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| Image result for nit meghalaya logo | | | | **National Institute of Technology Meghalaya**  An Institute of National Importance | | | | | | | | | | | | | | | | | | | | | | **CURRICULUM** | | | | | | |
| Programme | | | | **Bachelor of Technology** | | | | | | | | | | | | Year of Regulation | | | | | | | | | | **2019-20** | | | | | | |
| Department | | | | **Civil Engineering** | | | | | | | | | | | | Semester | | | | | | | | | | **VII** | | | | | | |
| Course  Code | | Course Name | | | | | | | | **Pre requisite** | | | Credit Structure | | | | | | | | Marks Distribution | | | | | | | | | | | |
| L | | T | | | P | C | | INT | | | MID | | | END | | | | Total | |
| **CE417** | | **Design of Steel Structures** | | | | | | | | **Nil** | | | **3** | | **0** | | | **0** | **3** | | **50** | | | **50** | | | **100** | | | | **200** | |
| Course  Objectives | | 1. To introduce steel structures and its basic components | | | | | | | | | Course Outcomes | | | | CO1 | | | Learning of basic elements of a steel structure | | | | | | | | | | | | | | |
| 1. To introduce structural steel fasteners like welding and bolting | | | | | | | | | CO2 | | | Learning about the fundamentals of structural steel fasteners | | | | | | | | | | | | | | |
| 1. To design tension members, compression members, beams and beam-columns | | | | | | | | | CO3 | | | Ability to design basic elements of steel structure like tension members, compression members, beams and beam-columns | | | | | | | | | | | | | | |
| 1. To design column splices and bases | | | | | | | | | CO4 | | | Ability to design column splices and bases. | | | | | | | | | | | | | | |
|  | | | | | | | | | CO5 | | |  | | | | | | | | | | | | | | |
|  | | | | | | | | | CO6 | | |  | | | | | | | | | | | | | | |
| 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** | **0** | **0** | **0** | **0** | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **0** |
| 2 | CO2 | | **3** | | **3** | **0** | **0** | **3** | **0** | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| 3 | CO3 | | **3** | | **3** | **0** | **0** | **0** | **0** | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **3** | | | **0** | | | | **3** |
| 4 | CO4 | | **3** | | **3** | **3** | **0** | **0** | **0** | **3** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **0** | | | | **3** |
| 5 | CO5 | | **3** | | **3** | **3** | **0** | **3** | **0** | **0** | | **0** | | **0** | | | **0** | | | **0** | | **0** | | | **0** | | | **3** | | | | **3** |
| 6 |  | |  | |  |  |  |  |  |  | |  | |  | | |  | | |  | |  | | |  | | |  | | | |  |
| SYLLABUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | | | | | | | | | | | | | Hours | | | | | | | COs | | |
| I | **Introduction**  Types of Structural Steel, Mechanical Properties of Steel, Types of Structural Steel, Mechanical Properties of Steel, Cold Work and Strain Hardening, Advantages of Steel as a Structural Materials, Types of Steel Structures, Codes and Specifications. | | | | | | | | | | | | | | | | | | | | | | 02 | | | | | | | CO1 | | |
| II | **Design Approach**  Factor of Safety, Permissible and Working Stresses, Elastic Method, Plastic Method, Introduction to Limit States of Design | | | | | | | | | | | | | | | | | | | | | | 02 | | | | | | | CO1,CO2 | | |
| III | **Connections**  Type of Connections, Riveted, Bolted and Welded Connections, Strength, Efficiency and Design of Joints, Modes of Failure of a Riveted Joint, Advantages and Disadvantages of Welded Joints, Design of Fillet and Butt Welds, Design of Eccentric Connections. | | | | | | | | | | | | | | | | | | | | | | 06 | | | | | | | CO3, CO4 | | |
| IV | **Tension Members**  Net Sectional Area, Permissible Stress, Design of Axially Loaded Tension Member, Design of Member Subjected to Axial Tension and Bending. | | | | | | | | | | | | | | | | | | | | | | 06 | | | | | | | CO3, CO4 | | |
| V | **Compression Members**  Modes of Failure of a Column, Buckling Failure:Euler’sTheory,EffectiveLength, Slenderness Ratio,Design Formula: I.S. Code Formula, Design of Compression Members, Design of Built-Up Compression Members: Laced and Battened Columns. | | | | | | | | | | | | | | | | | | | | | | 06 | | | | | | | CO3, CO4 | | |
| VI | **Beams**  Design Procedure, Built-Up Sections, Plate Thickness, Web Crippling, Web Buckling, Connections nd Curtailment of Flange Plates | | | | | | | | | | | | | | | | | | | | | | 06 | | | | | | | CO3, CO4 | | |
| VII | **Beam-Column**  Eccentricity of Load, Interaction Formulae, Design Procedure, Eccentrically Loaded Base Plates. | | | | | | | | | | | | | | | | | | | | | | 04 | | | | | | | CO3, CO4 | | |
| VIII | **Column Base**  Design of base plates, load transfer mechanism, design of slab base, gusseted base and anchorage | | | | | | | | | | | | | | | | | | | | | | 04 | | | | | | | CO3, CO4 | | |
| Total Hours | | | | | | | | | | | | | | | | | | | | | | | **36** | | | | | |  | | | |
| **Essential Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1. Negi, L. S., “Design of Steel Structures”, Tata McGraw Hill. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. M.R.Shiyekar Limit state design of steel structures, PHI Learning,2010. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Raz, S. A., “Structural Design in Steel”, New Age International Publisher. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Edwin, M., Gaylord, J., and Stallmeyer, J. E., “Design of Steel Structures”, McGraw-Hill | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Dayaratnam, P., “Design of Steel Structures”, Chand S. & Co.. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |