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| **Name of the Faculty** | **:**  |  |  |  |
| **Discipline** |  |  | **:** | **Civil Engg.** |  |  |
| **Semester** |  |  | **:** | **4th Sem.** |  |  |
| **Subject** |  |  | **:** | **CONCRETE TECH.** |  |  |
| **Lesson Plan Duration** | **:** | **15 weeks** |  |  |
|  |  |  |  |  |  |  |  |
| **Week** |  | **Theory** |  |  |  | **Practical** |  |
|  |  | **Lecture** | **Topic (including assignment / test)** | **Practical** | **Topic** |
|  |  | **Day** |  |  |  | **Day** |  |
| 1. |  |  1 | Introduction: Definition of concrete, properties of concrete, uses of concrete in comparison to other building materials | 1. | To determine the Physical properties of cement as per IS Codes. |
|  |  |  2. | Advantages and disadvantages of concrete.  |  |  |
|  |  | 3. | 2.Ingredients of Concrete2.1 Cement: physical properties of cement; different types of cement as per IS Codes |  |  |
| 2. |  | 1. | Aggregates:  2.2.1 Classification of aggregates according to size and shape | 2. | To determine Flakiness and elongation  Index of coarse aggregates. |
|  |  |  2. | 2.2.2 Characteristics of aggregates: Particle size and shape, surface texture, specific gravity of aggregate; bulk density, water absorption, surface moisture, bulking of sand, deleterious materials soundness |  |  |
|  |  |  3. | 2.2.3 Grading of aggregates: coarse aggregate, fine aggregate; All-in- aggregate; fineness modulus; interpretation of grading charts  |  |  |
| 3. |  |  1. | 2.3 Water: Water Quality requirements as per IS:456-2000 | 3. | To determine Silt in fine aggregate. |
|  |  | 2. | 3.Water Cement Ratio: 3.1 Hydration of cement principle of water-cement ratio, Duff Abram’s Water-cement ratio law: |  |  |
|  |  | 3. | Limitations of water-cement ratio law and its effects on strength of concrete |  |  |
| 4. |  | 1. | 4.Properties of Concrete 4.1 Properties in plastic state: Workability, Segregation,  | 4. | Determination of Specific gravity and water absorption of aggregates. |
|  |  | 2. |  Bleeding and Harshness  |  |  |  |
|  |  | 3. | 4.1.1Factors affecting workability, Measurement of workability: slump test, compacting factor and Vee Bee consistometer;  |  |  |
| 5. |  | 1. | Recommended slumps for placement in various conditions as per IS:456-2000/SP-23 | 5. | Determination of Bulk density and void of aggregates. |
|  |  | 2. | Properties in hardened state: Strength, Durability, Impermeability, Dimensional changes; |  |  |  |
|  |  | 3. | 5. Concrete Mix Design 5.1Objectives of mix design, introduction to various grades as per IS:456-2000; proportioning for nominal mix design as prescribed by IS 456-2000 |  |  |
| 6. |  | 1. | First Sessional and Assignment |  | 6. | Determination of Particle size distribution of fine, coarse and all in aggregates by sieve analysis |
|  |  | 2. | 5.2 Adjustment on site for: Bulking of fine aggregate, water absorption of aggregate, workability |  |  |
|  |  | 3. | 5.3 Difference between nominal and controlled concrete 5.4. Introduction to IS-10262-2009-Code for controlled mix design. |  |  |
| 7. |  | 1. | 6. Introduction to Admixtures (chemicals and minerals) for improving performance of concrete  | 7. | Revision |
|  |  | 2 |  DO |  |  |
|  |  | 3. | 7. Special Concretes (only features) |  |  |
|  |  |  |  |  |  |  |
| 8. |  | 1. | 7.1Concreting under special conditions, difficulties and precautions before, during and after concreting 7.1.1 Cold weather concreting 7.1.2 Under water concreting 7.1.3 Hot weather concreting | 8. | Viva-voce |
|  |  | 2. | 7.2 Ready mix concrete7.3 Fibre reinforced concrete |  |  |
|  |  | 3. | 7.4 Polymer Concrete 7.5 Fly ash concrete7.6 Silica fume concrete |  |  |
| 9. |  | 1. | 8. Concreting Operations: 8.1 Storing of Cement: 8.1.1 Storing of cement in a warehouse 8.1.2 Storing of cement at site 8.1.3 Effect of storage on strength of cement  | 9. | To determine necessary Adjustment for bulking of fine aggregates. |
|  |  | 2. | 8.1.4 Determination of warehouse capacity for storage of Cement |  |  |
|  |  | 3. | 8.2 Storing of Aggregate: Storing of aggregate at site |  |  |
| 10. |  | 1. | 8.3 Batching (to be shown during site visit ) 8.3.1 Batching of Cement | 10. | To determine workability by Slump test |
|  |  | 2. | 8.3.2 Batching of aggregate by:8.3.2.1 Volume, using gauge box (farma) selection of proper gauge box |  |  |
|  |  | 3. | 8.3.2.2 Weight spring balances and batching machines 8.3.3 Measurement of water |  |  |
| 11. |  | 1. | 8.4 Mixing: 8.4.1 Hand mixing 8.4.2 Machine mixing - types of mixers, capacities of mixers, choosing appropriate size of mixers, operation of mixers | 11. | To verify the Effect of water, aggregate/cement |
|  |  | 2. | 8.4.3 Maintenance and care of mixers |  | ratio on slump |
|  |  |  |  |  |  |
|  |  | 3. | Second Sessional and Assignment |  |  |
|  |  |  |  |  |  |
| 12. |  | 1. | 8.5 Transportation of concrete: Transportation of concrete using: wheel barrows, transit mixers, chutes, belt conveyors, pumps, tower crane and hoists etc. | 12. | Compaction factor test for workability. |
|  | 2. | 8.6 Placement of concrete:Checking of form work, shuttering and precautions to be taken during placement |
|  3 | 8.7 Compaction:8.7.1Hand compaction   8.7.2 Machine compaction - types of vibrators, internal screed vibrators and form vibrators 8.7.3 Selection of suitable vibrators for different situations |
|  13. |  1. | 8.8 Finishing concrete slabs - screeding, floating and trowelling | 13. | Non destructive test on concrete. |
|  | 2. | 8.9 Curing:  8.9.1Objective of curing, methods of curing like ponding, membrane curing, steam curing, chemical curing 8.9.2 Duration for curing and removal of form work |  |  |
|  | 3. | 8.10 Jointing: Location of construction joints, treatment of construction joints, expansion joints in buildings - their importance and location |  |  |
|   14. | 1. | 8.11Defects in concrete: Identification of defects and methods of removing defects | 14. | Tests for Compressive strength of concrete cubes. |
|  | 2. | 9.Importance and methods of non-destructive tests (introduction only)  9.1. Rebound Hammer Test 9.2. Pulse Velocity method  |  |  |
|  | 3. | Revision  |  |  |
|  15. | 1 | Assignment | 15. | To determine flexural strength of Concrete beam. |
|  | 2 | Third Sessional |  |  |
|  | 3 | Full Syllabus Test |  |  |

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|  **Name of the Faculty** | **:**  | DHEERAJ SAHNI |  |  |
| **Discipline** |  |  | **:** | **Civil Engg.** |  |  |
| **Semester** |  |  | **:** | **4th Sem.** |  |  |
| **Subject** |  |  | **:** | **Surveying** |  |  |
| **Lesson Plan Duration** | **:** | **15 weeks** |  |  |
|  |  |  |  |  |  |  |  |
| **Week** |  | **Theory** |  |  |  | **Practical** |  |
|  |  | **Lecture** | **Topic (including assignment / test)** | **Practical** | **Topic** |
|  |  | **Day** |  |  |  | **Day** |  |
| 1. |  | 1. | 1Contouring | Concept of contours, purpose of contouring, contour interval and horizontal equivalent |  | Preparing a Contour plan by radial line method |
|  |  | 2. | factors effecting contour interval, characteristics of contours, methods of contouring: Direct and indirect, use of stadia measurements in contour survey |  | -do- |
| 2. |  | 1. | interpolation of contours; use of contour map, Drawing cross section from a contour map; marking alignment of a road, railway and a canal on a contour map |  | Preparing a Contour plan by method of squares |
|  |  |  |  |  |
|  |  | 2. | computation of earth work and reservoir capacity from a contour map |  | -do- |
|  |  |  |  |  |  |
| 3. |  | 1. | 2. Theodolite Surveying: Working of a transit vernier theodolite, axes of a theodolite and their relation; temporary adjustments of a transit theodolite; concept of transiting, swinging, face left, face right and changing face |  | Preparing a contour plan of |
|  |  |  |  |  | Road/Railway track/canal by taking cross sections. |
|  |  | 2. | Measurement of horizontal and vertical angles. Prolonging a line (forward and backward) measurement of bearing of a line |  | -do- |
| 4. |  | 1. | traversing by included angles and deflection angle method; traversing by stadia measurement, theodolite triangulation, plotting a traverse |  | Basic about a theodolite |
|  |  | 2. | concept of coordinate and solution of omitted measurements (one side affected), errors in theodolite survey and precautions taken to minimize them;  |  | Study of a transit vernier theodolite,Temp. adjustment of a Theodolite |
| 5. |  | 1. | Limits of precision in theodolite traversing. Height of objects – accessible and non-accessible bases3.Tacho-metric surveying: Tachometry, Instruments to be used in tachometry, methods of tachometry Assignment |  | Reading of a vernier and working out least count, measurement of horizontal angles by repetition and reiteration methods. |
|  |  | 2. |   First Sessional |  | Measurement of vertical angles |
| 6. |  | 1. | Stadia system of tachometry, general principles of stadia tachometry, examples of stadia tachometry and Numerical problems. |  | Measurement of magnetic bearingof a line |
|  |  |  |  |
|  |  | 2. |  DO |  | Running a closed traverse with a |
|  |  |  |  |  |  |  | theodolite |
| 7. |  | 1. | 4 Curves: 4.1 Simple Circular Curve:\*Need and definition of a simple circular curve; Elements of simple circular curve - Degree of the curve, radius of the curve, tangent length, point of intersection (Apex point), tangent point |  |  -DO- |
|  |  | 2. | length of curve, long chord deflection angle, Apex distance and Mid-ordinate. Setting out of simple circular curve: |  | To find the height of objects with and without accessible bases. |
|  |  |  |  |  |  |  |  |
| 8. |  | 1. | a) By linear measurements only: - Offsets from the tangent - Successive bisection of arcs - Offsets from the chord produced |  | Revision practice of theodolite |
|  |  | 2. | b)By tangential angles using a theodolite |  |  -DO- |
| 9. |  | 1. | 4.2 Transition Curve:Need (centrifugal force and super elevation) and definition of transition curve; requirements of transition curve; |  | Viva-voce |
|  |  | 2. | Assignment |  II |  |  |
| 10. |  | 1. | Second Sessional |  | Setting out simple circular curve |
|  |  |  |  |  |  |  | with offsets from the chords |
|  |  |  |  |  |  |  | produced |
|  |  | 2. | length of transition curve for roads; by cubic parabola; calculation of offsets for a transition curve;  |  | -do- |
| 11. |  | 1. | setting out of a transition curve by tangential offsets only |  |  Setting out simple circular curvewith [a] offsets from chord produced [b] one theodolite  |
|  |  |  |  |  |
|  |  | 2. | 4.3 Vertical curveSetting out of a vertical curve |  |  -DO- |
| 12. |  | 1. | 5.Introduction to the use of Modern Surveying equipment and techniques such as: a] EDM or Distomat |  | Use of minor instruments |
|  |  |  |  |  |  |
|  |  | 2. | b]Planimeter (Digital)c]Total station d]Introduction to remote sensing and GPS  |  | Use of minor instruments |
| 13. |  | 1. | e] Auto level f]Digital theodolite |  | Use of minor instruments |
|  |  | 2. |  Revision |  | Demonstration of digital |
|  |  |  |  |  |  |  | instruments |
|   14. | 1. |  DO |  | To plot the area with the help of Total Station |
|  | 2. |  Assignment III |  | Field Visit |
| 15. | 1. | Third Sessional |  | Viva-voce and practice |
|  | 2. | Full Syllabus Test |  | Viva-voce and practice |

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| **Name of the Faculty** | **:** |  M.P.SINGH |  |  |
| **Discipline** |  |  | **:** | **Civil Engg.** |  |  |
| **Semester** |  |  | **:** | **4th Sem.** |  |  |
|  **Subject** |  |  | : | **Public Health and Irrigation Engg Drawing** |  |  |
| **Lesson Plan Duration** | **:** | **15 weeks** |  |  |
|  |  |  |  |  |  |  |  |
| **Week** |  | **Theory** |  |  | **Practical** |  |
|  |  | **Lecture** | **Topic (including assignment / test)** | **Practical** | **Topic** |
|  |  | **Day** |  |  |  | **Day** |  |
| 1. |  |  |  |  |  | 1. | X-section of Standard types of open drains. |
|  |  |  |  |  |  | 2. | X-section of earthenware and RCC |
|  |  |  |  |  |  |  | Sewer pipes. |
| 2. |  |  |  |  |  | 3. | X-section of masonry sewers[Circular and Egg shaped] |
|  |  |  |  |  |  | 4. | Detailed section of floor trap , gully trap |
| 3. |  |  |  |  |  | 5. | Detailed plan and section of an inspection chamber. |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | 6. | Detailed plan and section of a manhole |
| 4. |  |  |  |  |  | 7. | Detailed plan &X-section of a |
|  |  |  |  |  |  |  | Domestic septic tank with soak pit for 5-10 users |
|  |  |  |  |  |  | 8. |  DO |
|  |  |  |  |  |  |  |  |
| 5. |  |  |  |  |  | 9. | X-section through the external wall |
|  |  |  |  |  |  |  | of lavatories at Ground and First Floor. |
|  |  |  |  |  |  | 10. |  First Sessional |
| 6. |  |  |  |  |  | 11. | Plan of a bathroom showing positions of various fittings. |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | 12. | Draw Sectional elevation of a twostorey building showing details ofone pipe system and two pipesystem |
| 7. |  |  |  |  |  | 13. |  DO |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  | 14. |  Revision |
| 8. |  |  |  |  |  | 15. |  Revision |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | 16. | Reading of working drawings |
| 9. |  |  |  |  |  | 17. | Reading of working drawings |
|  |  |  |  |  |  | 18. | L-section of a channel |
| 10. |  |  |  |  |  | 19. | Typical X-sections of various canal |
|  |  |  |  |  |  |  | sections |
|  |  |  |  |  |  | 20. |  Second Sessional |
| 11. |  |  |  |  |  | 21. | Plan of a canal head works |
|  |  |  |  |  |  | 22. | Typical L-section of a weir |
| 12. |  |  |  |  |  | 23. | X-section of an earthen dam |
|  |  |  |  |  |  | 24. | -do- |
| 13. |  |  |  |  |  | 25. | X-section of a tube-well |
|  |  |  |  |  |  | 26. | -do- |
| 14. |  |  |  |  |  | 27. | Layout and X-section of rain water harvesting System |
|  |  | 28. | Third Sessional |
|   15. |  |  | 29. |  Revision |
|  |  |  | 30. |  Viva-voce |

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| **Name of the Faculty** | **:**  |  |  |  |
| **Discipline** |  |  | **:** | **Civil Engg.** |  |  |
| **Semester** |  |  | **:** | **4th Sem.** |  |  |
| **Subject** |  |  | **:** | **Structural Mechanics** |  |  |
| **Lesson Plan Duration** | **:** | **15 weeks** |  |  |
|  |  |  |  |  |  |  |  |
| **Week** |  | **Theory** |  |  |  | **Practical** |  |
|  |  | **Lecture** | **Topic (including assignment / test)** | **Practical** | **Topic** |
|  |  | **Day** |  |  |  | **Day** |  |
| 1. |  |  1 | 1. Properties of Materials 1.1 Classification of materials, elastic materials, plastic materials, ductile materials, brittle materials. | 1. | i)Determination of yield stress, ultimate stress, percentage elongation and plot the stress strain diagram and compute the value of young's modulus on mild steel |
|  |  |  2. | 1.2 Introduction to tensile test, compressive test, impact test, fatigue test, torsion test on metals. |  |  |
|  |  | 3. | 2. Simple Stresses and Strains 2.1 Concept of stress, normal and shear stresses |  |  |
| 2. |  | 1. | 2.2 Concept of strain and deformation, longitudinal and transverse strain,  | 2. | DO |
|  |  |  2. | poisson's ratio, volumetric strain |  |  |
|  |  |  3. | 2.3 Hooke's law, modulii of elasticity and rigidity, Bulk modulus of elasticity, relationship between the elastic constants. |  |  |
| 3. |  |  1. | 2.4 Stresses and strains in bars subjected to tension and compression. Extension of uniform bar under its own weight | 3. | ii)Testing of HYSD Steel |
|  |  | 2. | stress produced in compound bars (two or tPeriodsee) due to axial load |  |  |
|  |  | 3. | 2.5 Stress-strain diagram for mild steel and HYSD steel, mechanical properties, factor of safety.  |  |  |
| 4. |  | 1. | 2.6 Temperature stresses and strains | 4. | DO |
|  |  | 2. | 3. Shear Force and Bending Moment: 3.1  Concept of a beam and supports (Hinges, Roller and Fixed), |  |  |
|  |  | 3. | types of beams: simply supported, cantilever, propped, over hang, cantilever and continuous beams (only concept). |  |  |
| 5. |  | 1. | 3.2 Types of loads (dead load, live load, snow load, wind load seismic load as per IS Codes etc) and types of loading (point, uniformly distributed and uniformly varying loads) | 5. | iii)Determination of Young's modulus of elasticity for steel wire with searl's apparatus |
|  |  | 2. | Assignment |  |  |
|  |  | 3. | First Sessional |  |  |
| 6. |  | 1. | 3.3 Concept of bending moment and shear force, sign conventions | 6. | DO |
|  |  | 2. | 3.4 Bending Moment and shear force diagrams for cantilever, simply supported and overhanging beams subjected to concentrated, uniformly distributed  |  |  |
|  |  | 3. | DO |  |  |
| 7. |  | 1. | 3.5Relationship between load, shear force and bending moment, point of maximum bending moment, and point of contraflexure. | 7. | iv) Determination of modulus of rupture of a concrete beam |
|  |  | 2. | DO |  |  |
|  |  | 3. | 4.Moment of Inertia: Concept of moment of inertia and second moment of area and radius of gyration, theorems of parallel and perpendicular axis |  |  |
|  |  |  |  |  |  |  |
| 8. |  | 1. | Second moment of area of common geometrical sections: rectangle, triangle, circle *(without derivations).*  | 8. | DO |
|  |  | 2. | Second moment of area for L, T and I sections, section modulus. |  |  |
|  |  | 3. | 5.Bending Stresses in Beams: 5.1 Concept of pure/simple bending |  |  |
| 9. |  | 1. | 5.2 Assumptions made in the theory of simple bending, derivation and application of bending equation to circular cross-section, I section, T&L sections only  | 9. | v)Determination of maximum deflection and young's modulus of elasticity in simply supported beam with load at middle third point |
|  |  | 2. | Moment of resistance Calculations of bending stresses in simply supported beam |  |  |
|  |  | 3. | 6.Shear Stresses in Beams 6.1Concept of shear stresses in beams,  |  |  |
| 10. |  | 1. | shear stress distribution in rectangular, circular I, T, L sections for S.S. beams and Portland  | 10. | DO |
|  |  | 2. | Assignment II |  |  |
|  |  | 3. | Second Sessional |  |  |
| 11. |  | 1. | 7.Slope and Deflection:Determination of slope and deflection using Moment Area Theorem for simply supported beam for pointed load and U.D.L.(no derivation, numerical problems) | 11. | DO |
|  |  | 2. | DO |  |  |
|  |  |  |  |  |  |
|  |  | 3. | DO |  |  |
|  |  |  |  |  |  |
| 12. |  | 1. | 8.Columns: 8.1Theory of columns  | 12. | vi)Verification of forces in a framed structure |
|  | 2. | 8.2 Problem solving using Eulers and Rankine Formula  |  |  |
|   3 | 9.Analysis of Trusses: 9.1Concept of a perfect, redundant and deficient frames  |  |  |
|  13. | 1. | 9.2  Assumptions and analysis of trusses by:a) Method of joints | 13. | DO |
|  | 2. | b)Method of sections  |  |  |
|  | 3. | DO |  |  |
|   14. | 1. | Assignment III | 14. | DO |
|  | 2. | Revision |  |  |
|  | 3. | Third Sessional |  |  |
|  15. | 1. | Revision | 15. |  |
|  | 2. | DO |  | Revision |
|  | 3. | Full Syllabus Test |  |  |

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| **Name of the Faculty** | **:**  | Rakesh Kumar |
| **Discipline** |  |  | **:** | **Civil Engg.** |
| **Semester** |  |  | **:** | **4th Sem.** |
| **Subject** |  |  | **:** | **Reinforced Concrete Design** |
| **Lesson Plan Duration** | **:** | **15 weeks** |
|  |  |  |  |  |  |
| **Week** |  | **Theory** |  |  |  |
|  |  | **Lecture** | **Topic (including assignment / test)** |
|  |  | **Day** |  |  |  |
| 1. |  |  1 | 1.Introduction 1.1Concept of Reinforced Cement Concrete (RCC)1.2 Reinforcement Materials:Suitability of steel as reinforcing materialProperties of mild steel and HYSD steel |
|  |  |  2. | 1.3.Loading on structures as per IS: 875 |
|  |  | 3. | 2.Introduction to following methods of RCC design 2.1 Working stress method: Definition and basic assumptions |
| 2. |  | 1. | 2.2 Limit state method: Definition and basic assumptions |
|  |  |  2. | 3.Shear and Development Length Shear as per IS:456-2000 by working stress method i)Shear strength of concrete without shear reinforcement |
|  |  |  3. | ii)Maximum shear stressiii]Shear reinforcement |
| 3. |  |  1. | 4.Concept of Limit State Method 4.1.Definitions and assumptions made in limit state of collapse (flexure) |
|  |  | 2. | 4.2. Partial factor of safety for materials4.3. Partial factor of safety for loads |
|  |  | 3. | 4.4. Design loads4.5. Stress block, parameters |
| 4. |  | 1. | 5.Singly Reinforced beam : Theory and design of singly reinforced beam by Limit State Method |
|  |  | 2. | DO |  |
|  |  | 3. | DO |
| 5. |  | 1. | DO |
|  |  | 2. | DO |  |
|  |  | 3. | DO |
| 6. |  | 1. | First Sessional |
|  |  | 2. | 6.Doubly Reinforced Beams: Theory and design of simply supported doubly reinforced rectangular beam by Limit State Method |
|  |  | 3. | DO |
| 7. |  | 1. |  DO |
|  |  | 2. | DO |
|  |  | 3. | DO |
|  |  |  |  |  |
| 8. |  | 1. | DO |
|  |  | 2. | DO |
|  |  | 3. | 7. Behaviour of T beam, inverted T beam, isolated T beam and ‘L’ beams (No Numericals)  |
| 9. |  | 1. | 8. One Way Slab:Theory and design of simply supported one way slab including sketches showing reinforcement details (plan and section) by Limit State Method.. |
|  |  | 2. | DO |
|  |  | 3. | DO |
| 10. |  | 1. | DO |
|  |  | 2. | DO |
|  |  | 3. | DO |
| 11. |  | 1. | Second Sessional |
|  |  | 2. | 9.Two Way Slab: Theory and design of two-way simply supported slab with corners free to lift, no provisions for torsional reinforcement by Limit State Method including sketches showing reinforcement details (plan and two sections)  |
|  |  |  |
|  |  | 3. | DO |
|  |  |  |  |
| 12. |  | 1. | DO |
|  |  | 2. | DO |
|  |   3 | DO |
|  13. | 1. | 10.Axially Loaded Column 10.1 Definition and classification of columns10.2. Effective length of column, 10.3. Specifications for longitudinal and lateral reinforcement |
|  | 2. | DO |
|  | 3. | 10.4.Design of axially loaded square, rectangular and circular short columns by Limit State Method including sketching of reinforcement(sectional elevation and plan) |
|   14. | 1. | DO |
|  | 2. | 11Pre-stressed Concrete 11.1 Concept of pre-stressed concrete11.2 Methods of pre-stressing : pre-tensioning and post-tensioning |
|  | 3. | 11.3 Advantages and disadvantages of pre-stressing11.4 Losses in pre-stress |
|  15. | 1. | Revision |
|  | 2. | Third Sessional |
|  | 3. | Full Syllabus Test |

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| **Name of the Faculty** | **:**  |  |
| **Discipline** |  |  | **:** | **Civil Engg.** |
| **Semester** |  |  | **:** | **4th Sem.** |
| **Subject** |  |  | **:** | **Irrigation Engineering** |
| **Lesson Plan Duration** | **:** | **15 weeks** |
|  |  |  |  |  |  |
| **Week** |  | **Theory** |  |  |  |
|  |  | **Lecture** | **Topic (including assignment / test)** |
|  |  | **Day** |  |  |  |
| 1. |  |  1 | 1. Introduction:  1.1 Definition of irrigation 1.2 Necessity of irrigation  |
|  |  |  2. | 1.3 History of development of irrigation in India1.4 Major, medium and minor irrigation projects |
|  |  | 3. | 2. Water Requirement of Crops 2.1 Principal crops in India and their water requirements 2.2 Crop seasons – Kharif and Rabi |
| 2. |  | 1. | 2.3 Soil water, soil crop and crop water relationships, Duty, Delta and Base Period, their relationship |
|  |  |  2. | 2.4 Gross commanded area (GCA), culturable commanded area (CCA), Intensity of Irrigation, Irrigable area |
|  |  |  3. | 3. Hydrological Cycle Catchment Area and Run-off  Rainfall , definition rain-gauges – automatic and non-automatic,  |
| 3. |  |  1. | methods of estimating average rainfall (Arithmatic system)  |
|  |  | 2. | catchment area runoff, factors affecting runoff, hydrograph, basic concept of unit hydrograph. |
|  |  | 3. | 4.Methods of Irrigation 4.1 Flow irrigation - its advantages and limitations |
| 4. |  | 1. | 4.2 Lift Irrigation – Tubewell, submersible and well irrigation advantages and disadvantages |
|  |  | 2. | 4.3 Drip irrigation, suitability of drip irrigation, layout, component parts, advantages  |
|  |  | 3. |  5.Canals 5.1 Classification, appurtenances of a canal and their functions, sketches of different canal cross-sections  |
| 5. |  | 1. | 5.2 Various types of canal lining - their related advantages and disadvantages, sketches of different lined canal x-sections  |
|  |  | 2. | 5.3 Breaches and their control |
|  |  | 3. | 5.4 Maintenance of lined and unlined canals  |
| 6. |  | 1. |  Assignment |
|  |  | 2. | First Sessional |
|  |  | 3. | 6. Tube Well Irrigation: 6.1Introduction, occurrence of ground water, location and command, advantages and disadvantages, comparison with canal irrigation |
| 7. |  | 1. | 6.2 Tube wells, explanation of terms: water table, radius of influence, depression head, cone of depression, confined and unconfined aquifers. Yield of a well and methods of determining yield of well |
|  |  | 2. | 6.3 Types of tube wells and their choice-cavity, strainer and slotted type; |
|  |  | 3. | 6.4Method of boring, installation of well assembly, development of well, pump selection and installation and maintenance  |
|  |  |  |  |  |
| 8. |  | 1. | 6.5Water Harvesting Techniques: Need and requirement of various methods, Run-off from roof top and ground surface, construction of recharge pits and recharge wells and their maintenance. |
|  |  | 2. | 7. Dams7.1 Classification of dams; earth dams - types, causes of failure; cross-section of zoned earth dam, method of construction, gravity dams – types, cross-sections of a dam, method of construction   |
|  |  | 3. | 7.2 Concept of small and micro dams |
| 9. |  | 1. | 7.3 Concept of spillways and energy dissipators |
|  |  | 2. | 8. Canal Head Works and Regulatory Works Definition, object, general layout, functions of different parts of head works.  |
|  |  | 3. | Difference between weir and barrage |
| 10. |  | 1. | 9 Cross Drainage Works 9.1 Functions and necessity of the following types: aqueduct, super passage, level crossing, inlet and outlet |
|  |  | 2. | 9.2 Sketches of the above cross drainage works |
|  |  | 3. | Assignment II |
| 11. |  | 1. | Second Sessional |
|  |  | 2. | 10 Definitions of following Hydraulic Structures with Sketches10.1 Falls10.2 Cross and head regulators |
|  |  |  |  |
|  |  | 3. | 10.3 Outlets 10.4 Canal Escapes |
|  |  |  |  |
| 12. |  | 1. | 11. River Training Works Methods of river training, guide banks, retired (levees) embankments  |
|  |  | 2. |  groynes and spurs, pitched island, cut-off  |
|  |   3 | 12. Water Logging and Drainage and Ground Water Re-charge 12.1Definition of water logging – its causes and effects, detection,  |
|  13. | 1. |  prevention and remedies |
|  | 2. | 12.2 Surface and sub-surface drains and their layout |
|  | 3. | 12.3 Concept and various techniques used for ground water re-charge |
|   14. | 1. | Assignment III |
|  | 2. | Third Sessional |
|  | 3. | Revision |
|  15. | 1. | DO |
|  | 2. | DO |
|  | 3. | Full Syllabus Test |

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| **Name of the Faculty** | **:**  |  |  |  |
| **Discipline** |  |  | **:** | **Civil Engg.** |  |  |
| **Semester** |  |  | **:** | **4th Sem.** |  |  |
| **Subject** |  |  | **:** | **Public Health Engg** |  |  |
| **Lesson Plan Duration** | **:** | **15 weeks** |  |  |
|  |  |  |  |  |  |  |  |
| **Week** |  | **Theory** |  |  |  | **Practical** |  |
|  |  | **Lecture** | **Topic (including assignment / test)** | **Practical** | **Topic** |
|  |  | **Day** |  |  |  | **Day** |  |
| 1. |  |  1 | 1.Introduction 1.1Necessity and brief description of water supply system.1.2 Sources of water – surface/sub-surface sources | 1. | 1) To determine turbidity of water sample |
|  |  |  2. | 2 Quantity of Water 2.1 Water requirement   |  |  |
|  |  | 3. | 2.2 Rate of demand and variation in rate of demand |  |  |
| 2. |  | 1. | 2.3 Per capita consumption for domestic, industrial, public and fire fighting uses as per BIS standards (no numerical problems) | 2. | 2) To determine dissolved oxygen of given sample |
|  |  |  2. | 2.4 Population Forecasting |  |  |
|  |  |  3. | 3. Quality of Water 3.1 Meaning of pure water and methods of analysis of water   |  |  |
| 3. |  |  1. | 3.2 Physical, Chemical and bacteriological tests and their significance | 3. | 3) To determine pH value of water |
|  |  | 2. | 3.3 Standard of potable water as per Indian Standard  |  |  |
|  |  | 3. | 3.4 Maintenance of purity of water |  |  |
| 4. |  | 1. | 4. Water Treatment (brief introduction) 4.1 Sedimentation - purpose, types of sedimentation tanks  | 4. | 4) To perform jar test for coagulation |
|  |  | 2. | 4.2 Coagulation/floculation - usual coagulation and their feeding |  |  |  |
|  |  | 3. | 4.3 Filtration - significance, types of filters, their suitability |  |  |
| 5. |  | 1. |  4.4 Necessity of disinfection of water, forms of chlorination, break point chlorine, residual chlorine, application of chlorine. | 5. | 5)To determine BOD of given sample |
|  |  | 2. | 4.5 Flow diagram of different treatment units, functions of (i) Areation fountain (ii) mixer (iii) floculator, (iv) classifier, (v) slow and rapid sand filters (vi) chlorination chamber. |  |  |  |
|  |  | 3. | Assignment I |  |  |
| 6. |  | 1. | First Sessional |  | 6. | 6) To determine residual chlorine in water |
|  |  | 2. | 5. Conveyance of Water 5.1 Different types of pipes - cast iron, PVC, steel, asbestos cement, concrete and lead pipes. Their suitability and uses, types of joints in different types of pipes. |  |  |
|  |  | 3. | 5.2 Appurtenances: Sluice, air, reflux valves, relief valves, scour valves, bib cocks, stop cocks,  |  |  |
| 7. |  | 1. | fire hydrants, water meters their working and uses | 7. | 7) To determine conductivity of water and total dissolved solids |
|  |  | 2 | 6. Laying of Pipes 6.1 Setting out alignment of pipes 6.2 Excavation for laying of pipes and precautions to be taken   |  |  |
|  |  | 3. | 6.3 Handling, lowering and jointing of pipes6.4 Testing of pipe lines |  |  |
|  |  |  |  |  |  |  |
| 8. |  | 1. | 6.5 Back filling 7.Building Water Supply 7.1 Connections to water main (practical aspect only) | 8. | 8) To study the installation of following: a) Water meterb) Connection of water supply of building with main  |
|  |  | 2. |  7.2 Water supply fittings (with sketches) and terminology related to plumbing |  |  |
|  |  | 3. | **B. WASTE WATER ENGINEERING** 8.Introduction8.1Purpose of sanitation8.2 Necessity of systematic collection and disposal of waste |  |  |
| 9. |  | 1. | 8.3 Definition of terms in sanitary engineering8.4 Collection and conveyance of sewage | 9. | c) Pipe valves and bendsd) Water supply and sanitary fittings |
|  |  | 2. | 8.5 Conservancy and water carriage systems, their advantages and Disadvantages8.6 (a) Surface drains (only sketches) : various types, suitability (b) Types of sewage: Domestic, industrial, storm water and its seasonal       variation |  |  |
|  |  | 3. | 9. Sewerage System 9.1 Types of sewerage systems, materials for sewers, their sizes and joints9.2 Appurtenance: Location, function and construction features. Manholes,  |  |  |
| 10. |  | 1. | drop manholes, tank hole, catch basin, inverted siphon, flushing tanks grease and oil traps, storm regulators, ventilating shafts | 10. | 9) To study and demonstrate the joining/tPeriodseading of GI Pipes, CI Pipes, SWG pipes, PVC pipes and copper pipes. |
|  |  | 2. | 10. Laying and Construction of Sewers: 10.1Setting out/alignment of sewers10.2 Excavations, checking the gradient with boning rods preparation of bedding, handling and jointing testing and back filling of sewers/pipes. |  |  |
|  |  | 3. | 10.3 Construction of surface drains and different sections required |  |  |
| 11. |  | 1. |  Assignment II | 11. | 10) To demonstrate the laying of SWG pipes for sewers |
|  |  | 2. | Second Sessional |  |
|  |  |  |  |  |  |
|  |  | 3. | 11Sewage Characteristics: 11.1Properties of sewage and IS standards for analysis of sewage  |  |  |
|  |  |  |  |  |  |
| 12. |  | 1. | 11.2 Physical, chemical and bacteriological parameters |  12 | 11)Study of water purifying process by visiting a field lab |
|  | 2. | 12. Natural Methods of Sewerage Disposal 12.1 General composition of sewage and disposal methods12.2 Disposal by dilution  |
|  3 | 12.3 Self purification of stream12.4 Disposal by land treatment12.5 Nuisance due to disposal |
|  13. |  1. | 13. Sewage Treatment 13.1 Meaning and principle of primary and secondary treatment and activated sludge process their flow diagrams |  13. | 12) Demonstration of plumbing tools |
|  | 2. | 13.2 Introduction and uses of screens, grit chambers, detritus tanks, skimming tanks, plainsedimentation tanks, primary clarifers, secondary clarifers, filters, control beds |  |  |
|  | 3. | intermittent sand filters, trickling filters, sludge treatment and disposal, oxidation ponds (Visit to a sewage treatment plant) |  |  |
|   14. | 1. | 14. Building Drainage 14.1 Aims of building drainage and its requirements  | 14. |  |
|  | 2. | 14.2 Different sanitary fittings and installations 14.3 Traps |  |  |
|  | 3. | Assignment III |  |  |
|  15. | 1 | Third Sessional | 15. |  |
|  | 2 | Revision |  |  |
|  | 3 | Full Syllabus |  |  |