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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 | **2019-20** |
| Department | **Civil Engineering** | Semester | **IV** |
| CourseCode | Course Name | **Pre requisite** | Credit Structure | Marks Distribution |
| L | T | P | C | INT | MID | END | Total |
| **CE 202** | **Environmental Engineering – I** | **Nil** | **3** | **0** | **0** | **3** | **50** | **50** | **100** | **200** |
| CourseObjectives | 1. To emphasize on the importance of Public water supply scheme.
 | Course Outcomes | CO1 | Able to Identify environmental problems arising due to engineering and technological activities and the science behind those problems. |
| 1. To elucidate about Population forecasting and estimation of water demand.
 | CO2 | Able to Estimate the population - economic growth, energy requirement and demand. |
| 1. To compute water quality parameters.
 | CO3 | Able to Analyse material balance for different environmental systems. |
| 1. To familiarize students about Water Purification systems.
 | CO4 | Able to understand the importance of ecosystem and biodiversity for maintaining ecological balance. |
| 1. To analysis and design water distribution systems.
 | CO5 | Able to Identify the major pollutants and abatement devices for environmental management and sustainable development |
| 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 | **Water Supply System and Sources** Public water supply system, Planning and Components; Surface and Groundwater; Reservoir; Surface and Sub-surface sources - types, selection, storage reservoir – yield and capacity estimation.  | **06** | **CO1, CO2, CO3** |
| II | **Distribution System**Requirements, Classification, Analysis and Design of distribution systems, Detection and Prevention of leakage | **05** | **CO3** |
| III | **Water Demand**Population forecasting, Design period, estimation of water demand for various uses, factors affecting consumption | **05** | **CO3, CO4** |
| IV | **Water Quality**The hydrologic cycle and water quality parameters: physical, chemical and biological; water quality standards for chemical, physical and microbiological parameters; Drinking Water quality standards. | **06** | **CO4, CO5** |
| V | **Basic microbiology and chemistry**Microorganisms in natural water systems, development of dissolved oxygen (DO) sag model, introduction to environmental chemistry | **04** | **CO2, CO3** |
| VI | **Water Treatment**Screening, Design and operation of sedimentation and settling tanks, Theory of settling, types of settling (Type – I and Type – II Settling) and Coagulation and flocculation, Design of flocculation process, Aeration, Disinfection process-theory, Chlorination, Hardness Removal, Fluoride and Arsenic Removal, Household Water Treatment Systems; Flow-sheets for treatment of surface and sub-surface waters; Types of filtration, Mechanism of filtration, Design of Considerations, Filter design criteria, operation and maintenance. | **10** | **CO5** |
| **Total Hours** | **36** |  |
| **Essential Readings** |
| 1. Environmental Engineering, Peavy H. S., Rowe D. R. and George Tchobanoglous, McGraw-Hill International, First Edition, 2017
 |
| 1. Water Supply and Sewerage, McGhee T. J ., McGraw-Hill Inc., Sixth Edition, 2007
 |
| 1. Sawyer, C.N., McCarty, P.L., Parkin, G.F., Chemistry for Environmental Engineering, Tata McGraw-Hill, 2000.
 |
| **Supplementary Readings** |
| 1. Wastewater Engineering- Treatment and Reuse, Metcalf & Eddy (Revised by G. Tchobanoglous, F. L. Burton and H. D. Stensel), Tata McGraw Hill, Fourth Edition, 2010
 |
| 1. Introduction to Environmental Engineering, Davis M. L and Cornwell D. A McGraw-Hill, Inc.,5th Edition, 2012
 |
| 1. Manual for Sewer and Sewerage, Central Public Health & Environmental Engineering Organization, Ministry of Housing and Urban Development, Govt. of India, 2013.
 |
| 1. APHA, Standard Methods Examination of Water and Wastewater, American Public Health Association, Washington DC, 1995, 22nd Edition, 2012
 |
| 1. Manual for water supply and treatment, Central Public Health & Environmental Engineering Organization, Ministry of Housing and Urban Development, Govt. of India, 1999.
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