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| 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** | | | |
| Course  Code | | Course Name | | Pre requisites | | Credit Structure | | | | | Marks Distribution | | | | | | |
| L | T | | P | C | INT | | MID | | END | | Total |
| **CE568** | | **Soil Structure interaction** | | **None** | | **3** | **0** | | **0** | **3** | **50** | | **50** | | **100** | | **100** |
| Course  Objectives | | 1. To make the students understand various theories applicable to Soil-Structure-Interaction and the principal components of Soil-Structure-Interaction concisely 2. To make the students aware of the collective response of the structure, the foundation, and the geologic media underlying and surrounding the foundation, to a specified free-field ground motion. 3. To make the students learn and modelling of seismic soil-structure interaction effects on building structures in engineering practice. | | | Course Outcomes | | CO1 | | Students will be able to relate with the practical significance and importance of Soil-Structure interaction | | | | | | | | |
| CO2 | | Students will be able to model Soil-structure interaction problems using various concepts. | | | | | | | | |
| CO3 | | Students will be able to compute various parameters associated with dynamic analysis of structure and foundation | | | | | | | | |
| CO4 | | Students will be able to understand the Material nonlinearity of soil | | | | | | | | |
| CO5 | | Students will be able to apply the theories of Dynamic Soil-Structure Interaction to various practical Engineering problems. | | | | | | | | |
| SYLLABUS | | | | | | | | | | | | | | | | | |
| **No.** | **Content** | | | | | | | | | | | **Hours** | | | | **COs** | |
| I | **Introduction**  Objectives and practical significance and importance of Soil-Structure interaction (SSI); Fixed base structure, Structures on soft ground; Modelling of unbounded media. | | | | | | | | | | | 05 | | | | **CO1** | |
| II | **Fundamentals of Soil-Structure Interaction**  Rational methods of analysis of substructure; Equation of motion for flexible and rigid base; Kinematic interaction, Inertial interaction, and Effect of embedment. | | | | | | | | | | | 05 | | | | **CO1** | |
| III | **Modelling of Soil-structure interaction**  Discrete model Winkler, Pasternak, Filoneko-Borodich, Hetenyi, Kerr, Rhines; Continuum model: Vlazov, Reissner, Biots, Gorbunov and Posadov; Modeling of boundaries. | | | | | | | | | | | 08 | | | | **CO2** | |
| IV | **Concepts in dynamic analysis of structure and foundation**  Dynamic stiffness of Surface foundation, Embedded foundation, Shallow (strip) foundation and Deep (piles) foundations. | | | | | | | | | | | 06 | | | | **CO3** | |
| V | **Nonlinear Analysis**  Material nonlinearity of soil, Geometrical nonlinearity; Soil-pile structure interaction. | | | | | | | | | | | 06 | | | | **CO4** | |
| VI | **Engineering Applications**  Engineering Applications of Dynamic Soil-Structure Interaction. | | | | | | | | | | | 06 | | | | **CO5** | |
| **Total Hours** | | | | | | | | | | | | **36** | | | |  | |
| **Essential Readings** | | | | | | | | | | | | | | | | | |
| 1. Selva durai, A. P. S, “Elastic Analysis of Soil-Foundation Interaction”, Elsevier, 1979. | | | | | | | | | | | | | | | | | |
| 1. Bowles, J.E., “Foundation analysis and design”, McGraw Hill 1996. | | | | | | | | | | | | | | | | | |
| 1. Tomlinson, M. J., “Foundation Design and construction”, English language book society and pitman, London. | | | | | | | | | | | | | | | | | |
| 1. Chowdhury, I. and Dasgupta, S. P., “Dynamics of Structure and Foundation – A Unified Approach”, CRC Press, Balkema, *2009.* | | | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | | | |
| 1. Kurian, N. P., “Design of Foundation Systems – Principles and Practices”, Publishing House, New Delhi, Alpha Science International, U.K.,2005. | | | | | | | | | | | | | | | | | |
| 1. J.W. Bull, “Soil-Structure Interaction: Numerical Analysis and Modelling”, CRC Press, 1st edition,1994. | | | | | | | | | | | | | | | | | |
| 1. Desai C.S.& Christian J.T., “Numerical Methods in Geotechnical Engineering”, McGraw Hill. | | | | | | | | | | | | | | | | | |