Course Title	**Introduction to Smart Cities**	Semester	I/II
Course Code	**BETCK105O/205O**	CIE Marks	50
Course Type	Theory	SEE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	Exam Hours	03
Total Hours of Pedagogy	40 hours	Credits	3

Course Learning Objectives:

CLO1. To understand the concept of smart city and associated challenges.
CLO2. To understand latest technologies used in intelligent building.
CLO3. To understand process of planning and drafting a plan for smart city.
CLO4. To understand the importance of different smart system.

Teaching-Learning Process

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the delivered lessons shall develop students' theoretical skills.
2. State the need for the subject in the present scenario and Provide real-life examplesto understand them
3. Support and guide the students for self–study.
4. Teacher will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress.
5. Encourage the students to group learning to improve their creative and analytical skills.
6. Show short related video lectures related to each module.

- As an introduction to new topics (pre-lecture activity).
- As a revision of topics (post-lecture activity).
- As additional examples (post-lecture activity).
- As an additional material of challenging topics (pre-and post-lecture activity).

Module 1: Introduction to Smart cities (8 hours)

Self-Study: Research smart city concepts, analyze case studies, consider ethical implications, and identify potential smart city initiatives for your local community.
Introduction to city planning, Concept, Principle stakeholders, key trends in smart cities developments.
Applications: Essential foundation for understanding the complexities of smart cities and their potential to improve the quality of life for urban residents.
(RBT Levels: L2)

Module 2 Smart Cities Planning and Development (8 hours)

Self-Study: Research smart city dimensions, global standards, and financing models. Develop smart city plans and consider citizen participation and data privacy.
Understanding smart cities, Dimension of smart cities, Global Standards and performance benchmarks, Practice codes, Smart city planning and development, Financing smart cities development, Governance of smart cities.
Applications: Equips individuals with the knowledge to plan, develop, and finance smart cities,

ensuring sustainable and efficient urban environments.
(RBT Levels: L2, L3)

Module 3: Project management in Smart Cities (8 hours)

Self-Study: Focus on understanding project management methodologies, work breakdown structures, resource allocation, and risk management strategies.
Phases, Stages of project and work break down Structure, Project organization structure, Planning, Scheduling and CPM, Project cost analysis, resource allocation & leveling, Line of balancing technique, Project monitoring and control, Project risk management.
Applications: The skills to effectively manage smart city projects, ensuring timely delivery, optimal resource allocation, and minimal risk.
(RBT Levels: L3, L4)

Module 4: Green building in smart cities (8Hours)

Self-Study: Research green building concepts, explore rating systems, and investigate energy-efficient technologies.
Introduction to green buildings, Rating system, Energy saving system
Applications: Enables the development of sustainable and environmentally friendly smart cities by promoting energy-efficient buildings, reducing carbon footprint, and improving indoor air quality.
(RBT Levels: L3, L4)

Module 5 Smart Technologies, Water Resource Management and Infrastructures in Smart Cities (8Hours)

Self-Study: Research smart transportation technologies like autonomous vehicles and intelligent traffic systems. Explore sustainable water management practices, including water conservation and wastewater treatment.
Transportation System Management in Smart Cities: Smart Vehicles and Fuels, Intelligent Transportation System: Weigh –In motion, Variable Message Signs, GIS, GPS, Navigation System, Traffic Safety Management, Mobility Services, E-Ticketing etc.
Storage and Conveyance System of Water, Sustainable Water and Sanitation, Sewerage System, Flood Management, Conservation System Methods etc.
Applications: Equips learners with knowledge of smart technologies, particularly in transportation and water resource management, enabling the development of sustainable and efficient smart cities.
(RBT Levels: L2, L4)

Course outcome

At the end of the course, the student will be able to:

1 Acquaint knowledge on smart cities planning and development

2 Develop work break down structure, scheduling and project management of smart cities

3 Work out the most energy efficient technique

4 understand about the smart cities concepts and its rating norms.

5 Evaluate smart transport system and water resources systems for smart cities and its application

Course Assessment and Evaluation Details (both CIE and SEE)

Continuous Internal Evaluation: 50 marks		
Theory Assessment Tool	**Marks**	**Reduced marks**
ITA1	25	**25**
ITA2	25	
Assessment -1(activity based)	25	**25**
Assessment -2(activity based)	25	
Semester End Examination (SEE) : 50 marks		
SEE	**Marks**	**Reduced Marks**
Course end examination (Answer any one question from each unit – Internal choice)	100	50

Activity Based Learning / Practical Based learning

Suggested Activities are:

1. Research and present a global smart city case, focusing on implemented technologies, challenges, and outcomes.
2. Develop a proposal for a smart city initiative addressing a specific issue in the local community, considering feasibility and stakeholder roles.
3. Create a Work Breakdown Structure (WBS) and schedule for a hypothetical smart city project, managing resources and risks.
4. Design a basic layout for a green building using energy-saving technologies and evaluate it against a green building rating system.
5. Analyze and report on a chosen smart transportation or water management system, focusing on its components and urban benefits.
6. Participate in a team-based hackathon to develop a prototype or concept for a smart city solution, presenting its impact and implementation potential.

Suggested Learning Resources:

Text 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. William J. V. Neill (2004); “Urban Planning and cultural identity”; Routledge, London (ISBN: 0-415-19747-3)

Reference Books

1. John S. Pipkin, Mark E. La Gory, Judith R. Balu (Editors); “Remaking the city: Social science perspective on urban design”; State University of New York Press, Albany (ISBN: 0-87395-678-8)
2. Giffinger, Rudolf; Christian Fertner; Hans Kramar; Robert Kalasek; Nataša Pichler-Milanovic; Evert Meijers (2007). "Smart cities – Ranking of European medium-sized cities". Smart Cities. Vienna: Centre of Regional Science
3. "Draft Concept Note on Smart City Scheme". Government of India - Ministry of Urban Development 3.12.2014_REVISED_AND_LATEST_.pdf)

Web links and Video Lectures (e-Resources)

1. http://indiansmartcities.in/downloads/CONCEPT_NOTE
2. https://archive.nptel.ac.in/courses/124/107/124107158/
3. https://archive.nptel.ac.in/courses/109/105/109105185/

COs and POs Mapping (CO-PO mappings are only Indicative)

COs	POs											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3		2	1	2	3	2					2
CO2	2		3	2	3	2			3		2	2
CO3	2		3	3	2	2	3					2
CO4	3	2	3	3	2	2	3					2
CO5	2		3	2	2	2	2					2

Level 3- Highly Mapped, Level 2-Moderately Mapped, Level 1-Low Mapped, Level 0- Not Mapped