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|  | **National Institute of Technology Meghalaya**An Institute of National Importance | **CURRICULUM** |
| Programme | **Bachelor of Technology in Civil Engineering** | Year of Regulation | **2020** |
| Department | **Civil Engineering** | Semester | **IV** |
| Course Code | Course Name | **Pre-Requisite** | Credit Structure | Marks Distribution |
| **CE 256** | **STRUCTURAL ANALYSIS -I LAB** | **NIl** | L | T | P | C | Continuous Assessment | Total |
| **0** | **0** | **2** | **1** | **01 Experiment** | **10** | **100** |
| Course Objective | **I)** To use the concept of structural analysis and thus to solve different critical analytical problems in the civil engineering field. | Course Outcomes | CO1 | Able to use the concept of structural analysis and thus to solve different critical analytical problems in the civil engineering field. |
| **II)** To analyze statically determinate trusses, beams, and frames and obtain internal loading. | CO2 | Able to analyze statically determinate trusses, beams, and frames and obtain internal loading. |
| **III)** To obtain the influence lines for statically determinate and indeterminatestructures. | CO3 | Able to obtain the influence lines for statically determinate and indeterminatestructures. |
|  **IV)** To determine the deflections of beams and frames using classical methods. | CO4 | Able to determine the deflections of beams and frames using classical methods. |
| V) To get familiar with professional and ethical issues and the importance of lifelong learning in structural engineering. | CO5 | Able to get familiar with professional and ethical issues and the importance of lifelong learning in structural engineering. |
| No. | COs | Mapping with Program Outcomes (POs) | Mapping with PSOs |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| 1 | CO1 | **3** | **3** | **3** | **3** | **3** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **1** | **1** | **1** |
| 2 | CO2 | **3** | **3** | **3** | **3** | **3** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **1** | **1** | **1** |
| 3 | CO3 | **3** | **3** | **3** | **3** | **3** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **1** | **1** | **1** |
| 4 | CO4 | **3** | **3** | **3** | **3** | **3** | **0** | **0** | **0** | **2** | **1** | **0** | **0** | **1** | **1** | **1** |
| 5 | CO5 | **1** | **1** | **0** | **0** | **2** | **2** | **2** | **3** | **2** | **0** | **0** | **3** | **1** | **1** | **1** |
| SYLLABUS |
| No. | Content | Hours | COs |
| 1 | To experiment and verify the basic theory of bending moments and shear forces in a beam. | **01** | **CO1 CO2 CO3 CO4 CO5** |
| 2 | To study of beam deflection under different loads and fixing conditions. | **01** |
| 3 | To study of torque and deflection in different materials with circular section. | **01** |
| 4 | To study the unsymmetrical bending and shear center of different asymmetric sections. | **01** |
| 5 | To study the strains, stresses, forces, and deflections in various pin-jointed frameworks. | **01** |
| 6 | To study the characteristics of a three-pinned, two pinned, and fixed arch under various load conditions. | **01** |
| 7 | To study buckling of slender columns and to find relationships between length, end-fixing conditions, and buckling load. | **01** |
| 8 | To study the behavior of various indeterminate beams. | **01** |
| 9 | To study the plastic bending of beams and portal frames. | **01** |
| 10 | To study deflections and reactions, bending moments, and sway of rectangular portals. | **01** |
| 11 | To study the characteristics of a simple suspension bridge. | **02** |
| Total Hours | **12** |  |
| **Essential Readings** |
| 1. Hibbeler R.C., “Structural Analysis,” Pearson, 9th Edition, 2017
 |
| 1. KassimaliA., “Structural Analysis,” Cengage.
 |
| 1. Reddy C.S., “Basic Structural Analysis,” Tata McGraw Hill, 3rd Edition, 2011
 |
| **Supplementary Readings** |
| 1. Punmia B. C., “Theory of Structures” Laxmi Publication house, 16th Edition, 2017
 |
| 1. Ramamrutham S., “Theory of Structures,”Dhanpat Rai Publications, 9th Edition, 2014
 |