VIT®

Vellore Institute of Technology

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Reg. No. : 22 BCE 1138

Final Assessment Test(FAT) - Nov/Dec 2024

Programme	**B.Tech.**	Semester	**Fall Semester 2024-25**
Course Code	**BCSE316L**	Faculty Name	**Prof. A Swaminathan**
Course Title	**Design of Smart Cities**	Slot	**B2+TB2**
		Class Nbr	**CH2024250101361**
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.	Imagine you are a city planner implementing a Community Resource Sensing System for water management in a drought-prone area. a. Present a neat diagram illustrating this scenario. [3 Marks] b. Explain how you can use sensors, IoT devices, ICT, and AI in this process. [7 Marks]	10	5	2
02.	Chennai's recurring flooding issues underscore the challenges posed by an inadequate drainage system. Given the increasing unpredictability of weather patterns, effective flood management solutions are urgently needed. a. How can urban planners utilize urban planning principles, weather forecasting, and GIS databases to address this issue? [5 Marks] b. Develop a strategic plan that leverages these elements to create a resilient city infrastructure capable of managing flood risks. [5 Marks]	10	2	2
03.	Urban planning often faces rapid urbanization, climate change, socioeconomic disparities, and infrastructure deficits. a. Elaborate how would you prioritize and address the challenges mentioned above in the planning process for a new city. [4 Marks] b. Propose a comprehensive plan that balances the competing demands of growth, sustainability, and social equity. Justify the strategies. [6 Marks]	10	2	6

04.	"Energy as a catalyst for sustainable transformation" plays a vital role in driving sustainable development and creating positive societal change. Considering this scenario, answer the following questions. a. How can renewable energy, smart technologies, and energy storage solutions contribute to creating a sustainable energy future while addressing climate change and energy equity? [4 Marks] b. Discuss the key challenges and opportunities in optimizing energy usage through technology, and explore how industries and residential sectors can adopt energy-efficient practices to support this transformation. [6 Marks]	10	3	5
05.	Smart cities rely heavily on interconnected systems and digital technologies, which can expose them to various security threats, including cyberattacks and data breaches. a. Analyze the implications of security threats on critical urban infrastructure, such as Aadhaar data, healthcare data, and public safety systems. [3 Marks] b. Propose a comprehensive security framework that addresses these vulnerabilities by incorporating best practices from cybersecurity, physical security, and community engagement, and explain how you would evaluate the effectiveness of this framework over time. [7 Marks]	10	3	4
06.	Smart cities encompass various dimensions, including governance, economy, mobility, environment, and quality of life. a. Evaluate how the interplay between the different dimensions of a smart city can either facilitate or hinder the overall effectiveness of smart city initiatives. For example: select one dimension (e.g., mobility) and analyze its impact on at least two other dimensions (e.g., environment and quality of life). [4 Marks]. b. Propose a multi-dimensional strategy to enhance the resilience and sustainability of a smart city, and discuss potential challenges in implementing your strategy along with ways to address them. [6 Marks]	10	1	5
07.	a. Compare and contrast the process control mechanisms of a traditional washing machine that operates solely with timers and a fully automated washing machine that utilizes sensors and feedback loops. [5 Marks] b. Discuss the role of sensors, feedback loops, and actuators in maintaining optimal operation, and suggest strategies to address potential disturbances or disruptions in the process. [5 Marks]	10	1	4
08.	a. Considering the critical role of IoV in enhancing transportation safety and efficiency, how would you design a secure IoV framework that balances data privacy and real-time communication needs? [5 Marks] b. Given the role of Intelligent Transportation Systems (ITS) in reducing environmental impacts, how would you design a smart transportation plan for a medium-sized city that aims to cut carbon emissions by 30% over the next decade? Consider aspects such as traffic management, public transport integration, and renewable energy sources in your proposal. [5 Marks]	10	4	3
09.	Assume that you are tasked with creating a mobile application for addressing women's harassment and child abuse. a. Explain, with a flow diagram, how you can safeguard those in need. [5 Marks] b. Elucidate the features of the mobile application and describe how you can make use of ICT in this process. [5 Marks]	10	5	6

10.	a. How can project management practices be effectively utilized to achieve Sustainable Development Goals 13 (Climate Action), 14 (Life Below Water), and 15 (Life on Land)? [5 Marks] b. Identify challenges and propose a strategy that integrates these goals while measuring the success of your approach. [5 Marks]	10	4	3

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

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