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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** | | | | | | |
| Department | | | | **Civil Engineering** | | | | | | | | | | | | | Semester | | | | | | | | | | **V** | | | | | | |
| Course  Code | | Course Name | | | | | | | | **Pre requisite** | | | | Credit Structure | | | | | | | | Marks Distribution | | | | | | | | | | | |
| L | | T | | | P | C | | INT | | | MID | | | END | | | | Total | |
| **CE303** | | **Transportation Engineering- I** | | | | | | | | **Nil** | | | | **3** | | **0** | | | **0** | **3** | | **50** | | | **50** | | | **100** | | | | **200** | |
| Course  Objectives | | To understand the importance of transportation and various characteristics of road transport. | | | | | | | | | | Course Outcomes | | | | CO1 | | | Students will develop ability tocarry out surveys involved in planning and highway alignment | | | | | | | | | | | | | | |
| To study about the geometric design of highways and apply basic principles to estimate sight distances, and design horizontal and vertical alignment. | | | | | | | | | | CO2 | | | Students will learn to design cross section elements, sight distance, horizontal and vertical alignment and implement traffic studies | | | | | | | | | | | | | | |
| To know about the various pavement materials and equipment available. | | | | | | | | | | CO3 | | | Students will be able to characterize pavement materials. | | | | | | | | | | | | | | |
| To study the design aspects and methods of flexible and rigid pavement. | | | | | | | | | | CO4 | | | Students will be able to design flexible and rigid pavements as per IRC | | | | | | | | | | | | | | |
|  | | | | | | | | | |  | | |  | | | | | | | | | | | | | | |
| 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 | | 1 | 1 | 0 | 0 | 0 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 1 | | | **3** | | | **1** | | | | **0** |
| 2 | CO2 | | 1 | | 1 | 2 | 0 | 0 | 2 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 1 | | | **3** | | | **2** | | | | **2** |
| 3 | CO3 | | 0 | | 2 | 0 | 2 | 0 | 3 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 2 | | | **0** | | | **2** | | | | **0** |
| 4 | CO4 | | 1 | | 0 | 0 | 1 | 3 | 0 | | 0 | | 0 | | 0 | | | 0 | | | 0 | | 2 | | | **0** | | | **3** | | | | **1** |
| SYLLABUS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | | | | | | | | | | | | | | Hours | | | | | | | COs | | |
| I | **Introduction:** Importance and role of Transportation systems; Historical development of roads in India;  Roads classification, Road Patterns, Surveys for highway alignment design. | | | | | | | | | | | | | | | | | | | | | | | **03** | | | | | | | **CO1** | | |
| II | **Highway Geometric Design**: Pavement surface characteristics, Sight Distances: Definition and analysis of Stopping sight distance and Overtaking sight distance, Total reaction time;  Design of Horizontal Alignment: Super elevation, Extra widening, Setback distance, Transition curves, etc.;  Design of Vertical Alignment: Gradients, Vertical curves. | | | | | | | | | | | | | | | | | | | | | | | **08** | | | | | | | **CO2** | | |
| III | **Highway Materialsand Construction**: Pavement materials and their characterization,Standards and specifications related to Subgrade soil, Aggregates,Bitumen,Emulsion, Cutback bitumen; Bituminous mix design as per Marshall method.  Methods of construction of bituminous roads and concrete roads; Soil stabilization; Quality control and use of alternate materials in road construction. | | | | | | | | | | | | | | | | | | | | | | | **10** | | | | | | | **CO3** | | |
| IV | **Pavement Design and Analysis**: Stresses and Strains in Flexible Pavement, Stresses and deflections in Rigid Pavement, Philosophy of design of flexible and rigid pavements, Selection of pavement design input parameters: traffic loading and volume, Pavement design as per IRC guidelines. | | | | | | | | | | | | | | | | | | | | | | | **10** | | | | | | | **CO4** | | |
| V | **Hill and Urban Roads**: Special factors in alignment andgeometric design, drainage andmaintenance ofHill roads; Recent innovations in Urban Roads and their role in economic developments. | | | | | | | | | | | | | | | | | | | | | | | **05** | | | | | | | **CO2** | | |
| Total Hours | | | | | | | | | | | | | | | | | | | | | | | | **36** | | | | | |  | | | |
| **Essential Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. S.K.Khanna, C.E.G.Justo, A.Veeraragavan,”Highway Engineering”, Nemchand Bros. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Kadiyali, L.R. “Highway Engineering” Khanna Publishers. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Partha Charaborty and Animesh Das “Principles of Transportation Engineering”, PHI Learning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Rangwala, “Airport Engineering”, Charotar publishing house | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Yoder E.J., and Witczak M.W, “Principles of Pavement Design”, John Willey & Sons. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Kandhal, P.S. “Bituminous Road Construction in India” PHI learning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Yang H. Huang, “Pavement Analysis and Design” | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. MORT& H, “Specifications of Road and Bridge Works” | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Relevant IRC codes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |