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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 | **2020-2021** |
| Department | **Civil Engineering** | Semester | **V** |
| CourseCode | Course Name | **Pre requisite** | Credit Structure | Marks Distribution |
| L | T | P | C | INT | MID | END | Total |
| **CE 301** | **Geotechnical Engineering- I** | **Nil** | **3** | **0** | **0** | **3** | **50** | **50** | **100** | **200** |
| CourseObjectives | 1. To introduce basic assumptions in soil mechanics and application of the principles of hydraulics and mechanics in soil mechanics
 | Course Outcomes | CO1 | Able to understand origin of soil, basic soil terminology andsimple tests |
| 1. To introduce Soil classification, their origin and properties
 | CO2 | Able to classify various soil types, clay minerology and soil structure |
| 1. To introduce different geotechnical engineering structures and their design
 | CO3 | Able to compute the index properties (such as grain size distribution, Atterberg limits etc.) and engineering properties (such as permeability, compressibility, shear strength) of soil for geotechnical site investigation. |
|  | CO4 | Able to understand compaction and consolidation of soil |
|  | CO5 | Able to apply the knowledge of soil mechanics to design safe geotechnical structures such as slope, retaining structure etc. |
| 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**Origin and types, Identification and classification of soils, Index properties, phase relationship, consistency, sensitivity, clay mineralogy. | **6** | **CO1, CO2, CO3** |
| II | **Permeability and Seepage**Darcy’s law of permeability, Determination of Coefficient of permeability, Equivalent permeability for stratified soil, Flow nets – principles, construction and application, Effective stress analysis, quick sand condition, piping, filtration criteria. | **06** | **CO3** |
| III | **Shear Strength of Soil** Strength envelope, total and effective stress paths, pore pressure, evaluation of shear strength parameters, direct shear, triaxial shear, vane shear, unconfined compression test. | **06** | **CO3** |
| IV | **Compaction and Consolidation**Principle of compaction, Light and heavy compaction, field compaction control, factors affecting compaction. Compressibility and Consolidation: Terzagli’s theory of one-dimensional consolidation, Secondary Consolidation, estimation of consolidation settlement. | **06** | **CO4** |
| V | **Lateral Earth Pressure** Earth pressure at rest, active and passive earth pressure, Rankine and Coulomb’s earth pressure theories, Graphical Solutions. | **06** | **CO5** |
| VI | **Stability of Slope** Stability of infinite slope, stability of finite slope, slope protection. | **06** | **CO5** |
| Total Hours | **36** |  |
| **Essential Readings** |
| **1.** Ranjan Gopal and Rao, A.S.R., “Basic and Applied Soil Mechanics”, New Age International.  |
| **2.** Terzaghi K., Peck R. B. and Mesri G., “Soil Mechanics in Engineering Practice”, John Wiley & Sons  |
| **3.**[Arora](https://www.amazon.in/s/ref%3Ddp_byline_sr_book_1?ie=UTF8&field-author=K+R+Arora&search-alias=stripbooks) K. R., "Soil Mechanics And Foundation Engineering", Standard Publishers Distributors. |
| **4.** Murthy [V. N. S.](https://www.google.co.in/search?tbo=p&tbm=bks&q=inauthor:%22V.+N.+S.+Murthy%22), "Textbook of Soil Mechanics and Foundation Engineering", CBS Publishers & Distributors/Alkem Company (S). |
| **Supplementary Readings** |
| 1. Kaniraj S.R., “Design Aids in Soil Mechanics & Foundation Engineering”, Tata McGraw Hill.  |
| 2. Lambe T.W. and Whitman R.V., “Soil Mechanics”, John Wiley & Sons.  |
| 3.Punmia B.C., “Soil Mechanic and Foundation Engineering”, Laxmi Publication Pvt. Ltd. |
| 4. Braja M. Das., “Fundamental of Foundation Engineering”, Thomson Asia Pvt. Ltd, Singapore |