

Branch Name:	Civil Engineering
Program Code:	ET106
Course Name:	Smart Cities (Program Elective - III)
Course Code:	2ET1060706T
Pre-requisite Course:	Basic knowledge of environmental science, urban systems 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.	
4	3	1	-	4	24	60	16	40	-	-	-	-	100

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Introduction to Smart Cities Introduction to smart and sustainable cities including definitions, evolution, need and scope, dimensions of smart cities, global standards and performance benchmarks, Smart City Mission in India, stakeholders involved, key trends and challenges in smart city development, and relationship between sustainability and smart urban systems.	8	18
2	Smart City Planning and Urban Development Principles of urban planning in smart cities, land use planning and zoning, integration of infrastructure systems, role of planners in urban service delivery, sustainable urban design concepts, compact city development, mixed land use, resilience planning, and detailed case studies of national and international smart cities.	10	22
3	Infrastructure Planning, Financing and Governance Planning and development of urban infrastructure systems including water supply, sewerage, solid waste management, and energy systems, feasibility analysis of infrastructure projects, public-private partnership models (PPP, BOT, BOOT, DBOOT), financing mechanisms, smart governance, e-governance frameworks, policies and regulations, and implementation strategies with case studies.	10	22
4	Smart Mobility and Transportation Systems Urban transportation challenges, integration of land use and transport planning, sustainable mobility concepts, public transportation systems, non-motorized transport (NMT), parking management,	9	20

	transit-oriented development (TOD), intelligent transportation systems (ITS), traffic management systems, and case studies of smart mobility solutions.		
5	Smart Technologies and Sustainability Applications Role of smart technologies such as IoT, GIS, AI, and big data in urban management, applications in water, waste, energy, and environmental monitoring, smart grids, smart buildings, climate-responsive planning, disaster management systems, urban resilience, and sustainable development practices with case studies.	8	18

Course Learning Outcome:

CO1 (L3 – Apply)

Apply the concepts and principles of smart and sustainable cities in urban planning and development.

CO2 (L4 – Analyze)

Analyze urban planning strategies, land use patterns, and infrastructure systems in smart cities.

CO3 (L5 – Evaluate)

Evaluate feasibility, financing models, and governance frameworks for smart city infrastructure projects.

CO4 (L4 – Analyze)

Analyze transportation and mobility systems including intelligent transport solutions for sustainable urban development.

CO5 (L3 – Apply)

Apply smart technologies such as GIS, IoT, and AI for solving urban infrastructure and environmental challenges.

CO6 (L5 – Evaluate)

Evaluate sustainability and resilience strategies for smart city development under changing environmental conditions.

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_ce11/preview

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Apply the concepts and principles of smart and sustainable cities in urban planning and development.	L-3
CLO2	Analyze urban planning strategies, land use patterns, and infrastructure systems in smart cities.	L-4
CLO3	Evaluate feasibility, financing models, and governance frameworks for smart city infrastructure projects.	L-5
CLO4	Analyze transportation and mobility systems including intelligent transport solutions for sustainable urban development.	L-4
CLO5	Apply smart technologies such as GIS, IoT, and AI for solving urban infrastructure and environmental challenges.	L-3
CLO6	Evaluate sustainability and resilience strategies for smart city development under changing environmental conditions.	L-5

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

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6
CLO1	M	M	H		M	M	H					M	M	H		M	H	
CLO2	M	H	M	M	M	M	H					M	M	M	M	M	H	
CLO3	M	H	H	M	M	H	H	M			H	M	M	H	M	M	H	L
CLO4	M	H	M	M	M	M	H					M	M	M	M	M	H	
CLO5	M	M	H		H	M	H					M	M	H		H	H	
CLO6	M	H	H	M	M	H	H	M			H	M	M	H	M	M	H	L

H: High, M: Medium, L: Low