**17CE3101 - STRUCTURAL ANALYSIS –II**

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| **Course Category** | Professional Core | **Credits** | 4 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 3 - 2 - 0 |
| **Prerequisite** | Structural Analysis - I | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To apply Castigliano’s theorems for analysis of indeterminate trusses. 2. To calculate the shear force and bending moment of determinate structures using influence lines. 3. To apply the method of slope deflection for analysis of indeterminate structures. 4. To understand the importance of moment distribution method for analysis of indeterminate structures 5. To analyze indeterminate structures using Kani’s method and apply various methods for analysis of multistoreyed frames. 6. To assess the location of plastic hinges in beams and frames. | |
| **Course Outcomes** | CO1 | Analyze indeterminate trusses using Castigliano’s theorem. |
| CO2 | Apply the concepts of ILD and moving loads on determinate structures. |
| CO3 | Analyze indeterminate structures by slope deflection and moment distribution methods. |
| CO4 | Analyze indeterminate structures by moment distribution methods. |
| CO5 | Apply Kani’s method for analysis of indeterminate structures and analyze multistoreyed frames by portal and cantilever methods. |
| CO6 | Identify the location of plastic hinges in beams and frames. |
| **Course**  **Content** | **UNIT – I**  **INDETERMINATE STRUCTURES:** Determination of static and kinematic indeterminacies – Solution of trusses having up to two degree of internal and external indeterminacies – Castigliano’s theorem – II.  **UNIT – II**  **INFLUENCE LINES :** Influence lines for reactions, shear force and bending moment for determinate structures – Maximum shear force and bending moment for single, two and multipoint loads – UDL longer and shorter than span and EUDL.  **UNIT – III**  **SLOPE DEFLECTION METHOD:** Beams with degree of indeterminacy not exceeding three – Effect of sinking – Frames with sway limited to single bay single storey.  **UNIT – IV**  **MOMENT DISTRIBUTION METHOD:** Introduction – Frames with sway limited to single bay single storey – Effect of sinking of supports.  **UNIT – V**  **KANI’S METHOD:** Continuous beams – Settlement of supports – Single bay portal frames with side sway.  **MULTISTOREYED FRAMES:** Analysis of multistoreyed frames using portal and cantilever methods.  **UNIT – VI**  **PLASTIC ANALYSIS:** Idealized stress – Strain diagram – Shape factors – Moment-Curvature relationships – Plastic hinges – Collapse mechanism – Analysis of fixed, continuous beams and portal frames. | |
| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. Structural Analysis by T.S. Thandavamoorthy. 2. Structural Analysis Vol. I & II by R. Vaidanathan & Dr. P. Perumal. 3. Analysis of Structures Vol. I & II by V.N. Vazirani, M.M. Ratwani and Dr. S.K Duggal.   **REFERENCE BOOKS:**   1. Theory of Structures – Vol.I by G.S. Pandit, S.P. Gupta, & R. Gupta. 2. Mechanics of Structures Vol. I & II by S.B. Junnarkar and H.J. Shah. 3. Structural Analysis by R.C. Hibbeler. | |