PIUI 7002	Infrastructure Sector understanding & Planning	L	T	P	C
Version 1.0		3	0	0	3
Pre-requisites/Exposure	Graduate				
Co-requisites	Good Command in MS Word and MS Powerpoint				

Course Objectives

India is the third largest economy in the world with Gross GDP crossing 2 trillion dollar mark this year. However, one factor which is dragging the Indian economy backwards is the lack of world class infrastructure. India stands 142nd out of 189 countries ranked by the World Bank for ease of doing business. Infrastructure acts as a backbone for any country's economy and has a direct impact on the growth and development of an economy. There are many issues that need to be addressed in different infrastructural fields. To begin with, the gap between electricity production and demand is affecting both manufacturing and overall growth. Then though road transport is the backbone of the Indian transport infrastructure, it is inadequate in terms of quality, quantity, and connectivity. Also in the overall transport sector, civil aviation and ports desperately need modernization.

Course Outcomes

On completion of this course, the students will be able to

CO1	Understanding the issues & challenges in the Infrastructure Sector
CO2	To develop managerial skills required for Infrastructure Planning & formulation.
CO3	Analysing optimization techniques for Infrastructure Planning & Costing.
CO4	Integrating the knowledge for Project execution and control.
CO5	To learn the managerial and leadership quality for Infrastructure Projects.

Catalog Description

This course explores important substantive areas and concepts in the field of urban and regional planning and current urban planning and policy issues and debates. Topics include: forces that have historically guided and are currently guiding India's urbanization; land use, growth management, transportation and traffic congestion, economic development, housing and community development, environmental planning; legal, environmental, governmental contexts.

Course Content

Unit I: 4.5 lecture hours

Types of Infrastructure & Status of Infrastructure in India, Overview of Power Infrastructure, Overview of Oil & Gas Infrastructure, Overview of Utility Infrastructure, Overview of Transport Infrastructure

Unit II: 6 lecture hours

Introduction: Economic Rationale and Task of Regulation, The Averch-Johnson model of Rate of Regulation, Regulatory Mechanism to induce optimal outcomes for one product natural monopoly, Ramsey Prices, Surplus Subsidy Schemes, Regulation under Asymmetric information

Unit III: 7.5 lecture hours

What is Infrastructure Financing, Capital Market and Derivative market, International financing/Business Restructuring, Debt and Repayment

Unit IV: 6 lecture hours

Benefits & Problems of Privatization, Understanding the Business Cycle, Challenges in Privatization of Utility Infrastructure, Challenges in Privatization of Oil & gas Sector, Challenges in Privatization of Transport Sector

Unit V: 12 lecture hours

Economic and Demand risks, Political Risks, Socio Environmental Risks, Risk Management Framework, Case 1 & Case 2 Bidding, World bank standard of Bidding, Standard Bidding documents

Text Books and Journals

1. RBI Reports
2. Mckinsey report on Urbanization.
3. HANDBOOK ON SERVICE LEVEL BENCHMARKING
4. Optimal Regulation, The Economic Theory of Natural Monopoly- Kenneth E. Train
5. WB & OECD Reports
6. CEA & IEA Reports
7. NHAI & AAI Reports
8. Case studies/ Printed Materials

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Presentation/Assignment/Projects etc	ESE
Weightage (%)	50	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Programme Outcomes**
CO1	Understand the issues & challenges in the Infrastructure Sector	PO 1,2, ,4,7,8,9,10, 11,13, 14

CO2	To develop managerial skills required for Infrastructure Planning & formulation.	PO 1,2, 3, 7,8,9,10, 11,14
CO3	Analysing optimization techniques for Infrastructure Planning & Costing.	PO 1,2, 3, 8,9,10, 11, 13,14
CO4	Integrating the knowledge for Project execution and control.	PO 4,5, 8,12,13, 14
CO5	To learn the managerial and leadership quality for Infrastructure Projects.	PO 1,2, 3, 4,8,13,14

CourseOutcomes	**CO 1**	**CO 2**	**CO 3**	**CO 4**	**CO5**
PO 1	3	3	3	2	3
PO 2	3	3	3	2	3
PO 3	2	3	3	2	3
PO 4	3	2	2	3	3
PO 5	2	2	2	3	2
PO 6	2	2	2	2	2
PO 7	3	3	2	2	2
PO 8	3	3	3	3	3
PSO 9	3	3	3	2	2
PSO 10	3	3	3	2	2
PSO 11	3	3	3	2	2
PSO 12	2	2	2	3	2
PSO 13	3	2	3	3	3
PSO 14	3	3	3	3	3

		Students will demonstrate strong conceptual knowledge and execution in soft and hard infrastructure planning, development, management, financing, regulation and governance.	Students will demonstrate effective understanding of infrastructure planning and development, utility & energy management, urban transportation including metro rail, e-vehicle with charging and other modes of urban surface transportation, water supply and sewerage, smart city planning and effective financing urban infrastructure.	Students will demonstrate analytical skills to understand issues with remedial solutions relating to urban infrastructure. of soft and hard infrastructure	Students will exhibit the ability to integrate planning, construction & development, operation & management, financing, regulation and governance of urban infrastructure projects and facilities.	Students will exhibit the ability to integrate technical, economic, social and regulatory frameworks for urban infrastructure sector planning and resource management.	Students will exhibit deployable skills pertinent to urban hard and soft infrastructure sector and smart city development and management.	Students will be able to develop and evaluate alternate managerial choices and identify optimal solutions.	Students will demonstrate effective application capabilities of their conceptual understanding to infrastructure planning, development and management.	Students will be able to exhibit effective decision-making skills, employing analytical and critical thinking ability for planning, development and management of soft and hard infrastructure.	Students will demonstrate effective oral and written communication skills in the professional context.	Students will be able to work effectively in teams and demonstrate team-working capabilities.	Students will exhibit leadership and networking skills.	Students will demonstrate sensitivity towards ethical and moral issues and have ability to address them in the context of urban planning, development and management including cost effective financing and good governance.	Students will demonstrate employability traits in line with the needs of changing hard and soft urban infrastructure sector.
Course Code	Course Title	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO 12	PO13	PO14
PIUI 7005	Urban Transport Economics Planning & Mgt.	3	3	3	3	2	2	2	3	3	3	3	2	3	3

1=weakly mapped
2= moderately mapped
3=strongly mapped

Model Question Paper

Name: **Enrolment No:**	

Course: PIUI 7002-Infrastructure Sector understanding & Planning

Programme: MBA UISC **Semester: Even**

Time: 03 hrs. **Max. Marks:100**

Instructions:

Section A (each carrying 2 marks); Attempt all questions from **Section B** (each carrying 5 marks)**.** Any **Two Questions** from **Section C** (carrying 15 marks)**.** Case Study **Section D (** 30 Marks)

Section A ( )

1	No. of Zones of Indian Railway ?	**[2]**	**CO1**
2	No. of Major Ports in India ?	**[2]**	**CO5**
3	What is value of India's total GDP ?	**[2]**	**CO2**
4	When and where was first Indian Railway established ?	**[2]**	**CO2**
5	Full form of CEA –	**[2]**	**CO3**
6	Which is the longest National Highway in India ?	**[2]**	**CO1**
7	What is the full form of CRRP ?	**[2]**	**CO2**
8	The Minister of Road Transport and Highways of India ?	**[2]**	**CO4**
9	The Minister of Railways in India ?	**[2]**	**CO4**
10	Where are the largest sources of coal found in India ?	**[2]**	**CO2**
	SECTION B (Attempt all Questions**)**		
11	What is the importance of SMART GRID in the Power Distribution Sector in India ?	**[5]**	**CO4**
12	Main functions of DGCA ?	**[5]**	**CO2**
13.	Why implementing PPP is important for Growth in India ?	**[5]**	**CO5**
	What are the major strategic elements while planning for Non-Motorized transport?	**[5]**	**CO1**
	SECTION C (Attempt any Two Questions)		
14.	Explain the following:	**[15]**	**CO4**

	Pradhan Mantri Gram Sadak Yojna, Role of National Development Bank for Infrastructure sector Financing, Risk Mitigation		
15.	Explain Tax, Subsidy and Price cap with suitable examples and Graphs.	**[15]**	**CO4**
16	Explain Slots Allocation & Route dispersal guidelines of Civil Aviation Sector in India	**[15]**	**CO5**
	SECTION D (Case Study)		
	Case Study Urban travel in Indian cities predominantly happens through walking, cycling and public transport, including intermediate public transport (IPT). Despite high growth rates of motorised two wheelers and cars in the last two decades (15 per cent and 10 per cent per annum respectively), car ownership remains at 3–13 per cent of the households and two wheelers at 40–50 per cent. The latter is same as the bicycle ownership in cities of different sizes. The variation in modal shares among these three seems to have a relationship between city size and per capita income. Small and medium size cities have a lower income than the mega cities. Therefore the dependence on cycle rickshaws and bicycles is higher in smaller cities. In some medium-size cities (populations of 1 million to 3 million), private buses have been introduced. Public-sector-run state transport corporations have been responsible for running inter-city routes. Other than the four megacities (Delhi, Mumbai, Kolkata and Chennai) Bangalore and Pune are the exceptions in which municipal corporations have been running significant number of buses. Other cities have skeletal bus services provided by the city municipality. Intermediate public transport (IPT) modes like tempos, cars and cycle rickshaws assume importance as they are necessary to meet travel demands in medium size cities in India like Lucknow, Hubli, Varanasi, Kanpur and Vijayawada. These vehicles have minimal regulations in terms of road worthiness certifications issued by the transport authorities. Their operations have been left to the private operator. Often they have been found to cause serious emission and safety violations. However, there is no policy or project that can improve the operation of para-transit modes. Often the fare policy stipulated by the government is not honoured by the operators, and the road infrastructure also does not include facilities for these modes. As a result, the operators have to violate legal policies to survive. Of India's 285 million urban residents, nearly 100 million people live in urban slums. Travel patterns of people living in informal housing or slums are very different from residents in formal housing. Generally, cycling and walking account for 50 to 75 per cent of the commuter trips for those in the informal sector. The formal sector is dependent on buses, cars and two wheelers. This implies that despite high risks and a hostile infrastructure, low-cost modes exist because their users do not have any choice. They are	**[30]**	**CO3**

the captive users of these modes. Public transport is the predominant mode of motorised travel in mega cities. Buses carry 20 to 65 per cent of the total amount of passengers excluding those who walk. The minimum cost of public transport use accounts for 20 to 30 per cent of the family income for nearly 50 per cent of the city population living in unauthorised settlements.

Since transport is a state subject in the Indian constitution, central government did not have a policy or investment plan for urban transport infrastructure until 2006. City governments attempted to solve transport crises as isolated road improvement projects. Despite investments in road infrastructure and plans for land use and transport development, all cities continue to face the problem of congestion, traffic accidents and air and noise pollution. All these problems are on the increase. Investments in road-widening schemes and grade-separated junctions which primarily benefit personal vehicle users (cars and two wheelers) only, have dominated government expenditure. For example in Delhi, the total funds allocated for the transport sector in 2002–2003 have doubled in 2006–2007. However, 80 per cent of the funds have been allocated for road-widening schemes benefiting primarily the car and motorcycle users. In 2006–2007, 60 per cent of the funds have been earmarked for public transport, which primarily includes a metro system. Cars are owned by less than 15 per cent of the households in Delhi. Therefore, an investment in car-friendly infrastructure is not meant for a majority of the commuters.

In the name of promoting public transport, demand for rail-based systems (metro, LRT and monorail) has been pursued by several cities. This is despite the fact that the rail-based systems are capital intensive; capacity is underutilised and the system requires capital and operating subsidies. The existing metro systems in Kolkata, Chennai and Delhi carry less than 20 per cent of the available capacity. All three systems are running with operating losses. Despite this the government in Delhi has decided to expand the metro system. Similarly the state governments of Maharashtra, Karnataka and Andhra Pradesh have decided to invest in metro systems. These systems will cater for a small proportion of the total amount of journeys (less than five per cent). Yet they are being pursued by the city authorities and promoted as investment projects in which the private sector can participate. The Mumbai metro rail project has been approved as the first MRTS project being implemented as a public private partnership (PPP) project.

Traffic and transport improvement proposals prepared by consultants before the JNNURM (Jawaharlal Nehru National Urban Renewal Mission), include proposals for road widening, grade-separated junctions and metro systems. While the road-widening and junction-improvement schemes were implemented in only a few cities, public

	transport remained in the reports only because the finances required for metro projects are beyond the capacity of state or city governments. **1.** Critically analyse the case. (10) **2.** How are the State Governments planning their Urban Transportation system? (10) **3.** What are the main proposal of JnNURM for Urban Transport.(5) **4.** How Urban Transport in Delhi had been financed? (5)		