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|  | | | **National Institute of Technology Meghalaya**  An Institute of National Importance | | | | | | | | | | **CURRICULUM** | | |
| Programme | | | **Master of Technology** | | | | | Year of Regulation | | | | | **2018-19** | | |
| Department | | | **Civil Engineering** | | | | | Semester | | | | | **II** | | |
| Course Code | | Course Name | | Pre-requisite | | Credit Structure | | | | Marks Distribution | | | | | |
| L | T | P | C | INT | | MID | END | | Total |
| **CE 520** | | **Pavement Design and Analysis** | | **NIL** | | **3** | **0** | **0** | **3** | **50** | | **50** | **100** | | **200** |
| Course Objectives | | 1. To understand the fundamental properties of materials. 2. To understand basic concept and theory of pavement design 3. To learn the design method and analysis of flexible pavement 4. To learn the design method and analysis of rigid pavement 5. To learn the design of overlay and drainage | | | Course Outcomes | | CO1 | To have an understanding of fundamental properties of materials and their behaviour under different loading condition. | | | | | | | |
| CO2 | To know about various loading type, pattern and their effect on pavement strength and durability | | | | | | | |
| CO3 | To design the flexible pavement thickness and perform stress stain analysis at various depth. | | | | | | | |
| CO4 | To understand the various parameters involved in design and analyse the rigid pavement | | | | | | | |
| CO5 | To understand the design of overlay and drainage | | | | | | | |
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| SYLLABUS | | | | | | | | | | | | | | | |
| No. | Content | | | | | | | | | | Hours | | | COs | |
| I | **Introduction**  Elasticity, Plasticity and Viscosity of Granular or unbound materials, dynamic modulus and resilient modulus of materials and mixes, Creep in pavement, Fatigue properties and failure. Basic principles of theory of elasticity. | | | | | | | | | | **6** | | | CO1 | |
| II | **Pavement Design**  Fundamental of pavement design: Impact load, repeated load, effects of dual wheels and tandem axles, area of contact and tyre pressure. Stress and strain in pavement: Stresses in homogeneous masses and layered systems, deflections, shear failures, equivalent wheel and axle loads. Load stress and thermal stress in pavements. | | | | | | | | | | **8** | | | CO1, CO2 | |
| III | **Design of Flexible Pavement**  IRC design method for flexible pavement design. Comparison of different design approach. | | | | | | | | | | **8** | | | CO3 | |
| IV | **UNIT IV: Design of Rigid Pavement**  IRC design method for rigid pavement design. Comparison of different design approach. | | | | | | | | | | **8** | | | CO4 | |
| V | **UNIT V: Design of overlay and drainage system.**  Requirement and importance, Type of overlay, surface and sub-surface drainage system, road construction in water-logged areas, design methodologies. | | | | | | | | | | **6** | | | CO5 | |
| Total Hours | | | | | | | | | | | **36** | | |  | |
| **Essential Readings** | | | | | | | | | | | | | | | |
| 1.Yang H. Huang, Pavement Analysis and Design, Pearson Prentice Hall, 2004. | | | | | | | | | | | | | | | |
| 2. Yoder and Witzech, Pavement Design, McGraw-Hill, 1982. | | | | | | | | | | | | | | | |
| 3. IRC 37:2018 Guidelines for the design of flexible pavements | | | | | | | | | | | | | | | |
| 4. IRC 58:2015 Guidelines for the design of plain jointed rigid pavements for highways | | | | | | | | | | | | | | | |
| **Supplementary Readings** | | | | | | | | | | | | | | | |
| 1.Sharma and Sharma, Principles and Practice of Highway Engg., Asia Publishing House, 1980. | | | | | | | | | | | | | | | |
| 2. Teng, Functional Designing of Pavements, McGraw- Hill, 1980 | | | | | | | | | | | | | | | |