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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 | | | | | | | | | | **2020-21** | | | | | |
| Department | | | | **Department of Civil Engineering** | | | | | | | | | | | Semester | | | | | | | | | | **VII** | | | | | |
| Course  Code | | Course Name | | | | | | Pre Requisite | | | | Credit Structure | | | | | | | | Marks Distribution | | | | | | | | | | |
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| **CE 413** | | **Model of Air and Water Quality** | | | | | | **NIL** | | | | **3** | | **0** | | | **0** | **3** | | **50** | | | **50** | | | **100** | | | **100** | |
| Course  Objectives | | To educate the students onFundamentals of air and water pollution control modelling. | | | | | | | | Course Outcomes | | | | CO1 | | | Able to understand the basic concepts and application of mathematical modelling in environmental engineering | | | | | | | | | | | | | |
| To explore the feasibility of design and operation of various air and water pollution control devices. | | | | | | | | CO2 | | | Able to recognizethe need of Application of advanced instrumental methods in environmental engineering | | | | | | | | | | | | | |
|  | | | | | | | | CO3 | | | Able to comprehend with technologies available for the control of air pollution and decide and design an appropriate air pollution control system based on the problem at hand. | | | | | | | | | | | | | |
|  | | | | | | | | CO4 | | | Able to comprehend with technologies available for the control of water pollution and decide and design an appropriate water pollution control system based on the problem at hand. | | | | | | | | | | | | | |
| 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 | | **1** | | **3** | **1** | **3** | **3** | **1** | **0** | **3** | | **3** | | | **2** | | | **3** | | **3** | | | **0** | | | **3** | | | **3** |
| 2 | CO2 | | **1** | | **3** | **1** | **3** | **3** | **1** | **0** | **3** | | **3** | | | **2** | | | **3** | | **3** | | | **0** | | | **3** | | | **3** |
| 3 | CO3 | | **1** | | **3** | **3** | **3** | **3** | **1** | **0** | **3** | | **3** | | | **2** | | | **3** | | **3** | | | **0** | | | **3** | | | **3** |
| 4 | CO4 | | **1** | | **3** | **3** | **3** | **3** | **1** | **0** | **3** | | **3** | | | **2** | | | **3** | | **3** | | | **0** | | | **3** | | | **3** |
| SYLLABUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | | | | | | | | | | | | Hours | | | | | | COs | | |
| I | Modelling/Concept:  Environmental management, Role of mathematical models; types of models, model development and validation, model sensitivity – assessing model performance. | | | | | | | | | | | | | | | | | | | | | **4** | | | | | | **CO1** | | |
| II | Introduction to Sampling, Measurement and Analysis  Identify the sources and effect of Air pollution, standards and legislation in India, Role of Meteorology and Natural Purification Processes, Transport and dispersion of air pollutants | | | | | | | | | | | | | | | | | | | | | **5** | | | | | | **CO1, CO2** | | |
| III | Design/ Modelling protocols for air:  Principle and design of particulate matter control devices- gravitational settling chambers, cyclone separators, bag-house filters, electrostatic precipitators, wet and dry scrubbers, design of gaseous pollutant control devices, Dispersion Modelling and Plume behaviour. | | | | | | | | | | | | | | | | | | | | | **9** | | | | | | **CO1, CO2** | | |
| IV | Source correction methods:  Vehicular pollution control, indoor air quality monitoring and control, Control of specific gaseous pollutants– Control of sulphur dioxide, nitrogen oxides emission | | | | | | | | | | | | | | | | | | | | | **5** | | | | | | **CO1, CO2** | | |
| V | Design/ Modelling protocols for water  Historical development of water quality models; rivers and streams water quality modelling – river hydrologydepth and velocity and flow – low flow analysis – dispersion and mixing – estuarine transport, Models for lakes –Models for dissolved oxygen; Streeter – Phelps models. | | | | | | | | | | | | | | | | | | | | | **7** | | | | | | **CO4** | | |
| VI | Groundwater Quality Modelling:  Mass transport of solutes, application of concepts to predict groundwater contaminant movement, seawater intrusion – basic concepts and modelling | | | | | | | | | | | | | | | | | | | | | **8** | | | | | | **CO1, CO2** | | |
| Total Hours | | | | | | | | | | | | | | | | | | | | | | **38** | | | | | |  | | |
| **Essential Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Rao, C.S.“Environmental Pollution Control Engineering”, Wiley Eastern Ltd, Delhi . | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Warner, C F., Wark, K., and DavisW T., “Air pollution: its origin and control” John Wiley & Sons Inc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Peavy, H., and Rowe, R., “Environmental Engineering”, Mc-Graw Hill Publication. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Chapra, S.C., “Surface Water Quality Modelling”, Tata McGraw-Hill Companies, Inc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Stern, A.C.,“Air pollution Control: Vols 1, 2, 3”. Academic press. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Magill, P. L.,“Air pollution hand book”, McGraw –Hill. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. DeNevers., “Air Pollution Control Engineering”, McGraw-Hill. 2. Metcalf & Eddy, Inc., “Waste water Engineering Treatment and Reuse”, McGraw Hill Inc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Seinfeld, J. H., and Pandis.S. N., “Atmospheric Chemistry and Physics: From Air Pollution to Climate Change”, Academic press. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Stern, A.C., “Air Pollutants, their transformation and Transport”, Academic Press. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. J.L. Schnoor., “Environmental Modeling Fate and Transport of Pollutants in Water, Air and Soil”, John Wiley & Sons Inc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |