**NBKR INSTITUTE OF SCIENCE & TECHNOLOGY :: VIDYANAGAR**

*(AUTONOMOUS)*

**CIVIL ENGINEERING**

SCHEME OF INSTRUCTION AND EVALUATION

(With effect from the batch admitted in the academic year 2013-2014)

**III YEAR OF FOUR YEAR B.TECH. DEGREE COURSE – II SEMESTER**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.No. | Course  Code | Course Title | Contact  Hours/  Week | | | Credits | Evaluation | | | | | | | | | |
| Sessional  Test-I | | Sessional  Test-II | | | Total Sessional Marks (Max. 40) | Semester  End Examination | | Max.  Total Marks | |
| **THEORY** | L | P | T |  | Duration  in Hours | Max.  Marks | Duration  in Hours | | Max.  Marks | 0.8(Better of two sessional tests)  +  0.2(Other) | Duration  in Hours | Max.  Marks |  | |
| 1 | 13CE3201 | R.C.C. Structural Design - II | 3 | - | 1 | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 2 | 13CE3202 | Hydrology | 4 | - | - | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 3 | 13CE3203 | Structural Analysis -II | 3 | - | 1 | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 4 | 13CE3204 | Concrete Technology | 4 | - | - | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 5 | 13CE3205 | Environmental Engineering - I | 4 | - | - | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 6 | 13CE32EX | Elective –I | 4 | - | - | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
|  | | **PRACTICALS** |  |  | | | | | | | |  |  | | | |
| 1 | 13SH32P1 | Advanced Communication Skills Laboratory | - | 3 | - | 2 | - | - | | - | - | Day-to-day Evaluation and a test | 3 | 60 | | 100 |
| 2 | 13CE32P1 | Highway Materials Laboratory | - | 3 | - | 2 | - | - | | - | - | 3 | 60 | | 100 |
|  |  | **TOTAL** | **22** | **06** | **02** | **28** |  |  | |  |  |  |  | | **800** |

**Elective I:**

13CE32E1 Industrial Steel Structural Design

13CE32E2 Advanced Foundation Engineering

13CE32E3 Transportation Planning

13CE32E4 Industrial Waste and Waste Water Management

13CE32E5 Ground Water Hydrology

**13CE3204 –CONCRETE TECHNOLOGY**

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| --- | --- | --- | --- |
| **Course category:** | Program core | **Credits:** | 4 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3 - 1 - 0 |
| **Prerequisite:** | Building Technology (2-1) | **Sessional Evaluation :**  **Univ.Exam Evaluation:**  **Total Marks:** | 40  60  100 |

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| **Course Outcomes** | CO1 | Understand the behavior and characteristics of various types of cements and additives. |
| CO2 | Understand the characteristics and behavior of various types of aggregates. Determine the properties of fresh and hardened concrete. Understand the different types of mixing, storage, transportation and placement of concrete. |
| CO3 | Understand the various methods of curing concrete. Understand the various tests to be conducted on hardened concrete. |
| CO4 | Understand the long term behavior of elasticity, shrinkage and creep. Understand the durability of concrete. |
| CO5 | Be able to design concrete mix for various grades using different methods |
| **Course Content** | **UNIT – I**  **PORTLAND CEMENT :** Composition – Physical properties – Rapid hardening Portland cement –Portland Blast Furnace cement – Low heat Portland cement – Sulphate resisting Portland cement – White Portland Cement – Coloured Portland cement – High alumina cement – Super sulphate cement – Masonry cement – Expansive cements – Oil well cements.  **ADDITIVES:** Classifications – Accelerators – Retarders – Water Proofers – Pigments – Air entraining agents – Pozzolana.  **UNIT – II**  **CONCRETE AGGREGATES :** Classifications – Heavy aggregates – Normal weight aggregates – Strength and other mechanical properties – Moisture content and its effects – Deleterious substances – Alkali–Aggregate reaction – Thermal properties – Grading curves and Grading requirements – Gap–graded aggregate – Maximum aggregate size – Use of ‘Plums’ – Handling of aggregates.  **FRESH CONCRETE:** Workability – Factors affecting workability – Measurements of workability – Comparison of tests – Effect of time and temperature – Segregation – Bleeding – Mixing of concrete – Concrete mixers – vibration of concrete – Types of vibrators – Ready mixed concrete – Pumped concrete. Prepacked concrete and vacuum processed concrete  **UNIT – III**  **CURING OF CONCRETE:** Methods of curing − Maturity – Influence of temperature – Steam curing at atmospheric pressure – High pressure steam curing.  **HARDENED CONCRETE:** Compression tests – Effect of capping – Flexure test – Splitting test – Rebound Hammer test – Ultrasonic pulse test – Abrasion of Concrete.  **UNIT – IV**  **ELASTICITY, SHRINKAGE AND CREEP:** Modulus of elasticity – Dynamic modulus – Poisson’s ratio – Shrinkage and its effects – Creep of concrete – Factors affecting creep.  **DURABILITY:** Permeability – Chemical attack of Concrete – Efflorescence – Air entrained concrete – measurements – effects – Thermal properties – Resistance of concrete to fire.  **UNIT – V**  **CONCRETE MIX DESIGN AND QUALITY CONTROL:** Basic consideration – Factors in the choice of properties – Method of calculation by absolute volume method – Simple example of mix design – Design of high strength mixes– ACI & IS methods of mix design. | |
| **Text Books and reference Books:** | **TEXT BOOKS:**  1. Concrete Technology by M.S. Shetty.  2. Concrete Technology by G Gambhir  3. Concrete Practice by R.H. Elvery.  **REFERENCE BOOKS:**  1. Properties of Concrete by A.M. Neville  2. Concrete Technology Vol. I & II by D.F. Orchard.  3. Concrete Technology & Practice by W.H.Taylor.  4. I.S. 10262–2009 Guidelines for Concrete Mix Design. | |