**17CE41E3 – PAVEMENT CONSTRUCTION AND MANAGEMENT**

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| **Course Category** | Core Elective | **Credits** | 3 |
| **Course Type** | Theory | **Lecture - Tutorial - Practical** | 3 - 0 - 0 |
| **Prerequisite** | Transportation  Engineering - I | **Sessional Evaluation** | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | 1. To explain construction of different types of flexible pavements. 2. To discuss bituminous and cement concrete pavements. 3. To explain concepts of soil stabilization pavement layer. 4. To discuss soil-cement stabilization and also soil-bitumen stabilization. 5. To differentiate maintenance works for different types of pavements. 6. To explain strengthening of existing pavements. | |
| **Course Outcomes** | CO1 | Understand the construction procedure of embankment, gravel road and WBM road. |
| CO2 | Able to explain the construction procedure of bituminous and cement concrete pavements. |
| CO3 | Understand different methods of soil stabilization. |
| CO4 | Acquire knowledge about stabilization of soil with cement and also bitumen. |
| CO5 | Understand the need and methods of maintenance of different types of pavements. |
| CO6 | Understand methods of evaluation of different types of existing pavements and also different techniques to strengthen them. |
| **Course**  **Content** | **UNIT – I**  **FLEXIBLE PAVEMENT CONSTRUCTION:** typical components of highway on embankments and in cutting, steps for construction of new highway on embankments and in cutting, functions and design elements of embankment – construction of subgrade – materials, construction method and quality control check. Method of compaction of soil and equipment - construction of embankment – construction of gravel road and WBM road.  **UNIT – II**  **CONSTRUCTION OF BITUMINOUS AND CEMENT CONCRETE PAVEMENTS:** Construction of bituminous roads – Interface treatments, Bitumen surface dressing and penetration macadam – Built up spray grout – Premix methods construction of cement concrete pavements – Construction of joints in cement concrete pavements – Types of joints, arrangement of joints, joint filler and scalar.  **UNIT – III**  **SOIL STABILIZED PAVEMENT LAYERS:** Objectives, application of soil stabilization techniques, mechanics of stabilization and investigations for soil stabilized roads and soil stabilization methods. Mechanical soil stabilization properties of soil – Aggregate mixtures –Factors affecting mechanical stabilization – Minimum design in mechanical stabilization, construction procedure – Stabilization using soft aggregates – Mehras’s method of stabilization.  **UNIT – IV**  **SOIL CEMENT STABILIZATION:** Principle and applications – Factors influencing properties of soil – Cement – construction precedence of soil – Cement base course – application soil-cement and cement treated soils, factors affecting properties of soil-lime mix-soil-lime stabilization- principles and applications – Factors affecting properties of soil-lime construction procedure of soil-lime sub base course, stabilization of soil using Bituminous materials – principles and application – factors affecting properties of soil- bitumen mix – construction of Bituminous stabilized layer. Stabilization of black cotton soil and desert sand.  **UNIT – V**  **HIGHWAY MAINTENANCE:** Need – Causes of pavement failures – Classification of maintenance works maintenance management system – Failures in flexible pavements – Failures in sub grade – Failures in sub base or base course – Typical flexible pavement failures – Failures in cement concrete pavement – Typical rigid pavement failures –Different types of maintenance for Bituminous surfaces – Special repairs in flexible pavements – Waves and corrugations – Skidding of pavement surfaces – Maintenance of cement concrete pavements.  **UNIT – VI**  **PAVEMENT EVALUATION:** Structural evaluation of pavements – need and application of structural evaluation studies- different methods- factors affecting pavement deflection, general principle deflection approach, principle of structural evaluation of flexible pavements - Evaluation of pavement surface condition – Strengthening of existing pavements -objectives – Flexible overlay over flexible pavement by conventional design method – Overlay design by Benkelman beam deflection studies- rigid overlay over rigid pavement – Flexible overlay over rigid pavement. | |

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| **Textbooks**  **and**  **References** | **TEXTBOOKS:**   1. Highway Engineering – S.K. Khanna & C.E.G. Justo. 2. Transportation Engineering Vol I Venkataramaiah C. 3. Analysis of pavements – Animesh Das.   **REFERENCE BOOKS:**   1. Transportation Engineering, Vol I and VolI byVazirani and Chandola. 2. A course in Highway Engineering by S.P. Bindra. 3. Pavement engineering principles and practice Rajib B.Mallik and Tahar E korchi. |