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|  | | | **National Institute of Technology Meghalaya**  An Institute of National Importance | | | | | | | | | | **CURRICULUM** | | |
| Programme | | | **Master of Technology (Structural Engineering)** | | | | | Year of Regulation | | | | | **2018** | | |
| Department | | | **Civil Engineering** | | | | | Semester | | | | | **II** | | |
| Course Code | | Course Name | | Pre-requisite | | Credit Structure | | | | Marks Distribution | | | | | |
| L | T | P | C | INT | | MID | END | | Total |
| **CE 502** | | **Advance Structural Design** | | **NIL** | | **3** | **0** | **0** | **3** | **50** | | **50** | **100** | | **200** |
| Course Objectives | | The objective of this course is to make students to learn principles of Structural Design, design and detailing of special types of RCC structures and ductile detailing structures as per IS codal provision. | | | Course Outcomes | | CO1 | Understand the principles of structural design | | | | | | | |
| CO2 | Understand the principles of detailing and develop analytical skills | | | | | | | |
| CO3 | Able to design special types of the reinforced concrete structures silo, bunker, flat slab, water tank, folded plate and different types of foundation. | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | Hours | | | COs | |
| I | **Basic load calculation and design concept**  Dead load, live load, wind and seismic load calculation for different types of structures according to IS code. Basic design philosophy of RCC structures (working stress and limit state method of design). | | | | | | | | | | **08** | | | CO1 | |
| II | **Design of Flat slabs**  Flat slabs: Direct design method – Distribution of moments in column strips and middle strip-moment and shear transfer from slabs to columns – Shear in Flat slabs-Check for one way and two way shears-Introduction to Equivalent frame method. Limitations of Direct design method, Distribution of moments in column strips and middle strip and detailing. | | | | | | | | | | **08** | | | CO2 | |
| III | **Design of special RCC structures**  Design and detailing of reinforced concrete storage bins of granular and powdery materials like silo and bunker.  Design and detailing of underground and overhead water tank and their supporting structures.  Design and detailing of folded plates and corbels. | | | | | | | | | | **08** | | | CO3 | |
| IV | **Pre-stressed concrete**  Introduction, Pre-stressed systems, Pre-tensioned and post tensioned members, Analysis, Losses in Pre-stressed concrete, Pressure line, Load balancing concept, Factors influencing deflection, Analysis and design of statically determinate pre-stressed concrete structure for flexure and shear, Statically indeterminate beams. | | | | | | | | | | **06** | | | CO1 | |
| V | **Ductile Detailing**  Concept of Ductility – Detailing for ductility – Design of beams, columns for ductility - Design of cast-in-situ joints in frames | | | | | | | | | | **06** | | | CO2 | |
| Total Hours | | | | | | | | | | | **36** | | |  | |
| **Essential Readings** | | | | | | | | | | | | | | | |
| 1. Raju N.K, *“Advanced Reinforced Concrete Design”,*CBS. | | | | | | | | | | | | | | | |
| 2. Varghese, P.C, “*Advanced Reinforced Concrete Design*”, Prentice Hall of India. | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | |
| 1. Unnikrishna, P. and Devdas, M. “*Reinforced Concrete Design*”, McGraw Hill. | | | | | | | | | | | | | | | |
| 2. H.J.”Shah, ‘*’Reinforced Concrete Vol 2*”, Charotar Publishing House pvt.Ltd. | | | | | | | | | | | | | | | |