GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering
Level: PG
Branch: Construction Engineering and Management
Subject Code: ME02014051
Subject Name: Smart Infrastructure System

w.e.f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Professional Elective Course

Prerequisite:	Nil
Rationale:	Smart infrastructure systems are important because they canimprove quality of life, increase the sustainability, improve safety and resilience, increase the decision making and efficiency, and the overall user experience. This infrastructure collects data, processes information and takes appropriate action completely autonomously (without human intervention) and dynamically, and adapts to changing conditions.

Course Outcome:

After Completion of the Course, Student will able to:

No.	Course Outcomes
01	Learn basic concepts of modern cities and develop sustainable smart solutions.
02	Study surveillance and traffic systems for smart security infrastructure.
03	Explore wired and wireless network systems for smart infrastructure.
04	Understand the smart transport system for smart cities and its application.
05	Refer case studies of various countries for smart and renewable energy systems.

Teaching and Examination Scheme:

Teaching Scheme(in Hours)			Total Credits L+T+(PR/2)	Assessment Pattern and Marks				Total Marks
				Theory		Tutorial/Practical		
L	T	PR	C	ESE (E)	PA/ CA (M)	PA/CA(I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1	**MODERN CITIES – CHARACTERISTICS** Three layers concept of modern cities (Urban infrastructure, facility and service layers), Understanding the need to reduce carbon emissions and developing sustainable smart solutions. Four facets of smart solutions - Physical, Institutional, Social and Economic Infrastructure; Framework of public information system in smart cities.	**09**	**20**
2	**SMART SECURITY INFRASTRUCTURE** City surveillance systems, Intelligent Traffic Management Systems, Emergency Response systems and smart solutions to handle crisis management.	**09**	**20**
3	**SMART TELE COMMUNICATIONS INFRASTRUCTURE** Wired and wireless network systems, Role of satellite communication, Wi-Fi and RF systems in smart communication, Optical Fiber Cable and DWDM (Dense Wave Division Multiplexing), IPMPCS (Multi Protocol Cable Switching) solutions.	**09**	**20**
4	**SMART TRASNPORT INFRASTRUCTURE** Smart transportation, Logistics, Real time Information systems, traffic information management, smart solutions for water supply and waste water engineering; remote sensing and GIS technology.	**09**	**20**
5	**ENERGY SOLUTIONS** Renewable energy, Smart grid systems, reducing carbon emissions without compromising on convenience of users, Community Energy Management systems, Energy on wheels, H2H and V2H (Home to Home and Vehicle to Home) Energy solutions, smart meters, case studies-Japan and Europe countries	**09**	**20**
	Total	**45**	**100**

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	30	30	10	10	0

Where R:Remember; U:Understanding; A:Application, N:Analyze and E:Evaluate C:Create(as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

1. Various papers edited by T.Chou in his book on Remote sensing and smart city WTS press
2. Concept oriented research and development in Information Technology Edited by Kinji Mori WILEY Publ.
3. Negin Minaei (2022), Smart Cities. CRC Press
4. Houbing Song, Ravi Srinivasan, Tamim Sookoor, Sabina Jeschke (2017) , Smart Cities : Foundations, Principles and Applications, Wiley Publication
5. Hussein T. Mouftah, Melike Erol-Kantarci, Mubashir Husain Rehmani(2018) , Transportation and Power Grid in Smart Cities, Wiley Publications

Suggested Tutorials / Students Activities :

1. Case - studies
2. Projects
3. Seminars

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