



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Minor/Hons. Program

Level: UG

Branch: Minor/Hons. Smart Cities

Subject Code: BE040AF011

Subject Name: Fundamentals of Smart City Planning

w. e. f. Academic Year:	2025-26
Semester:	4 th
Category of the Course:	Core Courses

Prerequisite:	Understand process of planning and drafting a plan for smart city.
Rationale:	To understand the concept of smart city and associated challenges, latest technologies used in intelligent building.

Course Outcomes:

Sr. No.	CO statement	Marks% weightage
CO-1	Acquaint knowledge on smart cities planning and development.	25
CO-2	Develop work break down structure, scheduling and project management of smart cities.	30
CO-3	Work out the most energy efficient technique.	25
CO-4	Understand technologies, infrastructure, and concept of planning and latest methodology.	20

Teaching and Examination Scheme:

Teaching / Learning Scheme (in Hours per semester)					Total Credits = TH/30	Assessment Pattern and Marks					Total Marks
L	T	P	PBL*	TH		Theory		Tutorial / Practical			
						ESE (E)	PA (M)	PA (I)	PBL (I)	ESE (V)	
45	0	30	45	120	04	70	00	00	30	50	150

**Problem Based Learning (PBL) aims to accommodate learning beyond syllabus as per clause 9.4 of NBA manual.*

Where L = Lecture, T= Tutorial, P= Practical, TW/SL = Term-Work / Self-Learning, TH = Total Hours, PA = Progressive Assessment, ESE = End-Semester Examination

Content:



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Sr. No.	Content	Total Hrs
1	Introduction to Smart cities: Introduction of Smart City, Concepts, Objectives and criteria, History of Smart city of the world and India. Need to develop smart city, principle stakeholders, and key trends in smart cities developments.	11
2	Smart Cities Planning and Development: 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.	12
3	Smart City Elements: Solar energy for smart city, Smart Housing, E-ticketing, cyber security, mobility services, project management, Smart vehicles and fuels, GIS, GPS, Navigation system.	12
4	Green building in smart cities: Introduction to green buildings, Rating system, Energy saving system.	10
TOTAL		45

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15 %	20 %	20 %	20 %	15 %	10 %

R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

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 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



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(ISBN: 0- 415-19747-3)

5. 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)
6. 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 .
7. "Draft Concept Note on Smart City Scheme". Government of India - Ministry of Urban Development (http://indiansmartcities.in/downloads/concept_note_3.12.2014_revised_and_latest.pdf)

List of Tutorials:

- 1. Different smart materials associated with smart building.**
 - A. Identifying smart construction materials
 - B. Applications in smart buildings
 - C. Pros and Cons of smart materials over conventional materials
 - D. Preparing a detailed report on the above context
- 2. Technology involved in different construction of smart building. Smart construction techniques**
 - A. Need of smart construction techniques
 - B. Prepare a detailed report on smart construction of smart building
- 3. GIS and GPS applications in context to smart cities**
 - A. Prepare a report on applications of GIS and GPS in smart city.
- 4. Sustainable and Green building concepts**
 - A. Concepts and design of construction to minimize carbon foot print, energy efficient structures.
 - B. Case studies of green building construction in cities.

List of Open Source Software/learning website:

1. <https://nptel.ac.in>
2. <https://onlinecourses.nptel.ac.in>
3. <https://swayam.gov.in>
4. <https://smartcities.data.gov.in>
5. <https://www.sciencedirect.com>



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List of suggested activities for Problem Based Learning:

Sr. No	Name of the Activity	No. of Hours	Evaluation Criteria
1.	Technical site visit/ Industrial visit	Visit:5h, Report preparation: 5h,Total: 10h	Based on the report submitted. Report should contain observations and calculations based on industry/ site data.
2.	Technical Video based learning related to the subject	Duration of video: 5h Report preparation: 5h, Total: 10h	Report /presentation based on the video learning outcomes.
3.	Self-learning on-line course	Minimum duration of the course should be 10h.	Examination based assessment at the end of course.Based on the certificate produced.
4.	Videos on Industrial safety/ Disaster Management aspects based on subject	Duration of video: 5h Report preparation: 5h Total: 10h	Based on quiz/report submitted
5.	Discussion on research paper based on relevant subject	5 research paper: 20h	Summarize research paper and evaluation critical parameters
6.	Poster/chart/Power Point preparation on technical topics	Duration:6 h	Based on poster/chart preparation and presentation skills
7.	Working/non-working model on technical topics	Working: 12h Non- working: 8 h	Based on inter department/external evaluation
8.	Industrial exposure for 2-3 days to observe and provide tentative solutions on society /environment/health/any other issue	Duration: 15 h for industrial exposure Problem identification and tentative solution :10h Total:25 h	Based on evaluation of critical problems and solutions
9.	Group Discussion on emerging/trending technical topics based on subject	Duration: 1 h each	Based on performance in group discussion, technical depth, knowledge etc.
10.	Real world case studies based learning	Duration of data Collection /study: 5h Report preparation: 5h,Total: 10h	Based on in-depth study, technical depth, data collected, fact finding, etc.
11.	Expert lecture/session	Duration 2 hrs. For attending the lecture/session -2hrs. and for report writing 2h.	Based on the proof of Attendance and report submitted



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12.	Online Technical Quizzes/Simulations	Multiple quizzes summing up to 10h	Based on quiz scores and reflection report after each quiz.
13.	Tech Blog/YouTube Channel Curation	10h (Content curation +Analysis)	Summary report on curated content and learning outcomes.
14.	Patent Search and Innovation Gap Identification	10h (Search + Report)	Based on number of relevant patents analyzed and identification of innovation scope.
