**17CE32E1 – ADVANCED STRUCTURAL DESIGN**

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| **Course Category** | Core Elective | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 3 -0 - 0 |
| **Prerequisite** | R.C.C Structural designs I & II, Steel Structural Design  & Analysis of Structures. | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To explain advanced structural design of concrete members. 2. To analyze and design multi storey building frames including floors and slabs. 3. To apply the most recent BIS code of practices relevant to the design structural steel members. 4. To acquire the knowledge of plastic design of frames. 5. To perform the analysis of prestressed concrete members. 6. To design of various prestressed concrete beams and slabs. | |
| **Course Outcomes** | CO1 | Understand the design of slender reinforced concrete columns and concrete walls under loads. |
| CO2 | Analyze and design of multi storey building frames including floors and slabs. |
| CO3 | Perform the plastic design of beams and columns. |
| CO4 | Design structural members using BIS codes. |
| CO5 | Perform the analysis and design of prestressed concrete beams by using limit state design. |
| CO6 | Perform the design of prestressed concrete slabs, pressure pipes and railway sleepers. |
| **Course**  **Content** | **UNIT – I**  **REINFORCED CONCRETE-I:** Design of slender columns – Deep beams – Concrete walls under vertical loads.  **UNIT – II**  **REINFORCED CONCRETE-II:** Design of Multistorey building frames – Grid floors – Flat slabs.  **UNIT – III**  **STRUCTURAL STEEL-I:** Plastic design of simply supported and continuous beams –Columns.  **UNIT – IV**  **STRUCTURAL STEEL-II:** Plastic design of frames – Steps/process to as per the most recent BIS code of practices – Design of purlins, trusses, bracings and gantry girders.  **UNIT – V**  **PRESTRESSED CONCRETE-I:** Design of beams for strength in limit state in flexure and shear – Limit state strength at transfer conditions – Limit state of deflection and cracking.  **UNIT – VI**  **PRESTRESSED CONCRETE-II:** Design of reinforcement in anchor zones – Design of rectangular slabs – Design of pressure pipes – Design of railway sleepers. | |
| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. Advanced Reinforced Concrete Design by P.C. Varghese. 2. Design of Steel Structures by Ram chandra. 3. Prestressed Concrete by N. Krishna Raju.   **REFERENCES:**   1. Prestressed Concrete by G.S.Pandit & S.P.Gupta. 2. Advanced Reinforced Concrete Design by N. Krishna Raju. 3. E. H. Gaylord, C. N. Gaylord and J. E. Stellmeyer, “Design of Steel Structures”, McGraw Hill. | |