

Transportation Engineering Roadmap (12 Weeks)

Week 1: Introduction to Transportation Engineering

- Overview and importance.
 - Modes of transportation: road, rail, air, water.
 - Transportation system components.
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Week 2: Traffic Engineering Basics

- Traffic characteristics: flow, speed, density.
 - Traffic volume studies.
 - Traffic control devices and signage.
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Week 3: Highway Engineering – Geometric Design

- Cross-section elements.
 - Sight distance, super-elevation.
 - Horizontal and vertical alignment design.
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Week 4: Highway Materials and Construction

- Bituminous and cement concrete pavements.
 - Material properties and testing.
 - Pavement layers and construction techniques.
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Week 5: Traffic Safety and Accident Analysis

- Causes of accidents.
 - Road safety audits.
 - Traffic calming measures.
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Week 6: Pavement Design and Maintenance

- Types of pavement design methods (AASHTO, IRC).

- Structural and functional pavement failures.
 - Maintenance and rehabilitation techniques.
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Week 7: Urban Transportation Planning

- Trip generation, distribution, and mode choice.
 - Land use and transportation interaction.
 - Demand forecasting methods.
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Week 8: Public Transportation Systems

- Types: bus, metro, light rail.
 - Design and operation considerations.
 - Scheduling and fleet management.
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Week 9: Traffic Signal Design and Control

- Signal timing and phasing.
 - Coordinated traffic signal systems.
 - Adaptive traffic control.
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Week 10: Intelligent Transportation Systems (ITS)

- Components and applications of ITS.
 - Vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communication.
 - Smart traffic management.
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Week 11: Environmental and Sustainable Transportation

- Impact of transportation on environment.
 - Green transportation initiatives.
 - Policies and regulations.
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Week 12: Project / Case Study

- Traffic study and report for a selected corridor.
 - Pavement design project.
 - Application of ITS in a city scenario.
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Tools and Software:

- VISSIM, SYNCHRO, AutoCAD Civil 3D
- GIS software
- MATLAB for traffic simulation