|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Code – CE501** | | **Design of Reinforced Concrete Structure - 1** | **3L + 1T** | **3 Credits** |
| **Course Objective** | To introduce the different types of philosophies related to design of basic structural elements such as slab, beam, column and footing which form part of any structural system with reference to Indian standard code of practice | | | |
| **Course Outcome (CO)** | 1. Understand material properties and design methodologies for reinforced concrete structures. 2. Assess different type of loads and prepare layout for reinforced concrete structures 3. Identify and apply the applicable industrial design codes relevant to the design of reinforced concrete members 4. Analyze and design various structural elements of reinforced concrete building like beam, slab, column, footing, and staircase 5. Prepare structural drawings and detailing and produce design calculations and drawing in appropriate professional format | | | |

|  |  |
| --- | --- |
| **Program Outcome (PO)** | |
| PO 1 | **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems |
| PO 2 | **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences |
| PO 3 | **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations |
| PO 4 | **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions |
| PO 5 | **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations |
| PO 6 | **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| PO 7 | **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development |
| PO 8 | **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice |
| PO 9 | **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| PO 10 | **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions |
| PO 11 | **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| PO 12 | **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

|  |  |
| --- | --- |
| **Program Specific Outcome (PSO)** | |
| PSO 1 | Graduates will be able to apply technical skills & modern engineering tools for civil engineering day to day practice. |
| PSO 2 | Graduates will be able to participate in critical thinking & problem solving of civil engineering field that requires analytical & design requirements |
| PSO 3 | Graduates will be able to pursue a lifelong learning & professional development to face the challenging & emerging needs of our society. |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO-PO Mapping**  **Design of Reinforced Concrete Structure – 1**  **(Course Code - CE501)** | | | | | | | | | | | | | |
|  | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| **CO1** | 2 | 1 | - | 2 | - | 1 | 1 | - | - | 1 | - | 3 |
| **CO2** | 3 | 3 | 1 | 3 | - | 2 | 3 | 1 | 1 | - | 1 | 3 |
| **CO3** | 1 | 1 | - | - | 2 | - | 1 | - | 1 | 1 | - | 3 |
| **CO4** | 3 | 2 | 3 | 2 | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 3 |
| **CO5** | 3 | 2 | 3 | 2 | 3 | 1 | 3 | 2 | 2 | 2 | 2 | 3 |

|  |  |  |  |
| --- | --- | --- | --- |
|  | **PSO1** | **PSO2** | **PSO3** |
| **CO1** | 2 | 1 | 2 |
| **CO2** | 3 | 3 | 1 |
| **CO3** | 1 | 1 | 1 |
| **CO4** | 3 | 2 | 3 |
| **CO5** | 3 | 2 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CO Distribution** | **Assignment 1 (T1)** | **Slot Test 1 (T2)** | **Assignment 2 (T3)** | **Slot Test 2 (T4)** |
| **CO1** | Q1, Q2, Q3 | Q1 |  |  |
| **CO2** | Q5 | Q2 | Q1 |  |
| **CO3** | Q4, Q6 | Q4,Q6,Q3 | Q2,Q3 | Q1,Q2 |
| **CO4** |  | Q5 | Q4,Q5 | Q3,Q4 |
| **CO5** |  |  | Q6 | Q5,Q6 |