



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of the UGC Act, 1956)

Reg. No. :

Final Assessment Test(FAT) - Nov/Dec 2024

Programme	B.Tech.	Semester	Fall Semester 2024-25
Course Code	BCSE316L	Faculty Name	Prof. Vignesh U
Course Title	Design of Smart Cities	Slot	B1+TB1
		Class Nbr	CH2024250101353
Time	3 hours	Max. Marks	100

General Instructions

- Write only Register Number in the Question Paper where space is provided (right-side at the top) & do not write any other details.

Course Outcomes

1. Ascertain and describe the basic concepts of smart and sustainable cities.
2. Comprehend the knowledge of urban planning and sustainability in smart cities.
3. Analyze the security issues and challenges of smart cities and their advancements.
4. Incorporate project management, planning, and stack holders in the design and development of smart cities.
5. Investigate the various ICT and data analytics to connect government, urban planners, universities, city developers, and communities.

Section - I

Answer all Questions (10 × 10 Marks)

*M - Marks

Q.No	Question	*M	CO	BL
01.	In 2016, Columbus, received a \$50 million grant for its "Smart Columbus" plan, aiming to improve transportation and public services. As the project developed, economic growth, environmental health, and social fairness began to clash. (i) Analyse evaluation metrics in these areas. (3 Marks) (ii) What strategies can align evaluation with community needs? (3 Marks) (iii) How can data analytics clarify progress and resolve conflicts? (4 Marks)	10	1	1
02.	Singapore's Urban Redevelopment Authority (URA) aims to create a smart city, has collected extensive data on population density, transportation patterns and energy consumption. (i) Derive the possibility of this assumed data to inform urban planning decisions for creating more efficient, sustainable neighborhoods. (5 Marks) (ii) Illustrate the database structures that would optimize data retrieval for planners. (5 Marks)	10	1	2

03.	Coimbatore's Smart City project is part of the Indian government's Smart Cities Mission. launched in 2015 to transform urban areas through technology and innovation. The project aims to enhance the quality of life for residents, promote sustainable development and foster economic growth. Key objectives include implementing smart city solutions, adopting digital solutions for governance and service delivery and enhancing public amenities. (i) How has Coimbatore's Smart City project ensured inclusive and equitable access to digital services and infrastructure for all residents, particularly vulnerable populations? (5 Marks) (ii) Justify smart technologies have integrated into urban infrastructure based on resource optimization, service delivery and citizen mobility. (5 Marks)	10	2	3
04.	A university campus plans to reduce its waste generation by 50% within the next decade. (i) Identify strategies that can be implemented to enhance waste reduction in campus facilities. (5 Marks) (ii) Explore the recycling and composting methods that can be integrated into the existing campus infrastructure to minimize landfill contributions. (5 Marks)	10	2	3
05.	Imagine you are a Security Architect for an ongoing smart city project. (i) Design a comprehensive security framework with system architecture for a smart city with protocols and technologies integrated. (5 Marks) (ii) Develop a threat modeling strategy to identify potential vulnerabilities in smart city infrastructure. (5 Marks)	10	3	6
06.	A smart city's traffic management system, which uses IoT sensors to optimize traffic flow, has been compromised by a malicious actor. The hacker is manipulating traffic signals, causing congestion and accidents. (i) Analyze the city's IT department's mitigation of damage, considering the legal and ethical implications of this incident. (5 Marks) (ii) Illustrate the emergency response measures should be taken to minimize harm. (5 Marks)	10	3	4
07.	A smart city's ITS network has integrated data from traffic sensors, cameras, and weather stations. (i) Visualize a real-time dashboard displaying: Traffic congestion hotspots; Incident locations; Weather conditions & Traffic signal status. (5 Marks) (ii) Design the dashboard to optimize situational awareness and decision-making for city planners and emergency responders, ensuring efficient traffic management and highway safety. (5 Marks)	10	4	6
08.	While modelling an smart city, (i) What types of advanced control algorithms (e.g., model predictive control, fuzzy logic) can be integrated with IoT sensors to enhance process optimization and stabilization in smart structures, such as active vibration control in high-rise buildings and real-time monitoring of bridge deflection? (5 Marks) (ii) Evaluate the effectiveness of electric vehicle incentives and public transportation enhancements. (5 Marks) Consider factors like system stability, accuracy, and computational efficiency.	10	4	5
09.	(i) Compare and contrast the following global smart city standards and frameworks: ISO 37120 (Sustainable Development of Communities), IESE Cities in Motion Index and Smart City Index (SCI) (5 Marks) (ii) How do these standards facilitate benchmarking and performance evaluation of smart cities? (5 Marks)	10	5	5

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| 10. Analyzing successful smart city project management strategies, examine the web application and mobile-based implementation of the Smart City Initiatives, | 10 | 5 | 4 |
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- (i) Identify the primary goals, scope, and key performance indicators (KPIs) for each smart city project, along with the objectives for the project management approach. (5 Marks)
- (ii) Compare and contrast the web application and mobile-based technologies used in each city's smart initiatives (e.g., data analytics platforms, IoT sensors, mobile apps). (5 Marks)

BL-Bloom's Taxonomy Levels - (1.Remembering, 2.Understanding, 3.Applying, 4.Analysing, 5.Evaluating, 6.Creating)

