Gyanmanjari
Innovative University

Subject: Infrastructure for Smart City – BETCV14312

Type of course: Minor Stream

Prerequisite: Building and Town Planning

Rationale: To develop a basic understanding about various types of Infrastructure and Smart city. To enable the students to apply the basic need and planning concept to solve various Infrastructure problems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
03	00	00	03	60	30	10	0	50	150

Legends: CI, Class Room Instructions; T – Tutorial; P, Practical; C – Credit; ESE, End Semester Examination; MSE, Mid Semester Examination, V – Viva; CA, Continuous Assessment; ALA, Active Learning Activities.

Course Content:

Sr. No	Course Content	Hrs.	% Weightage
1	**Fundamental of smart city & Infrastructure:** Introduction of Smart City, Concept of smart city, Objective for smart cities, History of Smart city world and India. Need to develop smart city, Challenges of managing infrastructure in India and world, various types of Infrastructure systems, Infrastructures need assessment	10	10
2	**Planning and development of Smart city Infrastructure** Energy and ecology, solar energy for smart city, Housing, sustainable green building, safety, security, disaster management, economy, cyber security, Project management.	05	25
3	**Intelligent transport systems** Smart vehicles and fuels, GIS, GPS, Navigation system, traffic safety management, mobility services, E-ticketing	05	25
4	Management of water resources and related infrastructure	10	30

	Storage and conveyance system of water, sustainable water and sanitation, sewerage system, flood management, conservation system		
5	**Infrastructure Management system & Policy for Smart city** Integrated infrastructure management systems for smart city, Infrastructure management system applications for existing smart city. Worldwide policies for smart city Government of India - policy for smart city, Mission statement & guidelines, Smart cities in India, Case studies of smart city.	15	10

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
01	**Smart City Technology Exploration:** Set up stations with different smart technologies (e.g., It sensors, smart grids, traffic management systems). Students rotate through each station, where they: 1. Learn about the technology 2. Discuss its applications in smart cities 3. Consider its benefits and challenges 4. Provide examples of cities already using the technology	10
02	**Smart City Design Challenge:** Divide the students into teams and assign them the task of creating a design for a smart city. Each team must incorporate elements such as: 1. Renewable energy sources (solar, wind) Smart transportation systems (autonomous vehicles, public transport networks) 2. Green building designs 3. Waste management solutions (smart bins, recycling stations) 4. It applications (smart streetlights, environmental sensors)	10
03	**Infrastructure Failure Analysis and Recovery** Present students with a hypothetical scenario where a major infrastructure failure occurs in a smart city (e.g., a blackout, water supply disruption, or traffic gridlock). Students must work in teams to: 1. Analyze the cause of the failure 2. Develop strategies to recover from the situation 3. Implement preventive measures to avoid future failures	10
04	**Field Trip/Virtual Tour of a Smart City** Organize a field trip to a smart city or a nearby urban area with advanced infrastructure features, such as smart traffic lights, waste management systems, or sustainable buildings. If a field trip is not possible, conduct a virtual tour of smart cities (e.g., Singapore, Barcelona) using online resources.	10
05	**Infrastructure Simulation Game** Use a computer simulation or board game where students are tasked with building and maintaining infrastructure for a growing city. They must make decisions on transportation, energy, waste management, and more, while managing resources and dealing with challenges like budget constraints, population growth, or environmental disasters	10
	Total	**50**

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	30%	30%	30%	10%	,	,

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may lightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Understand the necessity of infrastructural development for smart cities.
CO2	Identify components of infrastructure and Prepare infrastructure plan for smart city.
CO3	Understand smart transport system for smart cities and its application
CO4	Study of water resources systems for smart city and its application
CO5	Understand National and Global policies to implement for smart city development.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e, courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] Smart City on Future Life - Scientific Planning and Construction by Xianyi Li
[2] The Age of Intelligent Cities: Smart Environments and Innovation-for-all Strategies (Regions and Cities) by Nicos Komninos
[3] Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia by Anthony Townsend
[4] Greg N.S., Infrastructure engineering and management, Wiley-Interseience, 1988
[5] Hudson W.R., Haas R., Uddin W., Infrastructure Management, McGraw-Hill, 1997
[6] Gaffing, Rudolf; Christian Fertner; Hans Kramar; Robert Kalasek; Nataša Pichler-Milanovic; Evert Meijers (2007).