Public Mass Transportation

Code	Credit Hours
CE 868	3-0

Course Description

The Public Mass Transportation Systems course is designed to provide students with a comprehensive understanding of the design, operation, and management of various modes of public transportation in urban environments. This course explores the crucial role of public mass transportation in addressing urban mobility challenges, promoting sustainability, and enhancing the quality of life for city dwellers.

Text Book:

1. Alan Black. Urban Mass Transportation Planning, McGraw-Hill, 1995.
2. Vukan R. Vuchic. Urban Transit: Operations, Planning and Economics, John Wiley & Sons, 2005.

Reference Book:

1. Avishai Ceder. Public Transit Planning andOperation Theory, modeling and practice (2007) , Salvador Koch, ISBN: 978-0-7506-6166-9
2. Vukan R. Vuchic. Urban Transit: Systems and Technology, John Wiley & Sons, 2007.
3. John D. Fricker and Robert K. Whitford. Fundamentals of Transportation Engineering: A Multimodal Systems Approach. Pearson Prentice Hall, 2004.
4. Numerous reference books are available in library.

Prerequisites

Nil

ASSESSMENT SYSTEM FOR THEORY

Quizzes	10-15%
Assignments	5-10%
Mid Terms	25%
ESE	40-50%
Term Project	10%

Teaching Plan

Week No	Topics	Learning Outcomes
1	Introduction to Urban Mass Transportation	Overview of urban mass transportation Importance and impact on urban development Historical development and future trends
2	Travel Demand Survey Design and Sampling Concepts	Designing travel demand surveys Sampling techniques and methodologies Data collection and analysis

3	Transit Routes/ Systems Design and Transit Planning	Fundamentals of transit route and system design Transit planning principles and methodologies Different route configurations and their applications
4	Service Monitoring and Performance Measures	Monitoring transit service performance Key performance indicators: capacity, productivity, efficiency, and utilization Techniques for improving service quality
5	Demand Characteristics and Estimation Models	Understanding transit demand characteristics Demand estimation models and their applications Concept of elasticity in transit demand
6	National Transit Database and Data Analysis	Introduction to the National Transit Database (NTD) Using NTD for transit data analysis and research Practical applications and case studies
7	Analysis, Evaluation, and Selection of Transit Modes	Criteria for evaluating and selecting transit modes Comparative analysis: Bus Rapid Transit (BRT), rail transit, high-speed rail Case studies of different transit modes
8	Transit Capacity, Speed, and Special Operations	Determining and optimizing transit capacity Factors affecting transit speed and acceleration Special transit operations and their applications
9	**MID SEMESTER EXAM**	
10	Transit Operations and Service Scheduling	Principles of transit operations management Service scheduling techniques and best practices Tools for optimizing transit schedules
11	Transit Cost Estimation and Analysis	Methods for estimating transit costs Analyzing transit cost structures Strategies for cost reduction and efficiency improvement
12	System Financing, Subsidies, and Fare Structures	Financing mechanisms for transit systems Role of subsidies in supporting transit operations Designing and implementing fare structures
13	Transit and Urban Development Modeling and Optimization in Transit Systems Analysis	Relationship between transit and urban development Concept of transit-oriented development (TOD) Planning and implementing TOD projects Introduction to modeling techniques in transit systems Optimization methods for improving transit operations

14	Transit Agency Operations, and Marketing Transit Ownership, Regulation, Safety, and Security	Operations management in transit agencies Marketing strategies for promoting transit use Different ownership models for transit systems Regulatory frameworks and compliance requirements Ensuring safety and security in transit operations
15-16	Special Groups of Transit Users Intelligent Transportation Systems (ITS) in Transit Unconventional Concepts and Systems	Understanding the needs of people with different abilities Designing accessible transit systems Policies and practices for inclusive transit services Role of ITS in enhancing transit operations ITS technologies and applications in transit systems Overview of unconventional transit systems: automated guided transit, monorails Advantages and challenges of unconventional systems
17	Term Project and Presentations	Development of a comprehensive project on urban mass transportation Application of course concepts to real-world scenarios Group presentations and peer review
18	**END SEMESTER EXAM**	