**COURSE OUTCOMES**

**Department of Civil Engineering:**

**M. Tech. Transportation Engineering**

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| **S No** | **Class & Semester** | **Course & Course Code** | **COs** | **Course Outcomes** |
| 01 | M. Tech. & I-Sem | MTE6101T - Transportation Planning | CO 1 | Describe the fundamental concepts and principles of transportation planning. |
| CO2 | Illustrate various methods for traffic forecasting and demand analysis. |
| CO3 | Apply transportation planning models in real-world scenarios. |
| CO4 | Analyze the effectiveness of transportation policies and planning systems. |
| CO5 | Evaluate the social, economic, and environmental impacts of transportation systems. |
| 02 | MTE6102T - Advanced Highway Material Characterization | CO 1 | Explain the properties and testing methods for various highway construction materials. |
| CO2 | Illustrate the role of material selection in highway design and performance. |
| CO3 | Apply material characterization techniques in real-world road construction projects. |
| CO4 | Analyze the durability and performance characteristics of materials used in highways. |
| CO5 | Evaluate advanced materials for sustainable and efficient highway construction. |
| 03 | MTE6103T - Railway, Airports, Ports, and Harbours | CO 1 | Describe the infrastructure and operations of railways, airports, ports, and harbors. |
| CO2 | Illustrate the design principles and layout considerations for these transportation hubs. |
| CO3 | Apply the principles of planning and designing transportation terminals. |
| CO4 | Analyze the challenges and solutions in the management of transport systems in these sectors. |
| CO5 | Evaluate the economic and environmental impact of transportation infrastructure. |
| 04 | MTE6106T - Management of Quality and Safety in Highway Construction | CO 1 | Explain the importance of quality and safety management in highway construction. |
| CO2 | Illustrate various quality control and safety measures in construction projects. |
| CO3 | Apply quality management techniques to highway construction projects. |
| CO4 | Analyze the safety challenges and mitigation strategies in highway construction. |
| CO5 | Evaluate the effectiveness of safety and quality assurance systems in construction projects. |
| 05 | Research Methodology and IPR (MLC6101T) | CO 1 | Explain the fundamentals of research methodology. (Understanding) |
| CO2 | Apply research design techniques in problem-solving. (Applying) |
| CO3 | Analyze various intellectual property rights (IPR) policies. (Analyzing) |
| CO4 | Evaluate the impact of patents and copyrights in research. (Analyzing) |
| CO5 | Use ethical guidelines in research and publication. (Applying) |
| 06 | Disaster Management (AUD6101T) | CO 1 | Describe types and causes of disasters. (Understanding) |
| CO2 | Apply disaster risk reduction strategies. (Applying) |
| CO3 | Analyze the impact of disasters on infrastructure and society. (Analyzing) |
| CO4 | Evaluate disaster preparedness and response plans. (Analyzing) |
| CO5 | Implement mitigation strategies for disaster management. (Applying) |
| 07 | M. Tech. & II-Sem | MTE6201T - Pavement Analysis, Design and Construction | CO 1 | Explain the fundamentals of pavement materials and design principles. |
| CO2 | Illustrate the different types of pavements and their characteristics. |
| CO3 | Apply the principles of pavement analysis in designing flexible and rigid pavements. |
| CO4 | Analyze the stress distribution and performance of pavements under traffic loads. |
| CO5 | Evaluate the use of modern tools and technologies in pavement design. |
| 08 | MTE6202T - Traffic Engineering &Modeling | CO 1 | Describe the principles and concepts of traffic flow and transportation systems. |
| CO2 | Explain the methods used in traffic data collection and analysis. |
| CO3 | Apply traffic modeling techniques to predict traffic patterns and congestion. |
| CO4 | Analyze the effectiveness of various traffic management techniques. |
| CO5 | Evaluate the impact of traffic management systems on urban mobility. |
| 09 | MTE6204T - Urban Mass Transportation System | CO 1 | Describe the structure and components of urban mass transportation systems. |
| CO2 | Explain the design and operational strategies for efficient transportation systems. |
| CO3 | Apply principles of system optimization to enhance urban transport efficiency. |
| CO4 | Analyze the economic and environmental impacts of mass transit systems. |
| CO5 | Evaluate current and future trends in urban mass transportation planning. |
| 10 | MTE6207T - Pavement Maintenance and Management System | CO 1 | Describe the principles and importance of pavement maintenance and management. |
| CO2 | Explain the different techniques for pavement evaluation and rehabilitation. |
| CO3 | Apply management strategies to assess the condition of pavements. |
| CO4 | Analyze the life cycle costs of pavement maintenance and management. |
| CO5 | Evaluate the impact of proper maintenance on the longevity and performance of pavements. |
| 11 | English for Research Paper Writing (AUD6201T) | CO 1 | Understand the structure and components of a research paper. |
| CO2 | Develop technical writing skills and academic communication. |
| CO3 | Apply proper citation styles and ethical research writing practices. |
| CO4 | Enhance clarity, coherence, and logical flow in technical documents. |
| CO5 | Prepare and edit research papers for academic and professional publication. |
| 12 | M. Tech. & III-Sem | MTE-301 Pavement Maintenance and Management System | CO 1 | Explain the importance of pavement management in transportation engineering. |
| CO2 | Illustrate various pavement distress types and their causes. |
| CO3 | Apply maintenance strategies for different pavement types. |
| CO4 | Analyze the structural and functional performance of pavements. |
| CO5 | Evaluate the lifecycle costs and management practices for pavement rehabilitation. |
| 13 | MTE-302 Transportation System Analysis | CO 1 | Describe the fundamental concepts of transportation system analysis and planning. |
| CO2 | Explain traffic flow theory and transportation demand modeling. |
| CO3 | Apply simulation models to analyze transportation networks. |
| CO4 | Analyze the efficiency and capacity of different transportation systems. |
| CO5 | Evaluate transportation policies and their impact on system optimization and sustainability. |