B. Tech. Engineering				
Course code: Course Title	**Course Structure**			**Pre-Requisite**
	L	**T**	**P**	
CE202: Smart city planning and intelligent transportation	**3**	**1**	**0**	**NIL**

Course Objective: To familiarize the students with the fundamental concepts of smart city planning, intelligent transportation, and its related applications in urban planning

S. No	Course Outcomes (CO)
CO1	To understand urban planning, Smart City concepts, and their city planning
CO2	To understand the parameters involved in smart city planning
CO3	To understand the basic concept of digital twins
CO4	To familiarize oneself with intelligent transportation systems
CO5	To be able to implement knowledge of geographical information systems in building modelling

S. No	Contents	Contact Hours
UNIT 1	**Introduction to Smart City Planning**- Definition and evolution of smart cities, key components and pillars of smart city planning, urbanisation trends and challenges, sustainable development goals and smart cities, stakeholder engagement and collaboration, urban governance and policy frameworks, successful smart city initiatives- case study, MOHUA Smart City Guidelines	8
UNIT 2	**Smart City Infrastructure Design-** Infrastructure planning, integrated infrastructure systems- energy, water, and telecommunications, green building practices and sustainable architecture, resilient urban design and climate adaptation strategies, public space design and urban mobility. Accessibility and inclusive design principles, data-driven decision making in urban development, financing smart city projects- public-private partnership	8
UNIT 3	**Fundamentals of Digital Twins-** Introduction to digital twins- definition and conceptual framework, historical development and evolution, types of digital twins- physical, virtual, hybrid, technologies enabling digital twins- IoT, AI, cloud computing, digital twins in urban planning and management, data integration and interoperability challenges, future trends and innovation in digital twin technology	8
UNIT 4	**Intelligent transportation systems**- Overview ITS, components of ITS- sensors, communication networks, control systems, traffic management and optimization techniques, smart mobility solutions- connected vehicle and autonomous transportation, real-time data analytics for traffic monitoring and prediction, vehicle and localization and navigation, multi-modal transportation planning, successful ITS deployments in urban environments, regulatory and policy consideration and ITS implementation	8

UNIT 5	**Building Information Modelling and GeoBIM-** Introduction to BIM, principles and methodologies, applications of BIM in architecture, engineering, and construction, GeoBIM-integrating GIS with BIM, 3D urban modelling and visualization techniques, collaborative workflows in interdisciplinary coordination, BIM for facility management, emerging trends and future direction	10
	Total	**42**

REFERENCES

S. No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Kapovits, A., et al., "Designing, Developing, and Facilitating Smart Cities", Springer International Publishing, (ISBN 9783319449241, 3319449249) .	2000
2	Zoughbi, S., "Planning and Designing Smart Cities in Developing Nations", IGI Global, (ISBN: 9781668435106, 1668435101).	2012
3	Chaudhary, G., et al., "Digital Twin Technology", CRC Press, (ISBN: 9781000455878, 1000455874).	2005
4	Tyagi, A.K., Sreenath, N., "Intelligent Transportation Systems: Theory and Practice", Springer Nature, Singapore, (ISBN: 9789811976223, 9811976228).	2008
5	Ying, Y., Koeva, M. N., Kuffer, M., & Zevenbergen, J. A. (2020, August). Urban 3d modelling methods: A state-of-the-art review. In XXIVth ISPRS Congress 2020 (pp. 699-706). International Society for Photogrammetry and Remote Sensing (ISPRS).	2021
6	Schiavi, B., Havard, V., Beddiar, K., & Baudry, D. (2022). BIM data flow architecture with AR/VR technologies: Use cases in architecture, engineering, and construction. Automation in Construction, 134, 104054.	2017
7	Teicholz, P. (Ed.). (2013). BIM for facility managers. John Wiley & Sons.	2018
8	Patacas, J., Dawood, N., Vukovic, V., & Kassem, M. (2015). BIM for facilities management: Evaluating BIM standards in asset register creation and service life planning. Journal of Information Technology in Construction.	2018
9	MOHUA Smart City Guidelines, India.	2015