Birla Institute of Technology & Science, Pilani
Hyderabad Campus

ACADEMIC – GRADUATE STUDIES AND RESEARCH DIVISION
SECOND SEMESTER 2023-2024
Course Handout (Part -II)

10/01/24

In addition to part I (General Handout for all courses appended to the timetable) this portion gives further specific details regarding the course.

Course No.: CE G566
Course Title: Public Transportation
Instructor-in-charge: Prasanta Sahu (prasanta.sahu@hyderabad.bits-pilani.ac.in)
Office: D-327

1. Scope and objectives of the course:

Scope: The course intends to equip the students with sufficient technical knowledge on mass transit planning, operations and management. The course covers the historical evolution of transit in cities; the technological innovations which made transit possible; and transit mode definitions and travel regimes. Critical planning concepts such as scheduling; level of service; capacity; and networks, particularly estimation of transit demand, route planning and terminal design are addressed. Transit operating agencies' organizational structures and operational procedures are introduced. The course would also include operation and management of transit systems, fleet and crew management, terminal management and fiscal management. Qualitative and quantitative planning objectives and models are presented; the importance of ITS technology in transit operation is evaluated. Methods to evaluate and select potential transit modes are described.

Course Outcome: At the end of this course, the students are expected to develop ability to:

1. Develop sound fundamental skills in the planning – demand estimation, network configuration, transfer locations, etc. – of urban public transportation systems.
2. Analyze the quantitative relationships which dictate transit system operation – tractive effort, vehicle resistance, and travel time analysis – as well as critical concepts such as time – space diagrams.
3. Comprehend and have sufficient quantitative skills to mathematically model and evaluate different transit operational schemes.
4. Able to apply both quantitative and qualitative analysis techniques and their application to public transportation systems.

Student Learning Outcomes (SLOs) assessed in this course – **(a), (b), (c), (e), (h), (i), (j),** and **(k).**

2. Textbook(s):

Text Book (TB)

1. Vuchic Vukan R.; *Urban Transit: Operations, Planning and Economics; John Wiley & Sons, Inc.*; 2005.
2. Vukan R. Vuchic, Urban Transit Systems and Technology, John Wiley & Sons, Inc. 2007 Edition

Reference Books (RB)

1. Black, Alan; *Urban Mass Transportation Planning;* McGraw-Hill Inc., 1995
2. Sarkar, P.K., Maitri, V., and Joshi, G.J. Transportation Planning, Principles, Practices and Policies, PHI Pvt. Ltd., Second Edition, 2017

Note: Handouts will be distributed time to time.

Lecture wise Course Plan

Lecture No.	Learning Objective	Topics Covered	Reference to TB, RB	SLO*
1 - 3	History of urban transit	Major movers of earlier centuries, subway and elevated systems, arrival of motor vehicles, decline of streetcar.	Ch 2 (TB 1)	**a, c**
4 - 7	Urban transit modes	Suburban railroad, heavy rail, light rail, bus, rail versus bus, comparison of modes.	Ch 5 (TB 1), Ch 2 (RB 1), Ch 2 (TB 2)	**a,c,e**
8 - 10	Para-transit	Dial-a-ride, taxi, jitney, ride sharing and other modes.	Ch 6 (TB 1), Ch 2 (TB 2)	**a,b,j**
11 - 13	Innovative technology	Personal rapid transit, people movers, rail transportation, guided bus-ways.	Ch 7 (TB 1)	**a,c,e**
14 - 23	Planning transit networks	Planning process, planning methodology, transportation networks, travel demand forecasting, configuration of network, spacing of routes, spacing of stops, frequency of service.	Ch 8 (TB 1)	**a,b,j,k**
24 - 26	Urban Bus Rapid Transit System	Definition and case studies with success stories.	Handout	**a,b,e,j,k**
27 - 30	Transit system performance	Line capacity, station capacity, theoretical and practical capacities of modes, quantitative performance measures.	Ch 7(RB 1)	**a,b,e,k**
31 - 35	Operations and Management	The operating cycle, scheduling, special service pattern, fare collection, marketing.	Ch 9 (RB 1)	**a,b,e,k**

36 - 38	Transit and urban development	Symbiotic relationship, impact of transit, land-use theory and simulation, measuring benefits of transit, issue of desirable urban form	Ch 18 (RB2)	**a,b,c,e.k**
39 - 40	Policies for the future	Future trends, major policy issues, land use policy, solving urban transportation problems.	Ch 16 (RB 1)	**c,e,i,j**
41 - 42	Analysis, evaluation and selection of transit modes	Definition of conditions set, Formulation, comparison and selection of candidate modes, Transit systems planning, Planning and selection of medium- and high-performance transit modes.	Ch 10 (TB 1), Ch 11 (TB 1), Ch 12 (TB 1)	**a,f,h,i,j**

Evaluation Scheme

E.C. No.	Evaluation component	Duration	Weightage	Date, time	Nature of component
1	Mid-semester test	90 min	25%	12/03 - 9.30 - 11.00AM	CB
2	Comprehensive	2 hours	35%		CB
3	Assignments/ Term paper/ project/Seminar/Quiz	-	40%	08/05 FN	OB

Chamber Consultation Hour: To be announced in the class.

Notices: All Notices concerning to the course will be displayed on **CMS and Notice Board** of Civil Engineering Department.

Make up policy: Makeup will be given only to the genuine cases with prior permission.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Instructor-in-charge

CE G566