test, Stability test, L Box test, rheometer test etc.</p> <p>UNIT-II Mineral and Chemical admixtures in Concrete: Chemical: Applications of accelerators, importance of chloride free admixtures, Typical dosages and applications, Case studies of use in tunnels. Application of Retarders, particularly in RMC applications. High range water reducing admixtures: Naphthalene and melamine based, PCE based. Principle of working. Application procedure, Shelf life, Outline of different commercial types available in Indian market (more than 10) Mineral : Flyash : Basic properties, IS 3812 specifications for use in cement and concrete. Properties of typical flyashes available in the country. Graded flyash, Pozzocrete and its applications. Ground Granulated Blast Furnace Slag (GGBFS): Basic properties, Indian standards, Applications. Ultra fine powders: Micro Silica, Metakaolin, Limestone, Calcium carbonate powders etc:</p> | <p style="text-align: center;">BTCE506B DISASTER MANAGEMENT</p> <p>Unit- I Introduction: Objective, scope and outcome of the course. Introduction: Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Natural and Manmade Disasters, Disaster and Development, and Climate Change. Types of Disasters, their occurrence/ causes, impact and preventive measures:</p> <p>Unit- II Geological Disasters: earthquakes, landslides, tsunami, mining;</p> <p>Hydro-Meteorological Disasters: floods, cyclones, lightning, thunder-storms, hail storms, avalanches, droughts, cold and heat waves.</p> <p>Unit- III Biological Disasters: epidemics, pest attacks, forest fire.;</p> <p>Technological Disasters: chemical, industrial, radiological, nuclear.</p> <p>Unit- IV Manmade Disasters: building collapse, rural and urban fire, road and rail accidents.</p> <p>Disaster profile of Indian continent, Mega Disasters of India and Lessons Learnt. Risk mapping.</p> <p>Unit- V Disaster Management Cycle: Disaster Management Cycle and its components: Pre disaster and post disaster, Paradigm Shift in Disaster Management. Safety tips for various types of disasters.</p> <p>Disaster management system in India: Disaster Management Act 2005, National Guidelines and Plans on Disaster Management; Role of Government (local, state and national), Non-Government and Inter-Governmental Agencies.</p> | Course code Changed and Content Changed |
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Basic properties, role in cement concrete and applications.

UNIT-III

Strength of Concrete:

Strength-porosity relationship, factors affecting compressive strength, behaviour of concrete under uniaxial, biaxial and triaxial stress states, Split Tensile strength and modulus of rupture -test methods and empirical formulae for their estimation as per ACI manual of concrete practice and Indian standards.

Elasticity, Creep and Shrinkage of Concrete:

Elastic behaviour, Method of determination of Elastic modulus, factors affecting modulus of elasticity, early volume change in concrete due to plastic shrinkage, autogeneous shrinkage and drying shrinkage- factors affecting them, typical values and their methods of determination. Creep of concrete- specific creep, typical values, creep recovery, factors affecting creep and its determination with ASTM procedure.

UNIT-IV

Microstructure of

Concrete: Interfacial transition zone, hydration kinetics, hydrated cement paste (hcp), ettringite, calcium hydroxide, presence of micro-cracks in concrete mass - their characteristics and significance on performance of concrete,

Penetrability of

Concrete: Permeability, sorptivity and diffusion in concrete- test methods and significance. **Durability**

of Concrete: Physical and chemical processes, recently employed methods of tests for ensuring longer and durable concrete structures like Resistivity, RCPT, etc- case studies involving decision based on rapid chloride permeability test (RCPT), DIN permeability, etc

UNIT-V

Special Aggregates: Light

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| | | <p>weight, heavy weight-their characteristics and uses in concrete. Specific purpose concretes and cement based composites: Self Compacting Concrete: Mix proportioning, EFNARC guidelines. Fiber cements and fiber reinforced cement based composites, mass concrete and polymer concrete etc.- materials, production and application areas.</p> <p>High performance concrete- performance characteristics in fresh and hardened states, production precautions - case studies of use of HPC in India: Delhi Metro construction, Mumbai – Worli Sea link project, atomic power projects, Hydro electric power projects etc. Nano Technology in Cement and Concrete: Use of nano silica, CNTs and other nano materials.</p> | | |
| 32 | BTCE506C | <p>BTCE506C SOLID WASTE MANAGEMENT</p> <p>UNIT-I</p> <p>General: Problems associated with Solid Waste Disposal. Generation of Solid Waste: Goals and objectives of solid waste management, Classification of Solid Waste. Solid Waste Generation, Factors Influencing Generation of Solid Waste, Characteristics of Solid Waste, Analysis of Solid Waste.</p> <p>UNIT-II Onsite Handling, Storage and Processing: Public Health and Aesthetics, Onsite Handling, Onsite, Storage, Dust bins, Community Containers, Container Locations, On-site Processing Methods.</p> <p>UNIT-III Solid Waste Collections, Transfer and Transport: Collection Systems, Equipment and Labor requirement, Collection Routes, Options</p> | <p>BTCE506C TOWN PLANNING</p> <p>Unit- I Introduction: Objective, scope and outcome of the course. Introduction: Definition of town planning, Evolution of towns, Objects of town planning, Economic Justification for town planning, Principles of town planning, Necessity of town planning, Origin, Growth and patterns of town development, distribution of land use, site for ideal town, powers required to enforce T.P. scheme</p> <p>Unit- II Civic Surveys: Definition, Necessity, collection of data, Types of surveys, methods adopted to collect data, Drawings, reports.</p> <p>Zoning: Definition, Use of land, Objects of zoning, Principles of zoning, Aspects, Advantages & Importance zoning, Transition zone, Zoning powers, Maps for zoning</p> <p>Unit- III Importance and Demand of housing, Classification, requirements and design of residential building, Housing agencies, Housing problems in India.</p> <p>Slums: Causes, characteristics and effects of slums, Slum clearance.</p> <p>Unit- IV Industries: Classification of industry, Concentration of industry, requirements of the industry, Industrial</p> | New Course |

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| | | <p>for Transfer and Transport Systems.</p> <p>UNIT-IV and Transport Systems. Disposal, Sanitary land filling, Composting and Incineration, Bioremediation.</p> <p>UNIT-V Recovery of Resources, Conversion, Products and Energy: Material Recovery, Energy Generation and Recovery Operation, Reuse in other industry. Industrial Solid Waste: Nature, Treatment and Disposal Methods.</p> | <p>townships.</p> <p>Public Buildings: Location, classification principle of design, town center, grouping of public buildings. Town Planning, CL-SPP/CL-DDU/Nadiad, Gujarat, INDIA 4</p> <p>Unit- V Re-planning of existing towns: Objects of re-planning, defects of existing town, data required for re-planning, Urban Renewal projects, De-centralization and Re-centralized, Garden city concept overview.</p> | |
| 33 | BTCE507 | <p>BTCE 507: ENVIRONMENTAL ENGINEERING DESIGN & Lab. -I</p> <ol style="list-style-type: none"> To determine the pH of the given sample of water. To determine the turbidity of the given sample of water To determine Total Solids of the given water sample. To determine the Total Dissolved Solids of the given water sample. To find out conductivity of the given water sample. To determine hardness of the given water sample. To find out chloride of the given water sample. To determine alkalinity of the given water sample. To find out acidity of the given water sample. To determine hardness of the given water sample. To determine the optimum dose of alum by Jar test. | <p>BTCE507A REPAIR AND REHABILITATION OF STRUCTURES</p> <p>Unit- I Introduction: Objective, scope and outcome of the course. Deterioration of Concrete Structures: Penetrability of concrete permeability, sorptivity, diffusion. Physical processes- abrasion, erosion. Chemical-carbonation, chloride and sulfate attack. Alkali – Aggregate Reaction. Corrosion- mechanism.</p> <p>Unit- II Factors affecting and Preventive measures : for all the above, including water – proofing techniques for various conditions, sacrificial anode, corrosion resistant steel, corrosion inhibitors, protective coatings etc. Cracks in Concrete and Masonry Structures- Types, patterns, measurement and preventive measures</p> <p>Unit- III Assessment of Risk/Damage in Structures: Preliminary investigation- visual, history collection etc. Detailed Investigation: core cutting, rebar locator, corrosion meter, penetration resistance, pull out tests, half-cell potential, concrete resistivity etc. Interpretation of non destructive test data from all the above tests as well as rebound hammer number and ultra sonic pulse velocity. Destructive and chemical tests- on material samples from site.</p> <p>Unit- IV Materials for Repair: polymers and resins, self curing compounds, FRP, ferro-cement- properties, selection criterion, cement based and polymer modified mortars etc Repair Techniques: Grouting, Jacketing, External bonded plates processes, limitations, design computations etc. including numerical problems.</p> | <p>Course code Changed and Content Changed</p> |

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| | | 12. To study various water supply Fittings. | <p>Unit- V Under Water Repair: Processes Case Studies: related to rehabilitation of bridge piers, heritage structures, masonry structures etc.</p> | |
| 34 | <u>BTCE5</u> <u>06A/</u> <u>BTCE5</u> <u>07B</u> | | <p>BTCE507B GROUND IMPROVEMENT TECHNIQUES</p> <p>Unit- I Introduction: Objective, scope and outcome of the course. Introduction: Formation of soil- Mechanical Weathering, Chemical weathering, types of soil- Residual soil, Transported soil, Regional soil Deposit in India, Difficult soils- Expansive soil, Collapsible soil, organic soil etc. Purpose and Principles of Ground Improvements.</p> <p>Unit- II Densification by Compaction Near Surface: Theory of compaction, Laboratory compaction tests; compaction in field, Effect of compaction on different soil properties, Factor affecting compaction in field, Measurement of density in field. Densification by Deep Compaction: (a) Vibration methods- Vibro compaction, Vibro floatation, Vibratory probes method, Blasting. (b) Displacement methods- Sand compaction piles; Dynamic compaction.</p> <p>Unit- III Modification Using Stone Columns: Introduction- Failure mechanism, load carrying capacity, settlement analysis, installation technique, Geo-synthetic -encased stone columns, Mechanism of encasement, field control of stone columns Pre-Compression and Vertical Drain: Applicability and types of pre compression. Purpose and mechanism of pre-compression by pre loading. Design procedure of pre-compression by preloading. Pre-compression by preloading with vertical drains- Principles, Advantages, and disadvantages of Vertical drains, Type of Vertical drains, Installation, Monitoring and Instrumentation of Vertical drains.</p> <p>Unit- IV Modification by Grouting: Purpose, principles and classification of grouts and their properties. Desirable characteristics of grout, Grouting methods, Planning and operation of grouting, control of grouting operations and monitoring.</p> <p>Unit- V Modification by Soil Reinforcement: Purpose of reinforced earth, Mechanism of reinforced soil, Failure mechanism of reinforced earth, Advantages of reinforced earth. Application of Reinforced Earth, Design methods of reinforced earth wall- (a) Check for External stability. Check for Internal stability.</p> | Course code Changed and Content Changed |

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| | | | <p>Miscellaneous Methods of Soil stabilization: Lime stabilization, cement stabilization, bituminous stabilization, chemical stabilization.</p> | |
| 35 | BTCE507C | | <p>BTCE507C ENERGY SCIENCE AND ENGINEERING</p> <p>Unit- I Introduction: Objective, scope and outcome of the course. Introduction to Energy Science: Scientific principles and historical interpretation to place energy use in the context of pressing societal, environmental and climate issues; Introduction to energy systems and resources; Introduction to Energy, sustainability & the environment</p> <p>Unit- II Energy Sources: Overview of energy systems, sources, transformations, efficiency, and storage. Fossil fuels (coal, oil, oil bearing shale and sands, coal gasification) - past, present & future, Remedies & alternatives for fossil fuels - biomass, wind, solar, nuclear, wave, tidal and hydrogen; Sustainability and environmental trade-offs of different energy systems</p> <p>Unit- III Energy & Environment: Energy efficiency and conservation; introduction to clean energy technologies and its importance in sustainable development; Carbon footprint, energy consumption and sustainability</p> <p>Unit- IV Civil Engineering Projects connected with the Energy Sources: Coal mining technologies, Oil exploration offshore platforms, Underground and under-sea oil pipelines, solar chimney project, wave energy caissons, coastal installations for tidal power, wind mill towers; hydro power stations above-ground and underground along with associated dams, tunnels, penstocks, etc.</p> <p>Unit- V Engineering for Energy conservation: Concept of Green Building and Green Architecture; Green building concepts; LEED ratings; Identification of energy related enterprises</p> | New Course |
| 36 | BTCE508 | <p>BTCE 508: GEOTECHNICAL ENGG.-I LABORATORY</p> <p>1. Grain size distribution by Sieve Analysis</p> <p>2. Determination of water content by Pycnometer.</p> | <p>BTCE 508 CONCRETE STRUCTURES DESIGN LAB</p> <p>1. Revision of Typical problems of BMD and SFD</p> <p>2 .Analysis and Design of singly reinforced rectangular beam section for flexure, based on Working stress design philosophy.</p> <p>3. Analysis and Design of singly reinforced rectangular beam section for flexure, based on Limit</p> | Course code Changed and Content Changed |

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| | | <p>3. Determination of specific Gravity by Pycnometer.</p> <p>4. Determination of liquid limit by Casagrande's apparatus.</p> <p>5. Determination of liquid limit by cone penetrometer.</p> <p>6. Determination of plastic limit</p> <p>7. Determination of shrinkage limit</p> <p>8. Determination of field density by core-cutter</p> <p>9. Determination of field density by sand replacement method</p> <p>10. Determination of compaction properties by standard Proctor Test Apparatus</p> <p>11. Determination of C-Ø values by Direct Shear Test Apparatus</p> <p>12. Determination of Unconfined Compressive Strength by unconfined compression Test Apparatus</p> | <p>State design philosophy</p> <p>4 .Analysis and Design of doubly reinforced rectangular beam section for flexure, based on Limit State design philosophy</p> <p>5. Analysis and Design of flanged beam section for flexure, based on Limit State design philosophy</p> <p>6. Problems on Limit state of serviceability for deflection as per codal provisions of empirical coefficients.</p> <p>7. Analysis and design of prismatic sections for shear using LSD</p> <p>8. Problems on limit state of collapse in bond</p> <p>9. Analysis and design of one way slabs using LSM,</p> <p>10. Analysis and design of two way slabs using LSM,</p> <p>11. Analysis and design of short axially loaded columns</p> <p>12. Analysis and design of footing</p> <p>13. Analysis and Design of beams for torsion as per codal method..</p> | |
| 37 | BTCE509 | <p>BTCE 509: SURVEY LAB. -II</p> <p>1. To measure the horizontal and vertical angles by Theodolite.</p> <p>2. To determine the Height of an object by trigonometric leveling (Instruments in same vertical plane).</p> <p>3. To determine the Height of an object by trigonometric leveling (Instruments in different vertical planes).</p> <p>4. To shift the R.L. of known point by double leveling.</p> <p>5. To measure and adjust the angles of a braced quadrilateral.</p> <p>6. To prepare a contour map by indirect contouring.</p> | <p>BTCE 509 GEOTECHNICAL ENGINEERING LAB</p> <p>1. Grain size distribution by sieve Analysis and Hydrometer</p> <p>2 .Determination of specific Gravity by Pycnometer.</p> <p>3. Determination of liquid limit by Casagrande's apparatus and cone penetrometer.</p> <p>4. Determination of plastic limit and shrinkage limit</p> <p>5. Determination of field density by core-cutter and sand replacement method</p> <p>6. Determination of compaction properties by standard Proctor Test Apparatus</p> <p>7. Determination of C-Ø values by unconfined compression Test Apparatus, Direct Shear Test Apparatus and Triaxial Test.</p> <p>8. To determine the differential free swell index of soil and swelling pressure of soil.</p> <p>9. To determine the CBR of soil.</p> | Course code Changed |

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| | | <ol style="list-style-type: none"> To prepare the map of given area by plane tabling. To determine the Azimuth of a given line by ex-meridian observations of Sun Survey Camp (including exercise on triangulation, topographic, or project survey) with maximum duration of 10 days | <ol style="list-style-type: none"> To determine the compressibility parameters of soil by consolidation test. To determine the permeability of soil by constant and falling head methods. Design as per syllabus of theory. | |
| 38 | BTCE5 10 | BTCE 510 : COMPUTERS AIDED BUILDING DESIGN Design Problems as syllabus of theory | BTCE510 WATER RESOURCES ENGINEERING DESIGN LAB Design as per syllabus of theory. | Course code Changed |
| 39 | BTCE5 11 | BTCE 511 : STRUCTURAL ENGINEERING LAB <ol style="list-style-type: none"> Study of friction, screw jacks, winch crabs etc. Deflection of a truss Clark-Maxwell reciprocal theorem with truss Funicular polygon for flexible cable Analysis of redundant frame Deflection of curved members Buckling of columns Clark-Maxwell reciprocal theorem with simply supported beam ILD for deflection in a steel beam using unit load method ILD for support reaction using Muller-Breslau Principle Unsymmetrical bending. Two hinged and three hinged arches. | BTCE 511 INDUSTRIAL TRAINING | New Course |
| 40 | <u>BTCE5 12</u> | | BTCE512 SOCIAL OUTREACH, DISCIPLINE & EXTRA CURRICULAR ACTIVITIES | New Course |
| 41 | BTCE6 01 | BTCE601 THEORY OF STRUCTURES – II UNIT-I Influence line diagram & Rolling load: ILD for beams & frames, Muller-Breslau principle and its application for drawing ILD, Rolling load, maximum stress resultants in a member/section, absolute maximum stress resultant in a structure. UNIT-II Arches: analysis of three | BTCE601 WIND AND SEISMIC ANALYSIS Unit-I Introduction: Objective, scope and outcome of the course. Structural Systems: Types of structures and Structure's forms, Symmetry and Asymmetry in building forms, Vertical and lateral load resting elements, shear walls, framed tubes and various multistory configurations. Unit-II Design Loads: various types of loads and relevant | New Course |

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| | | <p>hinged two hinged and fixed type parabolic arches with supports at the same level and at different levels.</p> <p>UNIT-III Cable and Suspension bridges: Analysis of cables with concentrated and continuous loading, girder.</p> <p>UNIT-IV Unsymmetrical bending: Definition, location of NA, computation of stresses and deflection, shear center and its location, Theories of Failures</p> <p>UNIT-V Introduction to matrix method, Force displacement relation, flexibility and stiffness coefficients, relation between flexibility and stiffness matrices, system approach of flexibility method and stiffness method, coordinate transformation matrix, rotation matrix, element and global stiffness matrix for pin jointed structures and beam element in 2D only</p> | <p>codes. Design loads for different types of buildings. (IS-875 part 1 & 2) & Load Flow Concept</p> <p>Unit-III Wind Loads Analysis: Wind loads & calculation of wind load on flat roof, pitched roof and single sloped roof buildings (IS: 875-Part 3).</p> <p>Unit-IV Earthquake Load Analysis: Earthquake loads & calculations of earthquake loads on framed structures. (IS: 1893 – Part 1).</p> <p>Unit-V Earthquake Resistant Construction: Typical seismic failure of masonry and RCC structures, Earthquake resistant construction of buildings, and various provisions as per IS codes; IS 4326, IS-13827, IS-13828, IS-13920, IS-13935.</p> | |
| 42 | BTCE602 | <p>BTCE 602 GEOTECHNICAL ENGINEERING – II UNIT-I Stresses in Soil under surface loading: Bossinesq’s and Westergaard’s analysis for vertical pressure and its distribution in a soil mass. Vertical stresses due to concentrated loads, Horizontal and shear stresses due to concentrated loads. Isobar diagram, Vertical stress distribution on a horizontal plane. Influence diagram. Vertical stresses at point under line load and strip load. Vertical stresses at a point under circular and rectangular loaded area. Approximate methods of obtaining vertical pressure due to surface loading. Newmark’s chart, Fensk’s Chart. Pressure bulb and its significance in Foundation exploration.</p> | <p>BTCE602 STRUCTURAL ANALYSIS-II</p> <p>Unit-I Introduction: Objective, scope and outcome of the course. Unit load method & their applications: deflection of determinate beams and frames, analysis of determinate and redundant frames up to two degree of redundancy, lack of fit in redundant frames. Introduction to Energy Methods: Strain energy for gradually applied, suddenly applied and impact loads, Strain energy due to axial loads, bending, shear and torsion;. Castiglione’s theorems & their applications in analysis of determinate and redundant frames up to two degree of redundancy and trussed beams; Stresses due to temperature & lack of fit in redundant frames; deflection of determinate beams, frames using energy methods.</p> <p>Unit-II Influence line diagram & Rolling load: ILD for beams & frames, Muller-Breslau principle and its application for drawing ILD, Rolling load, maximum</p> | New Course |

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| | <p>Contact pressure below foundations.</p> <p>UNIT-II</p> <p>Compressibility and Consolidation: Introduction to consolidation, comparison of compaction and consolidation, Spring Analogy. Terzaghi's one dimensional consolidation theory, Degree of consolidation, consolidation test, Compressibility parameters, co-efficient of consolidation. Preconsolidation pressure and its determination. Normally, Over and Under consolidated soils. Methods of computation of Settlement and its rate. Coefficient of consolidation for layered soil. Total and differential Settlement.</p> <p>Preconsolidation pressure and its determination. Normally, Over and Under consolidated soils. Methods of computation of Settlement and its rate. Coefficient of consolidation for layered soil. Total and differential Settlement.</p> <p>UNIT-III</p> <p>Stability of Slopes: Classifications of slopes, Stability analysis of infinite slopes. Stability analysis of finite slopes by Swedish and Friction circle method. Stability analysis by Taylor's stability number, Taylor stability number curves. Stability of slopes of earthen embankments under sudden draw down, steady seepage and during construction. Bishop's method of stability analysis.</p> <p>UNIT-IV</p> <p>Earth Pressure: Active, passive and earth pressure at rest. Rankine's and Coulomb's theories of earth pressure. Rebhann's and Culman's graphical methods for active earth pressure for vertical and</p> | <p>stress resultants in a member/section, absolute maximum stress resultant in a structure.</p> <p>Unit-III</p> <p>Arches: analysis of three hinged two hinged and fixed type parabolic arches with supports at the same level and at different levels.</p> <p>Unit-IV</p> <p>Unsymmetrical bending: Definition, location of NA, computation of stresses and deflection, shear centre and its location,</p> <p>Unit-V</p> <p>Approximate methods for lateral loads: Analysis of multistory frames by portal method, cantilever method & factor method. Analysis of determinate space trusses by tension coefficient method</p> | |
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| | | <p>inclined back retaining walls, horizontal and inclined cohesion less back fill. Earth pressure on cantilever sheet piles Stability analysis of retaining walls.</p> <p>UNIT-V Bearing Capacity of Soils: Terminology related to bearing capacity, Common types of foundations. Terzaghi and Meyehoff's theory for bearing capacity. Rankine's method for minimum depth of foundation. Skempton's method. Effect of eccentricity and water table on bearing capacity. Plate load and penetration tests for determining bearing capacity. Introduction to pile, well and machine Foundations. Site Investigations: Methods of explorations. Planning of Investigations, Depth of exploration, Number of boreholes, Undisturbed and Disturbed samples. Types of samplers. Brief description of procedures of sampling, Transportation and Storage of samples. Geophysical methods of investigations.</p> | | |
| 43 | BTCE603 | <p>BTCE603 ENVIRONMENTAL ENGINEERING –II</p> <p>UNIT I General: Terms: sewerage, domestic sewage, sewage treatment, disposal scope, Role of an Environmental engineer, historical overview. Sewage Characteristics: Quality parameters: BOD, COD, TOC, Solids, DO, Nitrogen, Phosphorus, Standards of disposal into natural watercourses and on land, Indian standards.</p> <p>UNIT II Collection of Sewage: Systems of sewerage, Separate, combined, and partially separate, components of sewerage systems, systems of layout,</p> | <p>BTCE603 ENVIRONMENTAL ENGINEERING</p> <p>Unit-I</p> <p>Introduction: Objective, scope and outcome of the course. <i>Water:</i> -Sources of Water and quality issues, water quality requirement for different beneficial uses, Water quality standards, water quality indices. Water Supply systems, Need for planned water supply schemes, Water demand industrial and agricultural water requirements, Components of water supply system; Transmission of water, Distribution system, Various valves used in W/S systems, service reservoirs and design.</p> <p>Unit-II</p> <p>Water Treatment: aeration, sedimentation, coagulation flocculation, filtration, disinfection, advanced treatments like adsorption, ion exchange, membrane processes.</p> | Course code Changed and Content Changed |

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| | | <p>quantity of sanitary sewage and variations, quantity of storms water, rational method, shapes of sewer, Hydraulic design of sewers: diameter self cleansing velocity and slopes, construction and testing of sewer line, Sewer materials, joints and appurtenances, Sewage pumping and pumping stations, maintenance of sewerage system.</p> <p>UNIT III Sewage Treatment: Various units: their purpose, sequence and efficiencies, preliminary treatment, screening and grit removal units, oil and grease removal, primary treatment, secondary treatment, activated sludge process, trickling filter, sludge digestion and drying beds, stabilization pond, septic tank, soakage systems, recent trends in sewage treatment, advanced wastewater treatment :nutrient removal, solids removal.</p> <p>UNIT IV Wastewater Disposal and Reuse: Disposal of sewage by dilution, self-purification of streams, sewage disposal by irrigation sewage farming, waste waters reuse. Plumbing for Design of Buildings: Various systems of plumbing–one pipe, two pipes, single stack, traps, layout of house drainage.</p> <p>UNIT V Air and Noise Pollution: Air quality, Emission standards, vehicular pollution, Effect of air pollution on human health, Noise Pollution, global effect of air and noise pollution, green house effect, acid rain etc.</p> | <p>Unit-III Sewage- Domestic and Storm water, Quantity of Sewage, Sewage flow variations. Conveyance of sewage- Sewers, shapes design parameters, operation and maintenance of sewers, Sewage pumping; Sewerage, Sewer appurtenances, Design of sewerage systems. Small bore systems, Storm Water-Quantification and design of Storm water. Sewage characteristics: Quality parameters: BOD, COD, TOC, Solids, DO, Nitrogen, Phosphorus, Standards of disposal into natural watercourses and on land, Indian standards.</p> <p>Unit-IV Sewage and Sullage, Pollution due to improper disposal of sewage, Wastewater treatment, aerobic and anaerobic treatment systems, suspended and attached growth systems, recycling of sewage – quality requirements for various purposes. Wastewater Disposal and Refuse: Disposal of sewage by dilution, Self purification of streams, sewage disposal by irrigation sewage farming, waste water reuse.</p> <p>Unit-V Air - Composition and properties of air, Quantification of air pollutants, Monitoring of air pollutants, Air quality standards, Control measures for Air pollution</p> <p>Noise- Basic concept, measurement and various control methods</p> | |
| 44 | BTCE604 | <p>BTCE604 DESIGN OF CONCRETE STRUCTURES – I</p> <p>UNIT I Objective and fundamental concepts of design of RC members, Types and function of reinforcement.</p> | <p>BTCE 604 DESIGN OF STEEL STRUCTURES</p> <p>Unit-I Introduction: Objective, scope and outcome of the course. Types of Steels and their broad specifications.</p> | Course code Changed |

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| | <p>Introduction to various related IS codes. Design Philosophies: Working stress, ultimate strength and limit states of design. Analysis and Design of singly reinforced rectangular beam section for flexure using Working Stress Method and Limit State Method.</p> <p>UNIT II Analysis and design of singly reinforced, flanged beams and doubly reinforced rectangular beams for flexure using Limit State Method. Limit state of serviceability for deflection, control provisions of empirical coefficients.</p> <p>UNIT III Limit state of collapse in shear: analysis and design of prismatic sections for shear using LSM. Limit state of collapse in bond: concept of bond stress, anchorage length and development length, curtailment of reinforcement as per codal provisions.</p> <p>UNIT IV Analysis and design of one way and two way slabs using LSM and Flat slab using direct design method as per code, Detailing of reinforcement.</p> <p>UNIT V Columns: Short and long columns, their structural behaviour. Analysis and design of axially loaded short columns, using LSM. Analysis of uniaxially eccentrically loaded short columns. Introduction to Pu-Mu interaction curves and their use for eccentrically loaded columns. Design of Column Footings: Analysis and design of Isolated column footing and combined footing for two columns (without central beam) for axial loads using LSM.</p> | <p>Structural steel forms- hot rolled, tubular, light gauge etc and their applicability. Classification of cross sections as per IS 800-2007- Plastic, compact, semi compact and slender- characteristics Plastic analysis of steel structures, fundamentals, shape factor, static and mechanism method of analysis, bending of beams of uniform cross sections (any shape)</p> <p>Connections: Types of bolts, load transfer mechanism, prying action. Design of bolted and welded connections under axial and eccentric loadings with IS provisions</p> <p>Unit-II</p> <p>Tension Members: Design strength in gross section yielding, net section rupture and block shear. Design of axially loaded members. Compression Members: Types of buckling, Imperfection factor, Buckling curves for different cross sections as per IS. Design of compression members: Axially loaded members including made up of angle section: single and in pair; built up columns including design of lacings and battens as per IS.</p> <p>Unit-III</p> <p>Beams: Design of beams: simple and compound sections. Design of laterally supported and unsupported beams including for web buckling, web crippling, lateral torsional buckling. Member design under combined forces: Compressive load and uniaxial moment. tension and uniaxial moment Column Bases: Design of column bases for axial and eccentric compressive loads: Slab and gusseted base.</p> <p>Unit-IV</p> <p>Design of plate girder: Design of welded and bolted sections including web and flange splicing, horizontal, intermediate and bearing stiffeners. Shear strength determination by post critical and tension field action methods. End panel design options and procedure as per IS 800. Curtailment of flange plates. Connections for flange plate to flange angles and flange angles to web, etc. Design of welded connections.</p> <p>Unit-V</p> <p>Design of gantry girder . Design of roof trusses members for combined forces, wind loading etc. Purlin design. Introduction to Pre Engineered Buildings , characteristics and their applications. Introduction of truss girder bridges-its members including portal and sway bracings etc. Design aspects of foot over bridges.</p> | |
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| 45 | BTCE605 | <p>BTCE605 TRANSPORTATION ENGINEERING-I</p> <p>UNIT I Introduction: Importance and Role of Transportation Systems, Technological and Operating Characteristics of Transportation Systems, Components of transportation Systems, Transportation Coordination, Transportation Modes and their comparison. Highway Planning: Highway Planning Process, specifically in India, Transport or Highway related Agencies in India, Classification of Roads and Road Development Plans, Road Patterns, Controlling Factors and Surveys for Highway Alignment.</p> <p>UNIT II Highway Materials and Construction: Desirable Properties, Testing Procedures, Standards and standard values relating to Soil, Stone Aggregates, Bitumen and Tar, fly-ash/pond-ash. Methods of constructing different types of roads viz. Earth roads, Stabilized roads, WBM roads, fly ash embankments, Bituminous roads and Concrete roads. Specific features of rural roads. Equipments for highway construction of rigid and flexible pavements.</p> <p>UNIT III Highway Geometric Design: Cross Sectional Elements, camber, Sight Distances – definition and analysis of SSD and OSD, Design of Horizontal Alignment – Super elevation, extra widening, transition curves. Design of Vertical Alignment – Gradients, Vertical curves. Recommendations Indian Road congress code of Practice.</p> <p>UNIT IV Elementary Traffic Engineering: Significance of different Traffic</p> | <p>BTCE605 ESTIMATING & COSTING</p> <p>UNIT 1 : INTRODUCTION : Objective, scope and outcome of the course. Purpose and importance of estimates, principles of estimating, Methods of taking out quantities of items of work. Mode Of measurement, measurement sheet and abstract sheet; bill of quantities.</p> <p>UNIT 2 : Estimating: Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.</p> <p>UNIT 3 : Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)</p> <p>UNIT 4 : Detailed Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.</p> <p>UNIT 5 : Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.</p> | New Course |
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| | | <p>Engineering Studies viz. Speed, Volume, O & D, Parking and Accident's Study. Importance and types of Traffic Signs, Signals, Road Markings and Road Intersections.</p> <p>UNIT V Structural design of Highway Pavements: Design of Flexible Pavements by G. I. and CBR methods. Design of Rigid Pavements by Westergard and modified methods. Design as guide lines of relevant Indian Road congress code of Practice. Hill Roads: Special factors in Alignment and Geometric design, Drainage and maintenance of Hill roads. Road side Arboriculture and Landscaping. Recent Developments in Urban Roads and their role in economic developments.</p> | | |
| 46 | BTCE606A | <p>BTCE606A REMOTE SENSING AND GIS</p> <p>UNIT I Photogrammetry: Definition of Photogrammetric Terms, Geometry of aerial and terrestrial photographs, Aerial camera and photo-theodolite, Scale of a Photograph, Tilt and Height displacements, Stereoscopic vision and stereoscopes, Height determination from parallax measurements, Flight planning, Maps and Map substitutes and their uses.</p> <p>UNIT II Remote Sensing: Introduction and definition of remote sensing terms, Remote Sensing System, Electromagnetic radiation and spectrum, Spectral signature, Atmospheric windows.</p> <p>UNIT III Different types of platforms, sensors and their characteristics, Orbital parameters of a satellite, Multi concept in Remote Sensing.</p> | <p>BTCE606A PRE-STRESSED CONCRETE</p> <p>Unit-I Introduction: Objective, scope and outcome of the course. Introduction: Basic concepts of Pre-stressing and its advantages. Materials for pre-stressed concrete. Tensioning devices. Pretensioning and post tensioning systems.</p> <p>Unit-II Analysis of Pre-stress and Bending Stresses: Assumptions, Flexural analysis of pre-stressed rectangular and unsymmetrical T section. Concept of load balancing.</p> <p>Unit-III Losses of Pre-stress: Losses due to - elastic deformation of concrete, successive tensioning of curved cable, shrinkage of concrete, creep of concrete, relaxation of stress in steel, friction and anchorage slip.</p> <p>Unit-IV Deflection of Pre-stressed Concrete Members: Effect of tendon profile and associated factors in continuous members. Computation of deflection in pre-stressed concrete members.</p> <p>Unit-V Design of Pre-stressed Concrete Sections: Flexural Shear and Torsional strength using simplified code procedure (IS-1343-2012). Design of simply supported Pre-stressed Concrete Sections for flexure.</p> | Course code Changed and Content Changed |

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| | | <p>UNIT IV Image Interpretation: Principles of interpretation of aerial and satellite images, equipments and aids required for interpretation, ground truth collection and verification, advantages of multirate and multiband images. Digital Image Processing concept.</p> <p>UNIT V Geographic Information System (GIS) : Introduction & applications of GIS in map revision, Land use, Agriculture, Forestry, Archaeology, Municipal, Geology, water resources, Soil Erosion, Land suitability analysis, change detection.</p> | | |
| 47 | BTCE606B | <p>BTCE 606B : ROCK MECHANICS</p> <p>UNIT I ENGINEERING CLASSIFICATION OF ROCKS: Objectives, Intact rock classification, Rock mass Classification. Terzaghi's, Rock load classification, Austrian classification, Deere's rock rating concept, RMR classification, Q classification. Inter relation between Q and RMR, prediction of ground condition and support pressure. Effect of Tunnel size on support pressure.</p> <p>UNIT II ENGINEERING PROPERTIES AND LABORATORY TESTS ON ROCKS: Porosity, Density, Moisture content, Degree of saturation, Co-efficient of permeability, Durability, Compressive strength, Tensile strength, Shear strength, elasticity, Plasticity Deformability. Sampling and Samples Preparations, Uniaxial Compressive strength, Tensile Strength – Brazilian test, Shear strength test – Direct Shear test and Punch shear test,</p> | <p>BTCE606B SOLID AND HAZARDOUS WASTE MANAGEMENT</p> <p>Unit-I Introduction: Objective, scope and outcome of the course. Introduction to SWM: Definition of waste and solid waste, classification solid waste, sources of solid waste, its composition, factors affecting waste generation, traditional methods of waste collection and disposal</p> <p>Unit-II Waste Collection: Components of waste collection, waste collection containers, their characteristics, types, waste collection vehicles, collection frequency, collection route, transfer stations</p> <p>Unit-III Solid Waste Characterization: Physical characteristics, chemical characteristics and biological characteristics of solid wastes Waste Processing: Size reduction, factors affecting size reduction, size reducing equipment, volume reduction, equipment for volume reduction, waste minimization, waste hierarchy, 3 R principle</p> <p>Unit-IV Hazardous Waste: Definition, sources, classification, collection, segregation, treatment and disposal methods Radioactive Waste, E-Waste, Biomedical Waste: Definition, sources, classification, segregation, management and disposal methods</p> | Course code Changed and Content Changed |

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| | | <p>Triaxial Test, Flexural strength.</p> <p>UNIT III INSITU TESTS ON ROCKS: Necessity of Insitu test, Plate load test for deformability, Shear test, Test for internal stresses – flat Jack, pressure meter test. JOINTED ROCKS: Rocks Joint properties, Joint properties, Joint Roughness Co-efficient, Scale effects, Dilation, Orientation of Joints, Gouge, Joint Intensity, Uniaxial Compressive strength of Jointed Rocks.</p> <p>UNIT IV STRENGTH OF ROCKS IN UNCONFINED CONDITION: Ramamurthy Strength Criteria, Singh and Rao Strength Criteria, Kulatilake Methodology, Hoek Criteria, Barton Methodology. STRENGTH OF ROCKS IN CONFINED CONDITION: History of Hoek and Brown Failure Criteria and latest methodology, Parabolic Strength Criteria.</p> <p>UNIT V GROUTING AND ROCK BOLTING: Grouting materials, Grouting operations, methods of Grouting, Mechanism of Rock Bolting, Principal of design. BEARING CAPACITY OF ROCKS: Bearing capacity of intact rocks, jointed rocks, IS Code methodology, Singh and Rao Method and latest methodologies.</p> | <p>Unit-V Treatment and Disposal of Solid Waste: Composting, vermicomposting, biogas production, thermal treatment, incineration, pyrolysis, gasification, biological treatment, Sanitary land filling, land fill leachate and gas management Latest Advances and Rules related to SWM, Hazardous Waste, Plastic Waste and E-Waste Management</p> | |
| 48 | BTCE606C | <p>BTCE606C REPAIR AND REHABILITATION OF BUILDINGS</p> <p>UNIT I Deterioration of concrete in structures: physical processes of deterioration like F & T abrasion, erosion, pitting, chemical processes like carbonation, chloride ingress, corrosion,</p> | <p>BTCE606C TRAFFIC ENGINEERING AND MANAGEMENT</p> <p>Unit-1 Introduction: Objective, scope and outcome of the course. Traffic Planning and Characteristics: Road Characteristics – Road user characteristics – PIEV theory – Vehicle – Performance characteristics – Fundamentals of Traffic Flow .</p> | New Course |

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| | | <p>alkali aggregate reaction, sulphate attack; their causes, mechanism, effect, preventive measures. Cracks: Cracks in concrete, type, pattern, quantification, measurement & preventive measures etc.</p> <p>UNIT II N.D.T.: Non destructive test methods for concrete including rebound hammer, ultrasonic pulse velocity, rebar locator, corrosion meter, penetration resistance and pull out test, core cutting etc. Corrosion: Methods for corrosion measurement and assessment including half-cell potential and resistivity, Mapping of data.</p> <p>UNIT III Materials for repair: polymers and resins, self curing compound, FRP, Ferro cement etc; properties, selection criterion, bonding aspect.</p> <p>UNIT IV Repair Techniques: grouting, jacketing, shotcrete, externally bonded plates and under water repair; materials, equipments, precautions process etc.</p> <p>UNIT V Investigation for structures: Distress, observation and preliminary test Case studies: related to rehabilitation of bridge piers, dams, canals, heritage structures, corrosion damaged structures.</p> | <p>Unit-II Traffic Surveys: Traffic Surveys – Speed, journey time and delay surveys – Vehicles Volume Survey including nonmotorized transports – Methods and interpretation – Origin Destination Survey – Methods and presentation – Parking Survey – Accident analyses -Methods, interpretation and presentation – Level of service – Concept, applications and significance</p> <p>Unit-III Traffic Design and Visual Aids: Intersection Design – channelization, Rotary intersection design – Signal design – Coordination of signals — Grade separation – Traffic signs including VMS and road markings – Significant roles of traffic control personnel – Networking pedestrian facilities & cycle tracks.</p> <p>Unit-IV Traffic Safety and Environment: Road accidents – Causes, effect, prevention, and cost – Street lighting – Traffic and environment hazards –</p> <p>Unit-V Traffic Management: Area Traffic Management System – Traffic System Management (TSM) with IRC standards – Traffic Regulatory Measures-Travel Demand Management (TDM) – Direct and indirect methods – Congestion and parking pricing – All segregation methods- Coordination among different agencies – Intelligent Transport System for traffic management, enforcement and education.</p> | |
| 49 | BTCE607 | <p>BTCE607: GEOTECHNICAL ENGG. DESIGN AND LABORATORY. – II</p> <ol style="list-style-type: none"> To determine the differential free swell index of soil. To determine the grain size distribution of fine grained soil by Hydrometer. To determine the CBR of soil. | <p>BTCE607A BRIDGE ENGINEERING</p> <p>Unit-1 Introduction: Objective, scope and outcome of the course. Introduction: Type of bridges & classification of road & railways bridges. IRC & Railway loadings for bridges, wind load & Earthquake forces. : Expansion joints.</p> | <p>Course code Changed and Content Changed</p> |

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| | | <ol style="list-style-type: none"> 4. To determine the compressibility parameters of soil by consolidation test. 5. To determine the swelling pressure of soil. 6. To determine the permeability of soil by constant and falling head methods. 7. To determine the shear strength parameters of soil by tri-axial test. 8. Design problems based different units of theory syllabus. | <p>Unit-II Steel bridges: Introduction to Design of through type & deck type steel bridges for IRC loading. Design of through type truss bridges for railway loadings.</p> <p>Unit-III Reinforced concrete culverts: Reinforced concrete slab culvert</p> <p>Unit-IV Reinforced concrete bridges: T-beam bridges- courbons & Hendry-Jaegar methods.</p> <p>Unit-V Bearings: Bearings for slab bridges and girder bridges. Elastomeric bearings, design concepts as per IRC 83 (Part II).</p> | |
| 50 | BTCE607B | | <p style="text-align: center;">BTCE607B ROCK ENGINEERING</p> <p>Unit-I Introduction: Objective, scope and outcome of the course. Engineering Classification of Rocks: Objectives, Intact rock classification, Rock mass Classification. Terzaghi's, Rock load classification, Austrian classification, Deere's rock quality classification, rock structure rating concept, RMR classification, Q classification. Inter relation between Q and RMR.</p> <p>Unit-II Engineering Properties and Laboratory Tests on Rocks: Porosity, Density, Moisture content, Degree of saturation, Co-efficient of permeability, Durability, Compressive strength, Tensile strength, Shear strength, elasticity, Plasticity Deformability. Sampling and Samples Preparations, Uniaxial Compressive strength, Tensile Strength – Brazilian test, Shear strength test – Direct Shear test and Punch shear test, Triaxial Test, Flexural strength.</p> <p>Unit-III In-situ Tests on Rocks: Necessity of Insitu test, Plate load test for deformability, Field Shear test Jointed Rocks: Rocks Joint properties, Joint properties, Joint Roughness Co-efficient, Scale effects, Dilation, Orientation of Joints, Gouge, Joint Intensity, Uniaxial Compressive strength of Jointed Rocks.</p> <p>Unit-IV Strength of Rocks in Unconfined Condition: Ramamurthy Strength Criteria, Singh and Rao Strength Criteria, Kulatilake Methodology, Barton Methodology.</p> <p>Unit-V Strength of Rocks in Confined Condition: History of Hoek and Brown Failure Criteria, Parabolic Strength Criteria. Bearing Capacity of Rocks: Bearing capacity of</p> | New Course |

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| | | | intact rocks, jointed rocks, IS Code methodology, Singh and Rao Method and latest methodologies. | |
| 51 | BTCE607C | | <p>BTCE607C GEOGRAPHIC INFORMATION SYSTEM & REMOTE SENSING</p> <p>Unit-I Introduction: Objective, scope and outcome of the course. Photogrammetry: Definition of Photogrammetric Terms, Geometry of aerial and terrestrial photographs, Aerial camera and phototheodolite, Scale of a Photograph, Tilt and Height displacements, Stereoscopic vision and stereoscopes, Height determination from parallax measurements, Flight planning, Maps and Map substitutes and their uses.</p> <p>Unit-II Remote Sensing: Introduction and definition of remote sensing terms, Remote Sensing System, Electromagnetic radiation and spectrum, Spectral signature, Atmospheric windows.</p> <p>Unit-III Different types of platforms, sensors and their characteristics, Orbital parameters of a satellite, Multi concept in Remote Sensing.</p> <p>Unit-IV Image Interpretation: Principles of interpretation of aerial and satellite images, equipments and aids required for interpretation, ground truth – collection and verification, advantages of multiband and multiband images. Digital Image Processing concept.</p> <p>Unit-V Geographic Information System (GIS) : Introduction & applications of GIS in map revision, Land use, Agriculture, Forestry, Archaeology, Municipal, Geology, water resources, Soil Erosion, Land Suitability analysis, change detection.</p> | Course code Changed and Content Changed |
| 52 | BTCE608 | BTCE608: ENVIRONMENTAL ENGINEERING LAB. & DESIGN – II <ol style="list-style-type: none"> 1. To determine the pH of the given sample of sewage. 2. To determine Total Solids of the given sewage sample. 3. To determine the Total Dissolved Solids of the given sewage sample. 4. To find out Total Settle-able Solids of the given sewage sample. 5. To determine Total Suspended Solids of the | <p>BTCE608 ENVIRONMENTAL ENGINEERING DESIGN AND LAB</p> <p>Design:</p> <ol style="list-style-type: none"> 1. Population forecasting and water demand 2. Water Quality parameters 3. Design of Sedimentation tanks, coagulation and flocculation tanks 4. Design of rapid and slow sand filters 5. Design of disinfection units and transmission systems 6. Design of Sewer lines and storm water systems 7. Design of aerobic and anaerobic treatment units 8. Design of suspended and attached growth systems | New Course |

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| | | <p>given sewage sample.</p> <ol style="list-style-type: none"> 6. To find out the Quantity of Dissolved Oxygen present in the given water sample by Winkler's Method. 7. To determine Biochemical Oxygen Demand exerted by the given wastewater sample. 8. To find out Chemical Oxygen Demand of the waste water sample. 9. To study various Sanitary Fittings. <p>Design as per syllabus of theory.</p> | <p>Lab:</p> <ol style="list-style-type: none"> 1. Physical Characterization of water: Turbidity, Electrical Conductivity, pH 2. Analysis of solids content of water: Dissolved, Settleable, suspended, total, volatile, inorganic etc. 3. Alkalinity and acidity, Hardness: total hardness, calcium and magnesium hardness 4. Optimum coagulant dose 5. Chemical Oxygen Demand (COD) 6. Dissolved Oxygen (D.O) and Biochemical Oxygen Demand (BOD) 7. Break point Chlorination 8. Bacteriological quality measurement: MPN, | |
| 53 | BTCE609 | <p>BTCE609 : DESIGN OF CONCRETE STRUCTURES- I Design problems as per different units of syllabus of theory.</p> | <p>BTCE609 STEEL STRUCTURES DESIGN LAB</p> <p>Analysis and design Problems as per different topics of syllabus of theory BTCE604, with latest version of IS 800 and other relevant IS codes. In addition to numerical problems, following exercises:</p> <ol style="list-style-type: none"> 1. Case study of foot over bridges/truss- girder bridge in vicinity /home town of the students, preferably in groups of 8-10 students. A report including photographs marked with names and section details of different members in it (maximum limit of words :1000). 2. Case study of a structure using tubular sections or light gauge sections in vicinity /home town of the students, preferably in groups of 8-10 students. A report including photographs marked with names, size and section details of different members in it (maximum limit of words: 1000). | Course code Changed and Content Changed |
| 54 | BTCE610 | <p>BTCE610 : ROAD MATERIAL TESTING LAB</p> <ol style="list-style-type: none"> 1. Aggregate Impact test 2. To determine the flakiness index & Angularity number test of given sample of aggregate. 3. To determine fineness modulus of a given sample of coarse aggregate. 4. Los angles abrasion test 5. Aggregate crushing value test 6. Specific gravity and water absorption test of aggregate. 7. Standard tar viscometer test 8. To determine the elongation index for given sample of aggregate. 9. Ductility test 10. To determine the softening point for give sample of bitumen. 11. Marshell stability test 12. Float test | <p>BTCE610 QUANTITY SURVEYING AND VALUATION LAB</p> <ol style="list-style-type: none"> 1. Preliminary Estimate (Plinth Area and Cubic Content) 2. Detailed Estimate of buildings (Long wall-Short wall and Centre line method) 3. Rate Analysis of different Items of Works (Earthwork, Concrete Work, DPC, Stone masonry, Brickwork, RCC, Roofing, Flooring, and Finishing etc.) 4. Earthwork Calculation for Roads, Irrigation Canals and Channels (cutting and filling) 5. Valuation of Buildings and Properties | New Course |
| 55 | BTCE6 | | BTCE611 WATER AND EARTH RETAINING | New Course |

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| | <u>11</u> | | <p align="center">STRUCTURES DESIGN LAB</p> <p>1. Continuous Beams: Analysis and Design of continuous beams using coefficients (IS Code), concept of moment redistribution</p> <p>2 Curved Beams: Analysis and design of beams curved in plan.</p> <p>3 Circular Domes: Analysis and design of Circular domes with u.d.l. & concentrated load at crown.</p> <p>4 Water Tanks and Towers: Water Tanks and Water Towers-design of rectangular, circular and Intze type tanks, column brace type staging.</p> <p>5 Retaining walls: Analysis and design of Cantilever Retaining Walls: Introduction to counter fort and buttress type retaining walls, their structural behaviour and stability analysis.</p> | |
| 56 | <u>BTCE8</u> <u>08 /</u> <u>BTCE6</u> <u>12</u> | | <p align="center">BTCE612 FOUNDATION ENGINEERING LAB</p> <p>1. Design of isolated shallow footings, combined footings, raft foundations.</p> <p>2. Design of pile foundations.</p> <p>3. Design of wells and cussions.</p> <p>4. Design of machine foundation.</p> <p>5. Design of retaining structures etc</p> | Course code Changed and Content Changed |
| 57 | <u>BTCE6</u> <u>13</u> | | BTCE613 SOCIAL OUTREACH, DISCIPLINE & EXTRA CURRICULAR ACTIVITIES | New Course |
| 58 | <u>BTCE7</u> <u>01</u> | <p align="center">WATER RESOURCES ENGINEERING – I (BTCE 701)</p> <p>UNIT-I Introduction: Definitions, functions and advantages of irrigation, present status of irrigation in India, classification for agriculture, soil moisture and crop water relations, Irrigation water quality. Consumptive use of water, principal Indian crop seasons and water requirements, multiple cropping, hybrid crops, water harvesting and conservation.</p> <p>UNIT-II Canal Irrigation: Types of canals, parts of canal irrigation system, channel alignment, assessment of water requirements, estimation of channel losses, design of channels, regime and semi theoretical approaches (Kennedy’s Theory, Lacey’s Theory), cross section of channels, silt control in canals. Water Distribution System: Rotational delivery (Warabandi, Jama Bandi, Khasra Bandi, Sajra Sheets), continuous delivery and delivery on demand, Role of command area development authority, Functions and organizational structures.</p> | <p align="center">BTCE701: Transportation Engineering</p> <p><u>Syllabus</u></p> <p><u>Unit- I</u></p> <p>Introduction: Objective, scope and outcome of the course Highway planning and alignment : Different modes of transportation – historical Development of road construction- Highway Development in India – Classification of roads- Road pattern – Highway planning in India- Highway alignment - Engineering Surveys for alignment – Highway Project- Important Transport/Highway related agencies in India. PMGSY project. Introduction about IRC, NRRDA</p> <p><u>Unit- II</u> Geometric Design of highways: The highway crosses sectional elements- Camber-Sight Distance - Types of sight distances -Design of horizontal alignments - Super elevation, Widening of Pavements on horizontal curves- transition curves- Design of Vertical alignments – Gradients- summit and Valley Curves- Recommendations of IRC Codes of Practice. Highway Materials: Desirable Properties, Testing</p> | Course code Changed and Content Changed |

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| | | <p>UNIT-III Distribution of Canal Water: System of regulation and control, outlets, assessment of canal revenue. Hydraulics of Alluvial Rivers : Critical tractive force, regimes of flow, resistance relationship for natural streams, bed load, suspended load and total equations, different stages of rivers, meandering, aggradations, and degradation, river training & bank protection works. UNIT-IV Water Logging: Causes, preventive and curative measures, drainage of irrigated lands, saline and alkaline lands, types of channels lining and design of lined channel. Well Irrigation: Open wells and tube wells, types of tube wells, duty of tube well water. UNIT-V Hydrology: Definition, Hydrologic cycle, Application to Engineering problems, measurement of rainfall, rain gauge, peak flow, flood frequency method, catchment area formulae, Flood hydrograph, Rainfall analysis, Infiltration, Run off, Unit hydrograph and its determination, Estimation of runoff.</p> | <p>Procedures, Standards and standard values relating to Soil, Stone Aggregates, Bitumen and Tar, fly-ash/pond-ash. Role of filler in bituminous mix, materials of filler. Specifications of DLC and PQC for rigid pavement</p> <p>Unit- III Highway Construction and Equipments: Methods of constructing different types of roads viz. Earth roads, Stabilized roads, WBM, WMM roads, earthen embankments, DLC and embankments with fly ash. Bituminous roads and Concrete roads. Berms and Shoulders, Features of rural roads including those in PMGSY. Hot mix plant for Bituminous roads-components, layout, control panel, quality assurance. Highway construction of rigid and flexible pavements including types of road rollers, specifications of compaction of different layers of bituminous roads, modern pavers for CC roads. Roller compacted concrete road construction</p> <p>Unit- IV Design of flexible and rigid pavements as per IRC: IRC provisions including those of IRC 37, IRC 58 Introduction of Railway Engineering: Types and Selection of Gauges, Selection of Alignment, Ideal Permanent Ways and Cross- sections in different conditions, Drainage, Salient Features and types of Components viz. Rails, Sleepers, Ballast, Rail Fastenings</p> <p>Unit- V Introduction of Airports and Harbours: Airport Engineering: - Introduction: Requirements to Airport Planning, Airport Classifications, Factors in Airport Site Selection, Airport Size. Planning of Airport: Requirements of Airport- Terminal Area, Runway Length etc. Harbours: history of water transportation, modern trends in water transportation, components of harbour, classification of harbours. Ports and docks</p> | |
| 59 | BTCE7 02 | <p>DESIGN OF STEEL STRUCTURES – I (BTCE 702)</p> <p>UNIT-I Introduction: Types of steels and their broad specifications. Plastic Analysis: Plastic analysis of steel structures, fundamentals, static and mechanism method of analysis, bending of beams of rectangular and I sections beams, shape factor. Classification of Cross Sections: As per IS 800-2007 Plastic, compact, semi compact, slender sections, their characteristics including moment-rotation. UNIT-II Connections: Types of bolts, load transfer mechanism, prying action. Design of bolted and welded connections under axial and eccentric loadings. Tension Members: Design strength in</p> | <p>BTCE702A: Human Engineering and safety</p> <p>Syllabus</p> <p>Unit- I Introduction: Objective, scope and outcome of the course , Human factors in system development – concept of systems Basic processes in system development, performance reliability, human performance. Information input process</p> <p>Unit- II Visual displays, major types and use of displays, auditory and factual displays.</p> <p>Unit- III Measurement of energy, direct and indirect methods. Energy cost of different activities and Acceptable work load. Noise and vibration, its measurement and control.</p> | New Course |

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| | | <p>gross section yielding, net section rupture and block shear. Design of axially loaded tension members.</p> <p>UNIT-III Compression Member: Types of buckling. Column buckling curves, Imperfection factor, Buckling curves for different cross sections. Design of compression member; Axially loaded compression members including angle section design: single and in pair, built up columns, design of lacings and battens.</p> <p>UNIT-IV Beams: Design of beams: simple and compound sections, main and subsidiary beams and their connections. Laterally supported and unsupported beam design, Web buckling, web crippling, lateral torsional buckling.</p> <p>UNIT-V Member design under combined forces: Compressive load and uniaxial moment. tension and uniaxial moment Column Bases: Design of column bases, Slab base, gusseted base for axial and eccentric compressive load. Grillage foundation design.</p> | <p>Unit- IV Anthropometry: arrangement and utilization of work space, atmospheric conditions, heat exchange process and performance.</p> <p>Unit- V Dangerous machine (Regulation) act, Rehabilitation and compensation to accident victims, Safety gadgets for spraying, threshing, Chaff cutting and tractor & trailer operation etc.</p> | |
| | | | <p>BTCE702B: Environmental Engineering and Disaster management</p> <p>Syllabus</p> <p>Unit- I Introduction: Objective, scope and outcome of the course. Importance of safe water supply system. Domestic water requirements for urban and rural areas</p> <p>Unit- II Sources of Water supply : Intakes and transportation of water. Drinking water quality. Indian Standards of drinking water.</p> <p>Unit- III Introduction to water treatment for safe drinking, Importance of sanitation. Domestic waste water: quantity, characteristics, disposal in urban and rural areas.</p> <p>Unit- IV Sewer: types, design discharge and hydraulic design. Introduction to domestic wastewater treatment. Solid waste: quantity, characteristics and disposal for urban and rural areas.</p> <p>Unit- V Introduction to air pollution.: Types of pollutants, properties and their effects on living beings. BIS standards for pollutants in air and their abetments. Introduction to various disaster, Importance of disaster management.</p> | New Course |
| 60 | BTCE702C | | BTCE702C: Non Destructive Testing | New Course |

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| | | | <p style="text-align: center;"><u>Syllabus</u></p> <p>Unit- I Introduction: Objective, scope and outcome of the course.</p> <p>Overview of NDT: NDT Versus Mechanical testing, Overview of the Non Destructive Testing Methods for the detection of manufacturing defects as well as material characterization. Relative merits and limitations, various physical characteristics of materials and their applications in NDT, Visual inspection, Unaided and aided.</p> <p>Unit- II</p> <p>Surface Non Destructive Evaluation (NDE) Methods: Liquid Penetrant Testing, Principles, types and properties of liquid penetrants, developers, advantages and limitations of various methods. Testing Procedure, Magnetic Particle Testing, Theory of magnetism, inspection materials. Magnetisation methods, Interpretation and evaluation, Principles and methods of demagnetization, Residual magnetism</p> <p>Unit- III Thermography and Eddy Current Testing (ET): Thermography, Principles, Contact and non contact inspection methods, Advantages and limitation, Instrumentations and methods, applications. Eddy Current Testing, Generation of eddy currents, Properties of eddy currents, Eddy current sensing elements, Types of arrangement, Applications, advantages, Limitations, Interpretation/Evaluation.</p> <p>Unit- IV Ultrasonic Testing (UT) and Acoustic Emission (AE): Ultrasonic Testing, Principle, Transducers, transmission and pulse-echo method, straight beam and angle beam, instrumentation, data representation, A-Scan, B-scan, C-scan. Acoustic Emission Technique, Principle, AE parameters, Applications.</p> <p>Unit- V Radiography (RT): Principle, Interaction of X-Ray with matter, imaging, film and film less techniques, Types and use of filters and screens, Geometric factors, Inverse square, law, characteristics of films, Interpretation/ Evaluation, Fluoroscopy, Xero Radiography, Computed Radiography, Computed Tomography.</p> <p>Special Techniques and Applications: Phased array ultrasonics time of flight diffractions, Automated and remote ultrasonic testing, Acoustic pulse reflectometry, Alternative current field method, Case studies on NDT techniques used in aircrafts.</p> | |
| 61 | BTCE7 03 | <p style="text-align: center;">DESIGN OF CONCRETE STRUCTURES-II (BTCE 703)</p> <p>UNIT-I Elements of Pre-stressed Concrete: Principles and systems, material properties, losses of pre-stress, I.S. specifications, analysis and design of</p> | <p style="text-align: center;">BTCE703: Road Material Testing Lab</p> <p style="text-align: center;"><u>Syllabus</u></p> <p>1. Aggregate Impact Test</p> | <p>Course code Changed</p> |

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| | | <p>rectangular and T sections for flexure and shear.</p> <p>UNIT-II Torsion: Analysis and Design of beams for torsion as per codal method. Continuous and Curved Beams: Analysis and Design of continuous beams using coefficients (IS Code), concept of moment redistribution. Analysis and design of beams curved in plan.</p> <p>UNIT-III Circular Domes: Analysis and design of Circular domes with u.d.l. & concentrated load at crown. Water Tanks and Towers: Water Tanks and Water Towers-design of rectangular, circular and Intze type tanks, column brace type staging.</p> <p>UNIT-IV Yield Line Theory: Introduction to Yield line concept, Application of Y.L.T. to slabs with simple support conditions. Retaining walls: Analysis and design of Cantilever Retaining Walls: Introduction to counterfort and buttress type retaining walls, their structural behaviour and stability analysis.</p> <p>UNIT-V Culverts and Bridges: Analysis and Design of super structure of slab culverts and T-bridge for I.R.C. loading.</p> | <p>2. To determine the Angularity Number, Flakiness Index & Elongation Index of aggregates</p> <p>3. Los Angeles Abrasion Test</p> <p>4. Aggregate Crushing Value Test</p> <p>5. Standard Tar Viscometer Test for given bitumen sample</p> <p>6. Ductility Test for a given bitumen sample</p> <p>7. To determine the softening point for given sample of bitumen.</p> <p>8. Marshall Stability Test</p> <p>9. Float Test</p> <p>10. Preparation of Dry lean concrete mix and testing of its strength</p> | |
| 62 | BTCE704 | <p>TRANSPORTATION ENGINEERING – II (BTCE 704)</p> <p>UNIT-I Introduction and Permanent Way Components: Types and Selection of Gauges, Selection of Alignment, Ideal Permanent Ways and Cross-sections in different conditions, Drainage, Salient Features and types of Components viz. Rails, Sleepers, Ballast, Rail Fastenings. Study of Specific Aspects: Coning of Wheels, Creep, Wear, failures in Rails, Rail Joints, Length of Rail, Sleeper Density and Spacing, Stations, Yards and Sidings, Turn-Table, Signaling.</p> <p>UNIT-II Points and Crossings: Types of Turnouts, Points or Switches, layout Plans of different types of Crossings, Design calculations of turnouts. Railway Systems Specific to Urban Movements: Surface railways (sub urban railway system of Mumbai, Chennai and Delhi), Underground system (Metro of Kolkata/ Delhi), Elevated Systems (as Proposed for Jaipur, Delhi, Mumbai), Light Rail System (MRTS, Thane). Recent Developments in Railway Networking.</p> <p>UNIT-III Geometric Design: Gradient and Grade</p> | <p>BTCE704: Professional Practices & Field Engineering Lab</p> <p>Course Objectives : Students would be able to</p> <p>Syllabus</p> <ol style="list-style-type: none"> 1. Different types of Knots 2. Site plan, index plan, layout plan, plinth area, and floor area of buildings 3. Foundation plan layout infield 4. Bar bending schedule 5. Specifications- For different classes of building and Civil Engineering works 6. Specifications of building components 7. Valuation of buildings and properties 8. Work at heights – scaffolding and ladders use, type of scaffolds, safety requirements, design and load factors, defects and inspection norms, type of ladders, upkeep, defects and good maintenance tips | New Course |

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| | | <p>Compensation, Super elevation and cant, cant deficiency, Types of Curves, Transition curves, their designs, Widening of Gauges.</p> <p>UNIT-IV Airport Engineering:-Introduction: Requirements to Airport Planning, Airport Classifications, Factors in Airport Site Selection, Airport Size, Obstructions, Zoning. Planning and Design of Airport: Requirements of Airport, Planning of Terminal Area, and different Layouts, Location of Gates, Types of Runway patterns, Runway Layout, Runway Length, Geometric Design of Runways, Layout of Taxiways, Geometric Standards, Exit or Turnaround Taxiways, Apron and Hangers.</p> <p>UNIT-V Airport Pavement Design: Factors Affecting Pavement Design, Design methods of Flexible Pavements, Design methods of Rigid Pavements.</p> | | |
| 63 | BTCE705 | <p>Applications Numerical Methods in Civil Engineering (BTCE 705)</p> <p>UNIT-I Errors & Approximations in Numerical Computation: Introduction to Mathematical Modeling and Engineering Problem Solving. Decimal & Binary Number system. Accuracy, Precision and Significant Digits. Errors and their types.: absolute and relative errors, approximations and round off errors, truncation errors and Taylor's series. Propagation of errors.</p> <p>UNIT-II Roots of Equations: Iterative processes and their Convergence. Existence of roots in engineering practices & their geometrical representation. Roots of the equations by: Graphical Method, Method of Successive Substitution, Bisection Method, False Position Method, Newton-Raphson Method, Secant Method, Regula Falsi Method. Application to simple civil engineering problems.</p> <p>UNIT-III Matrices and Determinants: Their types and basic operations. Rank of a matrix. Solution of Linear system of equations by Direct methods: Cramer's Rule, Gaussian elimination method, Gauss-Jordan Method and Cholesky Method. Application to simple civil engineering problems.</p> <p>UNIT-IV Iterative Methods for solving Linear system of equations: Jacobi Method, LU decomposition and Matrix inversion, Gauss Seidel method. Application to</p> | <p>BTCE705: Soft Skill Lab</p> <p>Syllabus</p> <p>SOFT SKILLS- Introduction to Soft Skills, Aspects of Soft Skills, Identifying your Soft Skills, Negotiation skills, Importance of Soft Skills, Concept of effective Communication. SELF-DISCOVERY- Self-Assessment, Process, Identifying Strengths and limitations, SWOT Analysis Grid.</p> <p>PREPARING CV/RESUME – Introduction, meaning, difference among bio-data, CV and resume, CV writing tips. Do's and don'ts of resume preparation, Vocabulary for resume, common resume mistakes, cover letters, tips for writing cover letters.</p> <p>INTERVIEW SKILLS - Introduction. Types of interview, Types of question asked, Reasons for rejections, Post-interview etiquette, Telephonic interview, Dress code at interview, Mistakes during interview, Tips to crack on interview, Contextual questions in interview skills, Emotional crack an interview, Emotional intelligence and critical thinking during interview process.</p> <p>DEVELOPING POSITIVE ATTITUDE – Introduction, Formation of attitude, Attitude in workplace, Power of positive attitude, Examples of positive attitudes, Negative attitudes, overcoming negative attitude and its consequences,</p> <p>IMPROVING PERCEPTION- Introduction, Understanding perception, perception and its application in organizations.</p> | New Course |

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| | | <p>simple civil engineering problems.</p> <p>UNIT-V Interpolation and Curve Fitting: Newton's Forward Difference, Newton's Backward Difference, Newton's Central Difference, Newton's Divided Difference, Lagrangian Interpolation, Hermitian Interpolation, Method of least square. Application to simple civil engineering problems.</p> | <p>CAREER PLANNING – Introduction, Tips for successful career planning, Goal Setting immediate, short term and long term, Strategies to achieve goals, Myths About choosing career.</p> <p>TEAM BUILDING AND TEAM WORK - Introduction, Meaning, Characteristics of an effective team, Role of a Team Leader, Role of Team Members, inter group Collaboration Advantages, Difficulties faced, Group Exercises-Team Tasks and Role-Play, Importance of Group Dynamics.</p> <p>TIME MANAGEMENT: The Time management matrix, apply the Pareto Principle (80/20 Rule) to time management issues, to prioritize using decision matrices, to beat the most common time wasters, how to plan ahead, how to handle interruptions , to maximize your personal effectiveness, how to say “no” to time wasters, develop your own individualized plan of action.</p> <p>STRESS MANAGEMENT – Introduction, meaning, positive and negative stress, Sources of stress, Case studies, signs of stress, Stress management tips, Teenage stress. Group discussion practice on current topics, Quantitative aptitude and reasoning preparation.</p> | |
| 64 | BTCE7 06A | <p>ADVANCE TRANSPORTATION ENGINEERING (BTCE 706A)</p> <p>UNIT-I Traffic Studies: Road inventories, Traffic Volume Studies, Spot Speed Studies, Travel Time and delay Studies, Origin-Destination studies, Methodology and Analysis of O-D data, Traffic capacity, Parking studies and characteristics, Accident studies and characteristics, causes and preventive measures.</p> <p>UNIT-II Statistical Methods for Traffic Engineering: Elementary concepts and Probability, Mean, Standard Deviation and variance, Poisson and Binomial Distribution, Normal distribution, sampling Theory and Significance testing, Linear Regression and correlation.</p> <p>UNIT-III Traffic Characteristics: Macroscopic and Microscopic Characteristics related to Volume, Speed and Density, their relationships, Road User Characteristics – Human and vehicular Characteristics. Traffic Engineering Design: Principles of Road Junction design, Design of Roundabouts, Bus Stops and Parking Lots, Design of Signals.</p> <p>UNIT-IV Traffic Management: Traffic Laws, Regulations and Ordinances for Drivers,</p> | <p>BTCE706: Environmental Monitoring And Design Lab</p> <p>Syllabus</p> <p>Design:</p> <ol style="list-style-type: none"> 1. Sewer design and estimation of Waste/Storm water by software. 2. Design of Water Treatment Plant and Sewage Treatment Plant 3. Design of Oxidation pond, stabilization pond and aerated lagoons. 4. Design of aerobic and anaerobic digester. <p>Lab:</p> <ol style="list-style-type: none"> 1. Demonstration of air pollution monitoring instruments namely, High volume sampler 2. Determination of SPM, PM10 and PM2.5. 3. Demonstration of noise pollution monitoring equipment namely, modular precision sound level meter. 4. Air quality monitoring for Traffic/Residential locality and its effect on the environment. 5. Noise quality monitoring for Traffic/Residential locality and its effect on the environment. 6. Latest technology for management of municipal solid waste | New Course |

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| | | <p>Pedestrians and Mixed Traffic. Traffic control Measures – One Way streets, Kerb Parking Control, Intersection Control, Speed Control, Access Control. Expressways. Traffic Control Devices – Traffic Markings, Signs, Signals, Traffic Islands, their Classification, types and Sketches, Street Lighting.</p> <p>UNIT-V Traffic and Environment: Detrimental Effects of Traffic on the environment – air pollution, noise pollution, visual intrusion, aesthetics etc. Road Safety: The identification of problem, causation and Prevention, Road layout and Improvements, Safety equipment.</p> | | |
| 65 | BTCE7 06B | <p>DESIGN OF PRE-STRESSED CONCRETE STRUCTURES (BTCE 706B)</p> <p>UNIT-I Introduction: Systems of pre-stressing in detail, pre-stressing techniques, transfer of pre-stress, types of commercially available jacks, computation of losses of pre-stress. Anchorage Zone: end block stresses, design.</p> <p>UNIT-II Cable profiles: Concordant and non-concordant cable profile and associated factors in continuous members. Modern cable laying: materials & practices, precautions etc. Computation of deflection in pre-stressed concrete members.</p> <p>UNIT-III Design of Pre-stressed Concrete Sections: Flexural, shear and torsion resistance of members, preliminary and final design of sections, design of pre and post tensioned flexural members; simply supported and continuous members.</p> <p>UNIT-IV Pre-stressed Slab: Design of slabs, tendon layout, precast slab, production and their applications. Partial Prestressing: Principles and advantages, methods, practices and design.</p> <p>UNIT-V Design of circular pipes and circular water retaining structures etc. Case study of one bridge girder with design and constructional features.</p> | | |
| 66 | BTCE7 06C | <p>RURAL WATER SUPPLY AND SANITATION (BTCE 706C)</p> <p>UNIT-I General: Importance of village community in India, Condition of Indian</p> | | |

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| | | <p>villages with special regard to economics, social and health aspects.</p> <p>Sources of water: Traditional sources of water in rural areas. Different types of wells, sanitary aspects in well construction, pumps used for village wells, Hand pump Technology, its operation and maintenance. Water harvesting techniques.</p> <p>UNIT-II</p> <p>Quality of water: Estimation of total water requirement including cattle water demand, quality of water needed for village community, water quality surveillance, standards of water quality.</p> <p>Communicable Diseases: Diseases and immunity, Source of communicable diseases, Mode of transfer, Control of communicable diseases, Guinea worm Eradication.</p> <p>UNIT-III</p> <p>Water Treatment: Slow sand filter, horizontal roughing filter and their combination. Disinfection of rural water sources, Fluoride and its removal.</p> <p>Schemes of Rural water supply: Different Schemes of Rural water supply in Rajasthan, Their Design and project formulation including the programmes and standards laid by Govt. of India and Govt. of Rajasthan.</p> <p>UNIT-IV</p> <p>Milk and Food sanitation: Essentials of dairy farm and cattle shed sanitation, Tests for milk and dairy products, food epidemics, food poisoning, Botulism.</p> <p>Fly and Mosquito control: Life cycle of flies and mosquitoes, various methods of flies and mosquito control.</p> <p>UNIT-V</p> <p>Rural Sanitation: Village latrines, VIP latrines, pour flush latrines, materials, construction and cost of the latrines, Pollution aspects and pollution travel from latrines. Storm water and sludge problems. Septic tank, soak pit, small bore sewer system; its design and construction. Animal waste, method of composting, Biogas, collection and disposal of wastes.</p> <p>Community Awareness and user participation: Planning of communication support in rural supply and sanitation projects.</p> | | |
| 67 | BTCE7 07 | <p>DESIGN OF WATER RESOURCES STRUCTURES LAB – I (BTCE 707)</p> <p>1. Design Problems as per syllabus of theory.</p> | BTCE707: Seminar | New Course |
| 68 | BTCE7 08 | <p>STEEL STRUCTURES DESIGN LAB – I (BTCE 708)</p> <p>1.Design Problems as per different units of syllabus of theory.</p> | BTCE708: Social Outreach, Discipline & Extra Curricular Activities | New Course |

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| 69 | BTCE7 09 | <p>CONCRETE STRUCTURES DESIGN LAB -II (BTCE 709)</p> <p>1.Design Problems as per different units of syllabus of theory.</p> | | |
| 70 | BTCE7 10 | <p>APPLICATION OF NUMERICAL METHODS IN CIVIL ENGINEERING LAB (BTCE 710)</p> <p>1.Computer programming for application of numerical methods (as described in BTCE 705) in solving problems related to Civil Engineering</p> <p>PROJECT - I</p> | | |
| 71 | BTCE8 01 | <p>Water Resource Engineering-II (BTCE 801)</p> <p>UNIT-I Regulation of works: Falls, Classification of falls, Design of falls, Distributory head regulator and cross-head regulator, Escape, bed bars. Cross-Drainage Structure: Necessity of Cross-drainage structures, their types and selection, comparative merits and demerits, design of various types of cross-drainage structure-aqueducts, siphon aqueduct, super passage siphon, level crossing and other types.</p> <p>UNIT-II Diversion Head works: Design for surface and subsurface flows, Bligh's and Khosla's methods. Selection of site and layout, different parts of diversion head works, types of weirs and barrages, design of weirs on permeable foundation, silt excluders and different types of silt ejectors. Energy dissipation.</p> <p>UNIT-III Embankment Dams: Suitable sites, causes of failures, stability and seepage analysis, flownet, slope stability analysis, precautions of piping, principles of design of earth dams. Gravity Dams: Force acting on a gravity dam, stability requirements, Instrumentation.</p> <p>UNIT-IV Spillways: Spillway capacity, flood routing through spillways, different types of spillways and gates, energy dissipation below spillways. Hydro Power Plant: General features of hydroelectric schemes, elements of power house structure, selection of turbines, draft tube and setting of turbine, cavitations</p> <p>UNIT-V Reservoirs: Evaluation of impact of water projects on river regimes and environment. Reservoir sedimentation and water shed management. Optimization: Introduction to</p> | <p>BTCE801 Project Planning and Construction Management</p> <p>Syllabus</p> <p>Unit-I Introduction: Objective, scope and outcome of the course Financial Evaluation of Projects And Project Planning: Capital investment proposals, criterions to judge the worthwhile of capital projects viz. net present value, benefit cost ratio, internal rate of return, Risk cost management, main causes of project failure. Categories of construction projects, objectives, project development process, Functions of project management, Project management organization and staffing, Stages and steps involved in project planning, Plan development process, objectives of construction project management.</p> <p>Unit-II Project Scheduling: Importance of project scheduling, project work breakdown process – determining activities involved, work breakdown structure, assessing activity duration, duration estimate procedure, Project work scheduling, Sequence of construction activities, Project management techniques – CPM and PERT networks analysis, concept of precedence network analysis.</p> <p>Unit-III Project Cost and Time Control: Monitoring the time progress and cost controlling measures in a construction project, Time cost trade-off process: direct and indirect project costs, cost slope, Process of crashing of activities, determination of the optimum duration of a project, updating of project networks, resources allocation.</p> <p>Unit-IV Contract Management: Elements of tender operation, Types of tenders and contracts, Contract document, Legal aspects of contracts, Contract negotiation & award of work, breach of contract, determination of a contract, arbitration.</p> <p>Unit-V Safety and Other Aspects of Construction</p> | New Course |

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| | | optimization techniques and system approach. Introduction to G.I.S. and Computer aided irrigation design | Management: Safety measures to be followed in various construction works like excavation, demolition of structures, explosive handling, hot bitumen work. Project Management Information System – Concept, frame work, benefits of computerized information system. Environmental and social aspects of various types of construction projects. | |
| 72 | BTCE 802 | <p align="center">Design of Steel Structures-II (BTCE 802)</p> <p>UNIT-I Design of gantry girder. Design of roof trusses including wind loading and purlin design, Introduction to Pre Engineered Buildings and tubular sections and their applications.</p> <p>UNIT-II Design of plate girder: Design of welded and bolted sections. Connections for flange plate to flange angles and flange angles to web, etc. Design of welded connections. Web and flange splicing. Horizontal, Intermediate and Bearing stiffeners. Curtailment of plates. Shear strength determination by post critical and tension field action methods. End panel design options and procedure as per IS 800.</p> <p>UNIT-III Bridges: Types of bridges, Loadings, Standard loading for railway bridges, Design of Deck type plate-girder bridges, design of its bracings and frames.</p> <p>UNIT-IV Design aspects of foot over bridges. Design of through type truss girder bridges including stringer design, cross girder design, main truss members, portal and sway bracings etc.</p> <p>UNIT-V Water tanks, circular tanks with segmental bottoms, rectangular tanks, pressed steel tanks, design of staging.</p> | <p align="center">BTCE802A Energy Management</p> <p align="center">Syllabus</p> <p>Unit-I Introduction: Objective, scope and outcome of the course.</p> <p>Unit-II Energy Basics; Energy Demand Management, Conservation & Resource Development, Energy for Sustainable Development.</p> <p>Unit-III Need for Energy Management by Sector- Industry, Buildings & Houses, Transport, Electric Power.</p> <p>Unit-IV Need for Energy Management by Sector- Agriculture, Domestic; Energy forecasting techniques; Energy Integration, Energy Matrix.</p> <p>Unit-V Energy Auditing; Energy management for cleaner production, application of renewable energy, appropriate technologies.</p> | New Course |
| 73 | BTCE802B | | <p align="center">BTCE802B Waste and By-product Utilization</p> <p align="center">Syllabus</p> <p>Unit-I Introduction: Objective, scope and outcome of the course.</p> <p>Unit-II Types and formation of byproducts and waste; magnitude of waste generation in different agro-processing industries; concept scope and maintenance of waste management and effluent treatment, basics of Waste Recycling & Resources Recovery System (WRRRS), Temperature, pH, Oxygen demands (BOD, COD), fat, oil and grease content, metal</p> | New Course |

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| | | | <p>content, forms of phosphorous and sulphur in waste waters, microbiology of waste, other ingredients like insecticide, pesticides and fungicides residues.</p> <p>Unit-III Waste utilization in various industries, furnaces and boilers run on agricultural wastes and byproducts, briquetting of biomass as fuel, production of charcoal briquette, generation of electricity using surplus biomass, producer gas generation and utilization.</p> <p>Unit-IV Waste treatment and disposal, design, construction, operation and management of institutional community and family size biogas plants, concept of vermi-composting, Pre-treatment of waste: sedimentation, coagulation, flocculation and floatation, Secondary treatments: Biological and chemical oxygen demand for different food plant waste- trickling filters, oxidation ditches, activated sludge process, rotating biological contractors, lagoons.</p> <p>Unit-V Tertiary treatments: Advanced waste water treatment process-sand, coal and activated carbon filters, phosphorous, sulphur, nitrogen and heavy metals removal, Assessment, treatment and disposal of solid waste.</p> | |
| 74 | <u>BTCE3</u> <u>11/</u> <u>BTCE8</u> <u>02C</u> | | <p align="center">BTCE802C DISASTER MANAGEMENT</p> <p align="center"><u>Syllabus</u></p> <p>Unit-I Introduction: Objective, scope and outcome of the course.</p> <p>Unit-II Understanding Disasters and Hazards and related issues social and environmental. Risk and Vulnerability. Types of Disasters, their occurrence/ causes, impact and preventive measures.</p> <p>Unit-III Natural Disasters- Hydro-meteorological Based Disasters like Flood, Flash Flood, Cloud Burst, Drought, Cyclone, Forest Fires; Geological Based Disasters like Earthquake, Tsunami, Landslides, Volcanic Eruptions.</p> <p>Unit-IV Man made Disasters: Textile Processing Industrial Hazards, Major Power Break Downs, Traffic Accidents, Fire Hazards.</p> <p>Unit-V Management roll in mitigating Disaster in Indian Textile Industries. Roll of production people in Disaster Management.</p> | Course code changed & content changed |
| 75 | BTCE 803 | <p align="center">PROJECT PLANNING & CONSTRUCTION MANAGEMENT (BTCE 803)</p> <p>UNIT-I FINANCIAL EVALUATION OF PROJECTS AND PROJECT</p> | <p align="center"><u>BTCE803 Project Planning and Construction Management Lab</u></p> <p align="center"><u>Syllabus</u></p> <p>1. Assignments on net present value, benefit cost ratio, internal rate of return.</p> | New Course |

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| | | <p>PLANNING: Capital investment proposals, criterions to judge the worth whileness of capital projects viz. net present value, benefit cost ratio, internal rate of return, Risk cost management, main causes of project failure. Categories of construction projects, objectives, project development process, Functions of project management, Project management organization and staffing, Stages and steps involved in project planning, Plan development process, objectives of construction project management.</p> <p>UNIT-II PROJECT SCHEDULING: Importance of project scheduling, project work breakdown process – determining activities involved, work breakdown structure, assessing activity duration, duration estimate procedure, Project work scheduling, Project management techniques – CPM and PERT networks analysis, concept of precedence network analysis.</p> <p>UNIT-III PROJECT COST AND TIME CONTROL: Monitoring the time progress and cost controlling measures in a construction project, Time cost trade-off process: direct and indirect project costs, cost slope, Process of crashing of activities, determination of the optimum duration of a project, updating of project networks, resources allocation.</p> <p>UNIT-IV CONTRACT MANAGEMENT: Elements of tender operation, Types of tenders and contracts, Contract document, Legal aspects of contracts, Contract negotiation & award of work, breach of contract, determination of a contract, arbitration.</p> <p>UNIT-V SAFETY AND OTHER ASPECTS OF CONSTRUCTION MANAGEMENT: Causes and prevention of accidents at construction sites, Safety measures to be followed in various construction works like excavation, demolition of structures, explosive handling, hot bitumen work. Project Management Information System – Concept, frame work, benefits of computerized information system. Environmental and social aspects of various types of construction projects.</p> | <ol style="list-style-type: none"> 2. Types of contracts – Tenders, tender form, submission and opening of tenders, measurement book, muster roll, piecework agreement and work order. 3. Drafting of tender documents, special terms and conditions. 4. Drafting of tender notices for different types of works 5. Different models of PPP like BOT, BOOT etc. 6. Arbitration. 7. Preparation of bar diagram. 8. Network Analysis using PERT and CPM. | |
| 76 | BTCE 804A | <p align="center">BRIDGE ENGINEERING (BTCE 804A)</p> <p>UNIT-I Introduction: Type of bridges & classification of road & railways bridges. IRC & Railway loadings for bridges, wind</p> | <p align="center">BTCE804 Pavement Design</p> <p align="center">Syllabus</p> <ol style="list-style-type: none"> 1. Pavement Mix Analysis: Aggregate blending, bituminous mix design – Marshall Stability approach, concrete mix design for | New Course |

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| | | <p>load & Earthquake forces. Steel bridges Design of through type & deck type steel bridges for IRC loading. Design of deck type & through type truss bridges for railway loadings.</p> <p>UNIT-II Reinforced concrete culverts & bridges: Reinforced concrete slab culvert, T-beam bridges-courbons & Hendry-Jaegar methods. Design of balanced cantilever bridge.</p> <p>UNIT-III Prestressed Concrete bridges: Prestressed & Post stressed concrete bridges Design of deck slab & girder sections.</p> <p>UNIT-IV Bearings: Bearings for slab bridges and girder bridges. Elastomeric bearings, design concepts as per IRC 83 (Part II).</p> <p>UNIT-V Joints: Expansion joints.</p> | <p>DLC and PQC with IS code provisions.</p> <p>2. Pavement Basics: Types & comparison, vehicular loading pattern, factors affecting design and performance of pavements, sub grade requirements.</p> <p>3. Design of Flexible Pavements: Analytical approach, flexible pavement layers, ESWL, repetitions of load, techniques of design methods, wheel load analysis, traffic analysis, stress distribution in sub-grade soil, Burmister's theories, group index method, CBR approach, IRC 37 and other guidelines.</p> <p>4. Design of Concrete Pavements: Westergaard's approach, temperature & frictional stresses, design of expansion & longitudinal joints, design of dowel & tie bars, IRC 58 and other guidelines.</p> <p>5. Specifications for rural roads: Important aspects of IRC SP 020, Rural Road Manual. NRRDA publications</p> | |
| 77 | BTCE 804B | <p>ADVANCED FOUNDATION ENGINEERING (BTCE 804B)</p> <p>UNIT-I Shallow Foundation: Methods of estimation of bearing capacity, computation of bearing capacity factors, Effect of eccentric and inclined loads, effect of water table on bearing capacity, Terzaghi, Vesic, Hansen, Moyerhof's analysis, Bearing capacity of stratified soils. IS code recommendations for minimum depth, factor of safety, design for local shear and general shear failure.</p> <p>UNIT-II Settlement Under Foundation: Methods of estimation of settlement of footings. Limits of settlements for various structures, Indian Standard Code Provisions (IS: 1904, 6403, 8009). Determination of allowable bearing capacity as per IS code. Schemartman's method, Dee beer's and Mortin method of finding out settlement from static cone penetration test. Methods of finding out bearing capacity from plate load test, standard penetration test data.</p> <p>UNIT-III Pile Foundation: types of pile and their use, modes of failure. Bearing capacity and settlement of pile foundation. Types of piles, Allowable load, Pile load test, Dynamic and static formulae. Bearing Capacity factors. Pile group bearing capacity and settlement. Negative skin friction. Behavior of piles under lateral loading. Winkler's assumption. Pile resistance and deflection under lateral loads, elastic method, Brooms method.</p> | | |

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| | | <p>UNIT-IV Foundation on Difficult Soils: Collapsible soil; identification, Collapse settlement: foundation design. Sanitary land fills settlement of sanitary land fill. Expansive soils: Behaviour of expansive soil, foundation practices, underreamed piles. Methods of finding out load carrying capacity of under reamed piles in clayey and sandy soil. Provision of IS 2911 Part III-1980 for design of under-reamed pile foundations.</p> <p>UNIT-V Raft foundation: Common types of raft, combined footing. Bearing capacity of raft, differential settlement of raft; semi empirical method of design of raft foundation. Well foundations: design and construction. Bearing capacity, settlement and lateral resistance. Tilts and shifts, IS and IRC codes methods.</p> | | |
| 78 | BTCE 804C | <p>EARTHQUAKE RESISTANT CONSTRUCTION & DESIGN (BTCE 804C)</p> <p>UNIT-I Introductory Seismology: Various terminology related with earthquake, Causes of earthquake, plate tectonics, Tsunami. Seismic wave propagation. Magnitude, intensity & energy of earthquake, magnitude & intensity scales, classifications of earthquakes, Seismic zoning case histories of earthquakes. Seismic hazards, induced hazards.</p> <p>UNIT-II Earthquake recording, Seismic instruments, Seismographs & Seismograms. Basic concept of liquefaction and isolation. Introduction to various IS related codes. Structural systems, Effects of earthquake on buildings in general, structural and nonstructural failures. Dynamic characteristics of buildings, natural period of vibration, damping, stiffness etc. Seismic performance of traditionally built masonry constructions, typical failure mechanism of masonry buildings under earthquakes.</p> <p>UNIT-III IS 4326: 1993: Planning consideration & architectural concept, provisions for earthquake resistant construction/ seismic strengthening of masonry constructions.</p> <p>UNIT-IV Seismic performance of reinforced concrete buildings. Plan, elevation & stiffness irregularities & their effects.</p> | | |

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| | | <p>Typical earthquake damages of RC constructions, short column effect, soft storey effect, strong column-weak beam analogy. IS 13920: 1993: Ductile detailing of reinforced concrete buildings and shear wall concept.</p> <p>UNIT-V</p> <p>Seismic design philosophy, IS 1893 (part I):2002 codal provisions : Load combinations, Design lateral loads, response reduction factors, structural modeling of building frames, equivalent load method for earthquake analysis of multistory frames.</p> | | |
| 79 | BTCE 805 | <p>DESIGN OF WATER RESOURCES STRUCTURES– II LAB (BTCE805)</p> <p>1. Design as per syllabus of theory.</p> | BTCE805: Project | New Course |
| 80 | BTCE 806 | <p>PROFESSIONAL PRACTICES AND ESTIMATING LAB (BTCE 806)</p> <p>1. Estimates – Methods of building estimates, types; site plan, index plan, layout plan, plinth area, floor area; Technical sanction, Administrative approval; estimate of buildings, roads, earthwork and R.C.C. works.</p> <p>2. Analysis of rates- for earthwork, concrete work, D.P.C., stone masonry,, plastering, pointing and roadwork.</p> <p>3. Specifications- For different classes of building and Civil Engineering works.</p> <p>4. Types of contracts – Tenders, tender form, submission and opening of tenders, measurement book, muster roll, piecework agreement and work order.</p> <p>5. Arbitration</p> <p>6. Valuation of real estate.</p> | BTCE 806: Social Outreach, Discipline & Extra | New Course |
| 81 | BTCE 807 | <p>STEEL STRUCTURES DESIGN LAB – II (BTCE 807)</p> <p>1. Design problems as per different units of syllabus of theory.</p> | | |
| 82 | BTCE 808 | <p>Design of Foundations Lab (BTCE 808)</p> <p>1. Design of isolated shallow footings, combined footings, raft foundations.</p> <p>2. Design of pile foundations.</p> <p>3. Design of wells and cassions.</p> <p>4. Design of machine foundation.</p> <p>5. Design of retaining structures etc.</p> | | |
| 83 | BTCE 809 | <p>STRUCTURAL ANALYSIS BY MATRIX METHODS LAB (BTCE 809)</p> <p>Introduction to matrix methods; Stiffness (Deflection) and Flexibility (Force) matrices for bar, plate, and beam elements w.r.t. local axes and global axes, for entire structure w.r.t. global axes (Direct method and by assembly method. Introduction of</p> | | |

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| | | Finite Element Methods. | | |
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