**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)

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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.  No. | | Course  Code | Course Title | Contact Hours/  Week | | | Cred-its | 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 | | 13CE2201 | Strength of materials | 3 | - | 1 | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 2 | | 13CE2202 | Fluid Mechanics - II | 3 | - | 1 | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 3 | | 13CE2203 | Soil Mechanics | 3 | - | 1 | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 4 | | 13CE2204 | Transportation Engineering - I | 4 | - | - | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 5 | | 13CE2205 | Building Planning & Drawing | 1 | 3 | - | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
| 6 | | 13CE2206 | Surveying - II | 3 | - | 1 | 4 | 2 | 40 | 2 | | 40 | 3 | 60 | 100 | |
|  | | | **PRACTICALS** |  |  | | | | | | | |  |  | | | |
| 1 | 13CE22P1 | | Surveying Laboratory - II | - | 3 | - | 2 | - | - | | - | - | Day-to-day Evaluation and a test | 3 | 60 | | 100 |
| 2 | 13CE22P2 | | Fluid Mechanics & Hydraulic Machinery Laboratory | - | 3 | - | 2 | - | - | | - | - | 3 | 60 | | 100 |
|  |  | | **TOTAL** | **17** | **09** | **04** | **28** |  |  | |  |  |  |  | | **800** |

**Note:-** *Survey camp for a duration of 10 days to be conducted before the last day of instruction for II B.Tech, II – Sem. This shall be evaluated as part of Survey Laboratory –II.*

**13CE2201 – STRENGTH OF MATERIALS**

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

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| **Course Outcomes** | CO1 | Be able to calculate support reactions, shear forces and bending moments for various types of beams with different types of loading. Understand the relationship between loading, shear force and bending moment. |
| CO2 | Be able to derive the simple bending equation and use the equation to calculate bending stresses. Be able to calculate shear stresses. Understand the unsymmetrical bending and be able to calculate shear center for simple sections. |
| CO3 | Be able to calculate combined stresses in dams and retaining walls. Be able calculate load on columns. |
| CO4 | Be able to derive pure torsion equation and calculate shear stresses and power transmission in a shaft. Be able to design springs for various loading conditions. |
| CO5 | Be able to calculate hoop and longitudinal stresses in thin thick cylinders. Be able to calculate principal stresses and strains and stresses on any plane. Understand the theories of failure. |
| **Course Content** | **UNIT – I**  **SHEAR FORCE AND BENDING MOMENT IN BEAMS:** Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these loads – Point of contra flexure- Relation between S.F, B.M and rate of loading at a section of a beam.  **UNIT – II**  **FLEXURAL AND SHEAR STRESSES IN BEAMS**: Theory of simple bending – Distribution of flexural stresses and shear stresses – Resilience due to flexure and shear – Bending in unsymmetrical sections-Shear Centre.  **UNIT –III**  **COLUMNS:** Stability of columns – Euler’s theory – Various end conditions- Rankine’s theory – Eccentrically loaded columns (without initial curvature).  **DIRECT AND BENDING STRESSES:** Stresses under the combined action of direct loading and B.M. – Core of a section – Circular, rectangular and triangular (solid and hollow) – Determination of stresses in the case of retaining walls and dams.  **UNIT – IV**  **TORSION OF CIRCULAR SHAFTS**: Theory of pure torsion in solid and hollow circular shafts – Transmission of power – Combined bending – torsion and end thrust.  **SPRINGS:** Types of springs – Close and open coiled helical springs under axial loads and axial couple – springs in series and parallel - Carriage or leaf springs.  **UNIT – V**  **CYLINDERS:** Thin cylinders subjected to internal fluid pressure – Thick cylinders – Lame’s theorem - internal and external pressure – Compound cylinders  **PRINCIPAL STRESSES:** Principal stresses and principal strains – Mohr’s circle of stresses – Theories of failure | |
| **Text Books and reference Books:** | **TEXT BOOKS:**   1. Strength of Materials by R.K.Rajput. 2. Strength of Materials by R.K. Bansal. 3. Strength of Materials by B.C Punmia.   **REFERENCE BOOKS**   1. Mechanics of Structures Vol.I & Vol.II by S.B.Junnarkar. 2. Strength of Materials by Andrew Pytel and Ferdinand Singer.   3. Strength of Materials Vol.1 & Vol.11 by Timoshenko. | |