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|  | | | | **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 | | | | | | | **III** | | | | |
| Course Code | | Course Name | | | | | | | | Pre-Requisite | | | | Credit Structure | | | | | | Marks Distribution | | | | | | | | |
| **CE 255** | | **Civil Engineering Materials Lab** | | | | | | | | **NIL** | | | | L | | T | | P | C | Continuous Assessment | | | | | | | Total | |
| **0** | | **0** | | **2** | **1** | **Experiment** | | | | **10** | | | **100** | |
| Course Objectives | | To develop the student’s knowledge on basics of civil engineering materials and its relevant testing methodology | | | | | | | | | | Course Outcomes | | | | CO1 | | Student will be able to understand the basics civil engineering materials which are relevant in engineering applications. | | | | | | | | | | |
| To provide some knowledge about various methods for design of concrete mix. | | | | | | | | | | CO2 | | Student will be able to evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials. | | | | | | | | | | |
| To provide some knowledge on quality control for obtaining good fresh and hardened concrete | | | | | | | | | | CO3 | | Student will be able to understand the various factors affecting in producing a suitable fresh and hardened concrete. | | | | | | | | | | |
| To provide knowledge about causes of deterioration of buildings. | | | | | | | | | | CO4 | | Student will be able to perform a suitable concrete design mix for various grades. | | | | | | | | | | |
| To provide knowledge on quality assessment of existing concrete structures through non destructive testing | | | | | | | | | | CO4 | | Student will be able to understand the basics civil engineering materials which are relevant in engineering applications. | | | | | | | | | | |
|  | | | | | | | | | | CO6 | |  | | | | | | | | | | |
| 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** | | **3** | **3** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | **0** | | **0** | | **3** | | **3** | | | **3** |
| 2 | CO2 | | **3** | | **3** | **3** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | **0** | | **0** | | **3** | | **3** | | | **3** |
| 3 | CO3 | | **3** | | **3** | **3** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | **0** | | **0** | | **3** | | **3** | | | **3** |
| 4 | CO4 | | **3** | | **3** | **3** | **0** | **0** | **0** | | **0** | | **0** | | **0** | | | **0** | **0** | | **0** | | **3** | | **3** | | | **3** |
| 5 | CO5 | | **3** | | **3** | **3** | **0** | **0** | **0** | | **3** | | **0** | | **0** | | | **0** | **0** | | **0** | | **3** | | **3** | | | **3** |
| 6 | CO6 | | **3** | | **3** | **3** | **0** | **0** | **0** | | **3** | | **0** | | **0** | | | **0** | **0** | | **0** | | **3** | | **3** | | | **3** |
| SYLLABUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | | | | | | | | | | | | Hours | | | | COs | | |
| 1 | Determination of standard consistency, initial and final setting time of cement sample using Vicat’s apparatus. | | | | | | | | | | | | | | | | | | | | | 01 | | | | CO1 CO2 CO3 CO4 CO5 | | |
| 2 | Determination of soundness of cement, compressive & tensile strength | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 3 | To determine the fineness modulus and particle size distribution of coarse, fine, and all in aggregates | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 4 | To determine the specific gravity, water absorption, bulking of fine aggregates and impact & crushing strength of coarse aggregates | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 5 | To conduct design concrete mix using IS Method and determine the strength of concrete (cube, cylinder & beam) | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 6 | To conduct workability comparison of concrete by slump test, compaction factor test, flow table test | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 7 | To determine cement and concrete permeability of a given mix. | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 8 | To determine the water absorption, compressive strength & efflorescence of burnt clay bricks. | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 9 | To determine the tensile and elongation of reinforcing steel bar | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 10 | To conduct non destructive test of concrete using rebound hammer & UPV | | | | | | | | | | | | | | | | | | | | | 01 | | | |
| 11 | Viva-voce and exam | | | | | | | | | | | | | | | | | | | | | 02 | | | |
| **Total Hours** | | | | | | | | | | | | | | | | | | | | | | **12** | | | |  | | |
| **Essential Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. M. Neville M and J.J Brooks, “Concrete Technology”, Pearson Education, Twelfth impression, 2014 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. A.R Santhakumar, “Concrete Technology”, Oxford Higher Education, Ninth impression, 2012 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. M.S. Shetty, “Concrete Technology (Theory & Practice)”, S.Chand and Co, Revised edition, 2015 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Relevant Indian Standards codes | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. M. S. Mamlouk, and J. P. Zaniewski, Materials for Civil and Construction Engineers, Pearson, Prentice Hall, 2nd Edn., 2006. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. J. F. Shackelford and M. K. Muralidhara, Introduction to Material science for Engineers, Pearson Education, 6th Edn., 2007 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. M.L. Gambhir, “Concrete Technology”, Tata McGraw Hill, fifth edition, 2013. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |