Infrastructure Engineering and Management

01CI0730

Objective of the Course:

- To provide an overview of Infrastructure Project.
- To develop an understanding of Infrastructure Master Plan, Development Plan and various project activities involved.
- To describe the characteristics of an Infrastructure Project.

Credit Earned: 02

Student's learning outcomes:

After successful completion of the course, it is expected that students will be able to,

1. Analyze comprehensive infrastructure master plans by utilizing multi-criteria analysis and life cycle assessment techniques.
2. Prepare project development plan for Infrastructure organizations and systems.
3. Evaluate various financial models and risk management strategies in Public-Private Partnership (PPP) infrastructure projects.
4. Apply innovative maintenance techniques and risk mitigation strategies to ensure the sustainability and longevity of infrastructure systems.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Term Work (TW)	
02	00	00	02	50	30	20	-	-	100

Detailed Syllabus

Sr. No.	Title of the unit	Number of Hours
1	**Infrastructure**	**8**
	Definitions of infrastructure, Governing Features, Historical overview of Infrastructure development in India, Infrastructure Organizations & Systems.	
2	**Infrastructure Planning**	**10**

	Typical infrastructure planning steps, Planning and appraisal of major infrastructure projects, Screening of project ideas, Life cycle analysis, multi-criteria analysis for comparison of infrastructure alternatives, Procurement strategies, Scheduling and management of planning activities, Infrastructure Project Budgeting and Funding, Regulatory Framework, Sources of Funding	
3	**Public-Private Sector Participation**	**6**
	Structure of PPP, benefits, problems, challenges and financial models Managing risk in private infrastructure projects	
4	**Infrastructure Maintenance and Risk Management**	**4**
	Introduction, requirement and techniques for infrastructure maintenance Risk in infrastructure and strategies for risk management	
	Total	**28**

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve an effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
15%	25%	20%	20%	10%	10%

Instructional Method and Pedagogy:

1. At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
2. Lectures will be taken in class room with the use of multi-media presentations, white board– mix of both.
3. Attendance is compulsory in lectures which carries a 5% component of the overall evaluation.
4. Minimum two internal exams will be conducted and average of two will be considered as a part of 15% overall evaluation
5. Surprise tests/Quizzes will be conducted which carries 5% component of the overall evaluation.

Recommended Study Material

1. Parkin J. & Sharma D, Infrastructure Planning. Thomas Telford
2. Chandra P. Projects: Planning, analysis, selection, financing, implementation, and review, Tata McGraw-Hill
3. Goodman S. and Hastak M., Infrastructure Planning Handbook. Planning, Engineering, and Economics. McGraw-Hill
4. Webster T. J., Managerial Economics: Theory and Practices, Elsevier

5. Tan W. Principles of Project and Infrastructure Finance, Taylor and Francis
6. Ronald W Hudson, "Infrastructure Management: integrating design, Construction, maintenance, rehabilitation and renovation", MGH, 1st Edition, 1997
7. Grig N. S., "Infrastructure Engineering and Management", Wiley-Interseience, 1988

Web Links:

1. https://onlinecourses.nptel.ac.in/noc21_mg81/preview
2. https://onlinecourses.nptel.ac.in/noc20_mg28/preview