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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**  | Year of Regulation | **2019** |
| Department | **Civil Engineering** | Semester | **V** |
| CourseCode | Course Name | Pre requisite  | Credit Structure | Marks Distribution |
| L | T | P | C | INT | MID | END | Total |
| **CE 371** | **Solid Waste Management** | **Nil** | **2** | **0** | **0** | **2** | **50** | **50** | **100** | **200** |
| CourseObjectives | 1. Understanding of problems of municipal waste.
 | **Course Outcomes** | **CO1** | Able to describe solid waste management systems with respect to its physical properties, and associated critical considerations |
| 1. Knowledge of legal, institutional and financial aspects of management of solid wastes.
 |
| **CO2** | Able to outline the types, sources and composition of municipal solid waste with methods of handling and storage of solid waste. |
| 1. Become aware of Environment and health impacts solid waste mismanagement
 |
| **CO3** | Able to understand and develop the technical options for waste management |
| **CO4** | Able to understand the Environment and health impacts associated with solid waste mismanagement |
| 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 | **2** | **2** | **3** | **2** | **3** | **3** | **3** | **2** | **1** | **2** | **2** | **2** | **3** | **2** | **3** |
| 2 | CO2 | **3** | **3** | **3** | **3** | **3** | **3** | **3** | **1** | **1** | **1** | **3** | **2** | **3** | **2** | **2** |
| 3 | CO3 | **3** | **3** | **3** | **3** | **2** | **3** | **3** | **1** | **1** | **2** | **3** | **2** | **2** | **2** | **3** |
| 4 | CO4 | **2** | **2** | **2** | **2** | **1** | **3** | **3** | **1** | **1** | **2** | **2** | **2** | **1** | **1** | **1** |
| SYLLABUS |
| No. | Content | Hours | COs |
| I | Solid Waste introduction: Origin, types, generation rates and composition; physical, chemical, biological and thermal characteristics. | **04** | **CO1** |
| **CO2** |
| II | Solid Waste Management System: Collection, Storage, segregation, reuse and recycling possibilities, Transportation, Treatment / processing, final disposal. | **06** | **CO2** |
| **CO3** |
| III | Separation and transformation/treatment of solid waste: Material separation and processing technologies; biological treatment techniques: conventional composting, vermicomposting, mechanical composting  | **10** | **CO3** |
| **CO4** |
| IV | Final Disposal Techniques: Landfill classification, types and methods, landfill siting consideration, characteristics, collection and use of landfill gas; composition, collection and treatment of leachate, Landfill design - an Overview. | **04** | **CO3** |
| **CO4** |
| Total Hours | **24** |  |
| **Essential Readings** |
| 1. Tchhobanoglous, G., Theisen and Vigil, “Solid Waste Management: Engineering Principles and Management issues”, , McGraw Hill.
 |
| 1. Peavy, H. S., Rowe, D. R. and Tchhobanoglous, G,.”Environmental Engineering”, McGraw Hill International Ed.
 |
| 1. Vesilind, P. A., Worrell, W. A. and Reinhart,D. R., “Solid Waste Engineering”, Thomson Brooks/Cole.
 |
| 1. Wentz, C. A., “Hazardous Waste Management” , McGraw Hill.
 |
| **Supplementary Readings** |
| 1. John Pichtel, “Waste Management Practices: Municipal, Hazardous and Industria”, CRC Press, Taylor and Francis Group.
 |
| 1. LaGrega, M.D. Buckingham, P.L. and Evans, J.C., “Hazardous Waste Management”, McGraw Hill.
 |
| 1. Richard J. Watts, “Hazardous Wastes - Sources, Pathways, Receptors”, John Wiley and Sons, New York.
 |
| 1. Manual on municipal solid waste management. Central Public Health and Environmental Engineering Organization, CPHEEO, New Delhi. http://www.indiawaterportal.org/articles/manual-municipal-solid-wastemanagement-cpheeo-moud
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