

Branch Name:	Civil Engineering
Program Code:	ET106
Course Name:	Smart Cities (Open Elective - III)
Course Code:	2ET1060881T
Pre-requisite Course:	Basic knowledge of environmental science, urban systems, and computer/IT fundamentals is desirable.

Course Objective:

1. To develop understanding of smart and sustainable city concepts
2. To analyze urban planning, infrastructure, and governance systems
3. To apply smart technologies in urban development
4. To evaluate mobility, sustainability, and implementation strategies

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								
					Theory (Marks)				Practical (Marks)				Total (Marks)
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction to Smart and Sustainable Cities Concept, definition, and need of smart cities, evolution of urban development, key dimensions (governance, mobility, environment, economy), overview of Smart City Mission in India, stakeholders involved, and major challenges in urban development.	9	20
2	Urban Planning and Infrastructure Basics Basic concepts of urban planning, land use planning, introduction to urban infrastructure systems such as water supply, sewerage, solid waste management, transportation, and energy systems, role of planners and engineers, and importance of sustainable urban development.	9	20
3	Smart Governance and Infrastructure Development Introduction to smart governance and e-governance, digital platforms in urban management, basics of infrastructure planning, public-private partnerships, financing concepts, policies and programs related to smart cities, and case studies of Indian smart cities.	9	20
4	Smart Mobility and Urban Services Concepts of urban mobility, public transport systems, non-motorized transport, parking management, basics of intelligent transportation systems (ITS), and integration of transport with land use planning, along with real-life examples.	9	20
5	Smart Technologies and Sustainability Overview of smart technologies such as IoT, GIS, AI, and big data, applications in water management, waste management, energy systems, environmental monitoring, disaster management, climate resilience, and sustainable practices in urban development with case studies.	9	20

Course Learning Outcome:

CO1 (L2 – Understand) Understand the concepts and components of smart and sustainable cities.

CO2 (L3 – Apply) Apply basic principles of urban planning and infrastructure systems in real-world contexts.

CO3 (L4 – Analyze) Analyze the role of governance and infrastructure systems in smart city development.

CO4 (L3 – Apply) Apply concepts of smart mobility and urban services for improving city efficiency.

CO5 (L4 – Analyze) Analyze the role of smart technologies in addressing urban challenges.

CO6 (L5 – Evaluate) Evaluate sustainable practices and solutions for future smart city development.

Reference Books:

1. Jo Beall (1997); “A city for all: valuing differences and working with diversity”; Zed books limited, London (ISBN: 1- 85649-477-2).
2. UN-Habitat; “Inclusive and sustainable urban planning: a guide for municipalities”; Volume 3: Urban Development Planning (2007); United Nations Human Settlements Programme (ISBN: 978- 92-1-132024-4).
3. Arup Mitra; “Insights into inclusive growth, employment and wellbeing in India”; Springer (2013), New Delhi (ISBN: 978- 81-322-0655-2
4. Mission statement & guidelines on Smart City Scheme". Government of India - Ministry of Urban Development

List of Open-Source Software/learning website:

1. [http://smartcities.gov.in/upload/uploadfiles/files/Smart City Guidelines\(1\).pdf](http://smartcities.gov.in/upload/uploadfiles/files/Smart City Guidelines(1).pdf)
2. NPTEL (<https://nptel.ac.in/>)
 - o Courses on Smart Cities
 - o https://onlinecourses.nptel.ac.in/noc26_cell1/preview

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand the concepts and components of smart and sustainable cities.	L-2
CLO2	Apply basic principles of urban planning and infrastructure systems in real-world contexts	L-3
CLO3	Analyze the role of governance and infrastructure systems in smart city development.	L-4
CLO4	Apply concepts of smart mobility and urban services for improving city efficiency.	L-3
CLO5	Analyze the role of smart technologies in addressing urban challenges.	L-4
CLO6	Evaluate sustainable practices and solutions for future smart city development.	L-5

L1- Remember, L2- Understand, L3- Apply, L4- Analyze, L5- Evaluate, L6- Create

Mapping of CLOs with POs & PSOs

	Program Outcomes (POs)												Program Specific Outcomes (PSOs)					
Course Learning Outcome s	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CLO1	M	M				M	H					M	M				H	
CLO2	M	M	M		M	M	H					M	M	M		M	H	
CLO3	M	H	M	M	M	H	H	M				M	M	M	M	M	H	
CLO4	M	M	M		M	M	H					M	M	M		M	H	
CLO5	M	H	M	M	H	M	H					M	M	M	M	H	H	
CLO6	M	H	H	M	M	H	H	M				M	H	M	H	M	H	L

H: High, M: Medium, L: Low