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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** |
| CourseCode | 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** |
| CourseObjectives | 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 |
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| 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.
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