**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 – I SEMESTER**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| 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 | 13SH2102 | Computational Techniques, Statistics and Complex Analysis | 3 | - | 1 | | 4 | | 2 | | 40 | | 2 | | 40 | | 3 | 60 | | 100 | |
| 2 | 13CE2101 | Engineering Mechanics | 3 | - | 1 | | 4 | | 2 | | 40 | | 2 | | 40 | | 3 | 60 | | 100 | |
| 3 | 13CE2102 | Fluid Mechanics - I | 3 | - | 1 | | 4 | | 2 | | 40 | | 2 | | 40 | | 3 | 60 | | 100 | |
| 4 | 13CE2103 | Building Technology | 4 | - | - | | 4 | | 2 | | 40 | | 2 | | 40 | | 3 | 60 | | 100 | |
| 5 | 13CE2104 | Surveying – 1 | 3 | - | 1 | | 4 | | 2 | | 40 | | 2 | | 40 | | 3 | 60 | | 100 | |
| 6 | 13CE2105 | Engineering Geology | 4 | - | - | | 4 | | 2 | | 40 | | 2 | | 40 | | 3 | 60 | | 100 | |
|  | | **PRaCTICALS** |  |  | | | | | | | | | | | | |  |  | | | | |
| 7 | 13CE21P1 | Surveying Laboratory – I | - | 3 | | - | | 2 | | - | | - | | - | | - | Day-to-day Evaluation and a test | 3 | | 60 | | 100 |
| 8 | 13CE21P2 | Engineering Geology Laboratory | - | 3 | | - | | 2 | | - | | - | | - | | - | 3 | | 60 | | 100 |
|  |  | **TOTAL** | **20** | **06** | | **04** | | **28** | | **-** | | **-** | | **-** | | **-** | **-** | | **-** | | **800** |

**13CE2101 – ENGINEERING MECHANICS**

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

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| **Course Outcomes** | CO1 | Determine the components of force in rectangular or non-rectangular coordinates, the resultant force and moment for a given system of forces |
| CO2 | Determine the support reactions on structures and analyze systems that include frictional forces. |
| CO3 | Locate the centroid of an area, calculate the second moment and principal second moment of an area |
| CO4 | Calculate the motion characteristics of a body subjected to a given force system |
| CO5 | Determine the deformation of a shaft (simple, tapered and compound) and understand the relationship between different material constants. Determine temperature stresses |
| **Course Content** | **UNIT-I**  **STATICS**: Introduction - units and dimensions - Law of mechanics, vectors, vectorial representation of forces and moments, vector operations. Coplanar and concurrent forces, resolution and composition of forces - Equilibrium of a particle - Equivalent systems of forces - Principle of transmissibility, single equivalent force, free body diagram- Types of supports and their reactions, equilibrium of rigid bodies in two dimensions.  **UNIT – II**  **PROPERTIES OF SURFACES AND SOLIDS**: Determination of areas and volumes - First moment of area and the centroid - second and product moments of plane area - Parallel axis theorems and perpendicular axis theorems - Polar moment of inertia - Principal moments of inertia of plane areas - Principal axes of inertia.  **UNIT – III**  **FRICTION :** Types of friction - limiting friction - Laws of friction - Static and dynamic friction - motion of bodies –Bolt drivers, open crossed and compound - length of belt, tension, tight side and slack side initial and centrifugal - Power transmitted and conditions for maximum power.  **UNIT – IV**  **DYNAMICS**: Displacement, velocity and acceleration, their relationship - Relative motion - Curvilinear motion - Newton’s law of motion - Impact of elastic bodies - Moment of Momentum Equations - Work energy equation, D’Alemberts Principle and its uses, Impulse and Momentum.  **UNIT – V**  Concept of Stress and Strain - Elasticity and Plasticity - Hooke’s law - Stress- Strain diagram - tapered bars, Compound bars - Poison’s ratio - Volumetric strain - relation between elastic constants - temperature stresses - factor of safety - ductile and brittle materials under compression- endurance limit. | |
| **Text Books and reference Books:** | **TEXT BOOKS:**   1. Engineering Mechanics by Timoshenko, Young and Baskar Rao. 2. Engineering Mechanics by Shames & Rao 3. Engineering Mechanics by Bhattacharya.   **REFERENCE BOOKS**   1. Engineering Mechanics by F L Singher. 2. Engineering Mechanics by J L Merium. 3. Engineering Mechanics And statistics by PB Beer & E R Jhostan. | |