|  |  |  |
| --- | --- | --- |
| 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 |
| **CE564** | **Advance foundation design** | **None** | **3** | **0** | **0** | **3** | **50** | **50** | **100** | **100** |
| CourseObjectives | 1. To introduce various aspects of foundation engineering along with bringing out the advanced theories and practical knowledge of the subject
2. To develop an ability and skill to apply the codal provisions for the design of various types of foundation
3. To develop an ability and skill to design various aspects of foundation engineering including soil exploration, details of shallow and deep foundations
 | Course Outcomes | CO1 | Able to understand various Bearing Capacity Theories |
| CO2 | Able to Select and design shallow foundation satisfying bearing capacity and settlement requirements |
| CO3 | Able to design pile foundation satisfying bearing capacity and settlement requirements |
| CO4 | Able to understand the engineering behaviour of well Foundations and their design aspects |
| CO5 | Able to understand the engineering behaviour of expansive soils and selection of suitable foundation type for such soils |
| SYLLABUS |
| **No.** | **Content** | **Hours** | **COs** |
| I | **BEARING CAPACITY THEORIES** Bearing capacity theories (Terzaghi's, Meyerhoff’s, Hansen’s, Vesic’s, Balla’s)- foundations subjected to centric vertical loads, inclined loads, eccentric loads, foundations on layered soils, anisotropic soils, foundations on slopes, over voids, interference of footings.  | **07** | **CO1** |
| II | **SHALLOW FOUNDATIONS**Settlement analysis- components of settlement, elastic settlement, flexible and rigid footings, contact pressure distribution, prediction of elastic parameters from SPT, CPT and other field tests, consolidation settlement, differential settlement. Design of individual footings, strip footing, combined footing, rigid and flexible mat, buoyancy raft, basement raft, underpinning. | **10** | **CO2** |
| III | **PILE FOUNDATIONS** Estimation of load carrying capacity of single and pile group under various loading conditions. Pile load testing (static, dynamic methods and data interpretation), settlement of pile foundation, code provisions, design of single pile and pile groups, and pile caps. Load transfer mechanism, Pile capacity in various soil types, negative skin friction, group action, settlements, laterally loaded vertical piles, pile foundations on rocks. | **10** | **CO3** |
| IV | **WELL FOUNDATIONS** Types, components, construction methods, design methods (Terzaghi, IS and IRC approaches), check for stability, base pressure, side pressure and deflection. | **05** | **CO4** |
| V | **SPECIAL TOPICS** Foundations on difficult sub-soils (collapsible and expansive soils) - Foundations for tall structures. | **04** | **CO5** |
| **Total Hours** | **36** |  |
| **Essential Readings** |
| 1. Bowles. J.E., Foundation Analysis and Design, Tata McGraw-Hill International Edition, 5th Edn, 1997.
 |
| 1. Das B.M., Shallow Foundations: Bearing capacity and settlement, CRC Press, 1999.
 |
| 1. Prakash, S. and Sharma, H.D., Pile Foundations in Engineering Practice, John Wiley & Sons Inc., 1990.
 |
| 1. Murthy, V.N.S. (2011). Advanced foundation engineering., CBS Publishers, 1st Edn.
 |
| **Supplementary Readings** |
| 1. Tomlinson, M.J. and Woodward J (2012). Foundation Design and Construction, Taylor and Francis, 5th Edn
 |
| 1. Coduto, D.P., Foundation design: Principles and practices, Pearson publications, second edn, 2013.
 |
| 1. Peck, R.B., Hanson, W.E. and Thornburn, T.H., Foundation Engineering, Wiley Eastern Ltd., 2nd Edn., 1980.
 |
| 1. Teng, W.C., Foundation Design, Prentice-Hall of India (Pvt) Ltd., 1965.
 |
| 1. Kurian, N.P. Design of Foundation Systems - Principles and Practices, Narosa Publishing House, 2nd Edn., 1994.
 |