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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 in Civil Engineering** | | | | | | | | | | | | | Year of Regulation | | | | | | | | | **2019-20** | | | | | |
| Department | | | | **Civil Engineering** | | | | | | | | | | | | | Semester | | | | | | | | | **III** | | | | | |
| Course  Code | | Course Name | | | | | | | | **Pre requisite** | | | | Credit Structure | | | | | | | | Marks Distribution | | | | | | | | | |
| L | | T | | | P | C | | Continuous Assesment | | | | | | | | Total | |
| **CE251** | | **Solid Mechanics Lab** | | | | | | | | **Nil** | | | | **0** | | **1** | | | **2** | **2** | | **1 experiment** | | | | | **10** | | | **100** | |
| Course  Objectives | | 1. To understand the basic concepts of solid mechanics | | | | | | | | | | Course Outcomes | | | | CO1 | | | To understand the basics about the subject and practically verify them | | | | | | | | | | | | |
| 1. To introduce the concept of stress strain and deformation due to internal actions. | | | | | | | | | | CO2 | | | To understand about the hardness test | | | | | | | | | | | | |
| 1. To analyze solid mechanics problems using classic methods and energy methods | | | | | | | | | | CO3 | | | To understand about the Uniaxial test under tension and compression | | | | | | | | | | | | |
| 1. To apply various failure criteria for general stress state at a point | | | | | | | | | | CO4 | | | To understand about the torsional test | | | | | | | | | | | | |
|  | | | | | | | | | | CO5 | | | To understand about the impact test | | | | | | | | | | | | |
| 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 | | 0 | 0 | 0 | 0 | 0 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 0 | | 0 | | | 3 | | | 0 |
| 2 | CO2 | | 3 | | 0 | 0 | 0 | 0 | 0 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 0 | | 0 | | | 3 | | | 0 |
| 3 | CO3 | | 3 | | 0 | 0 | 0 | 0 | 0 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 0 | | 0 | | | 3 | | | 0 |
| 4 | CO4 | | 3 | | 0 | 0 | 0 | 0 | 0 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 0 | | 0 | | | 3 | | | 0 |
| 5 | CO5 | | 3 | | 0 | 1 | 0 | 0 | 0 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 0 | | 0 | | | 3 | | | 0 |
| SYLLABUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | | | | | | | | | | | | | | Hours | | | | | COs | | |
| I | **Introduction to the laboratory** | | | | | | | | | | | | | | | | | | | | | | | **04** | | | | | **CO1** | | |
| II | **Hardness test:**  To determine the hardness of a given set of specimens by Brinell hardness testing machines | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO2** | | |
| III | **Hardness test:**  To determine the hardness of a given set of specimens by Vickers hardness testing machines | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO2** | | |
| IV | **Hardness test:**  To determine the hardness of a given set of specimens by Rockwell hardness testing machines | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO2** | | |
| V | **Uni-axial tension test:**  To obtain the stress-strain relation of mild steel using a circular cylindrical Specimen and determine   1. Young’s modulus (E), 2. proportional limit (p), 3. yield stress (y), 4. Ultimate tensile stress (u) and percentage elongation. | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO3** | | |
| VI | **Uni-axial compression test:**  To obtain the stress-strain relation of mild steel using a circular cylindrical Specimen and determine   1. Young’s modulus (E), 2. proportional limit (p), 3. yield stress (y), 4. Ultimate tensile stress (u) and percentage elongation. | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO3** | | |
| VII | **Torsion test**:  To obtain twisting moment- twist relationship of a mild steel specimen. To determine   1. shear modulus G, 2. yield stress y in pure shear, theoretical and experimental ultimate torque based on elastic-perfectly plastic model of material. | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO4** | | |
| VIII | **Impact Test**  To determine the toughness or impact strength of a given specimen by Izod Impact testing machine | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO5** | | |
| IX | **Impact Test**  To determine the toughness or impact strength of a given specimen by Charpy Impact testing machine | | | | | | | | | | | | | | | | | | | | | | | **02** | | | | | **CO5** | | |
| X | Revision and doubt clearing sessions | | | | | | | | | | | | | | | | | | | | | | | **04** | | | | | **CO1** | | |
| Total Hours | | | | | | | | | | | | | | | | | | | | | | | | **24** | | | | |  | | |
| **Essential Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Kazimi S.M.A., “Solid mechanics-First revised edition”, Tata McGraw Hill.; Twenty sixth edition, 2006 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Popov E. P., “Engineering Mechanics of Solids”, Dorling Kindersley (India) Pvt Ltd; Second edition, 1999 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Timoshenko, S.P. and Gere, J.M., Mechanics of Materials, Tata McGraw Hill, First edition, 1992. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Srinath L. S., “Advanced Solid Mechanics”, Tata McGraw Hill; Third edition, 2010 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Pitarresi J.M., “Introduction to Solid Mechanics”, Prentice Hall of India; Third edition, 2000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |