|  |  |  |
| --- | --- | --- |
| Image result for nit meghalaya logo | **National Institute of Technology Meghalaya**An Institute of National Importance | **CURRICULUM** |
| Programme | **Master of Technology** | Year of Regulation | **2018-19** |
| Department | **Civil Engineering** | Semester | **II** |
| CourseCode | Course Name | Pre requisites | Credit Structure | Marks Distribution |
| L | T | P | C | INT | MID | END | Total |
| **CE506** | **Slopes and Retaining Structures** | **None** | **3** | **0** | **0** | **3** | **50** | **50** | **100** | **100** |
| CourseObjectives | 1. To impart knowledge on investigation, analysis, design, and stabilization of slopes.
2. To learn basic concepts of analysing stability of slopes; seepage; design of different types of retaining structures.
 | Course Outcomes | CO1 | Able to Gain knowledge about the purpose of computing slope stability and understand the basic concepts of various slope stability analysis procedures. |
| CO2 | Able to estimate seepage through dam sections and foundations  |
| CO3 | Able to Identify the basic design requirements and causes of failures of dams, distinguish foundation types and the different fill materials |
| CO4 | Able to understand the Earth pressure theories, concepts on rigid and flexible retaining structures, bulkheads |
| CO5 | Able to understand the concepts and design the Reinforced soil walls/slopes |
| SYLLABUS |
| **No.** | **Content** | **Hours** | **COs** |
| I | **Slope stability**Infinite slopes; finite height slopes – Swedish method, Bishop’s simplified method and other limit equilibrium methods; Stability charts; conditions of analysis – steady state, end of construction and sudden draw down; earthquake effects. | **08** | **CO1** |
| II | **Seepage**Flow-net in isotropic, anisotropic, and layered media; entrance-exit conditions; determination of phreatic line.  | **06** | **CO2** |
| III | **Earth Dams**Introduction, factors influencing design, design of components, construction, instrumentation. Road and rail embankments. | **07** | **CO3** |
| IV | **Earth Pressure**Types; Rankine’s theory and Coulomb’s theory; Effects due to wall friction; Graphical methods; Earthquake effects. Rigid retaining structures: Types; stability analysis. Flexible retaining structures: Types; material; cantilever sheet piles; anchored bulkheads–methods of analysis, moment reduction factors; anchorage. | **08** | **CO4** |
| V | **Reinforced soil walls**Elements and stability. Soil arching. Braced excavation: Pressure distribution in sands and clays; bottom heave, Reinforced slopes. Soil nailing; Gabions. | **07** | **CO5** |
| **Total Hours** | **36** |  |
| **Essential Readings** |
| 1. Abramson, L. W., Lee, T. S., Sharma, S., and Boyce, G. M. (1996). Slope Stability and Stabilization Methods, John Wiley & Sons, New York.
 |
| 1. Anderson, M.G., and Richards, K.S., Slope Stability, John Wiley, 1987.
 |
| 1. Atkinson, J.H., Foundations and Slopes, McGraw Hill, 1981.
 |
| 1. Gulati and Datta "Geotechnical Enginering", Tata Mc Graw Hill.
 |
| **Supplementary Readings** |
| 1. Muni Budhu, Soil Mechanics and Foundations, John Wiley and Sons, Inc, Network, 2000.
 |
| 1. Chowdhury, D.F., Slope analysis, Prentice Hall, 1988.
 |
| 1. Braja M. Das, "Principles of Foundation engineering", PWS Publishing Company.
 |