SARVAJANIK UNIVERSITY
Sarvajanik College of Engineering and Technology
Masters of Technology
Town & Country Planning

M. Tech. I - Semester - 1

Subject Name: Smart and Sustainable Infrastructure Planning **Subject Code:** MTTC14101

Type of course: PE-I
Prerequisite: Basic understanding on water supply and sanitation engineering; traffic planning and transportation engineering
Rationale: The course shall help understanding the concepts of planning, designing and management of urban infrastructure (service and social).

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
3	0	2	4	60	25	15	30	20	

CA1: Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

Content:

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	**Role of Smart Infrastructure in Development** Elements of smart and sustainable Infrastructure (physical, social, utilities and services); Basic definitions, concepts, significance and importance; Data required for provision and planning of urban networks and services; Resource analysis, provision of infrastructure, and land requirements; Principles of resource distribution in space; Types, hierarchical distribution of facilities, Access to facilities, provision and location criteria, Norms and standards, etc.	10	**15%**
2.	**Water Supply System** Water supply systems and networks, and network mapping; Water sources, quality and quantity requirements, and water requirement for various land uses; Factors affecting water demand; Storage facilities and distribution systems; Rainwater harvesting systems and locational criteria, implications on land use and density of water harvesting system; Innovative Methods and successful urban water supply system practices; Water programmes and policies.	9	**20%**
3.	**Sanitation and Sewerage System and Storm Water Drainage** General considerations and principle of sanitation and sewerage	9	**20%**

	systems; Sewage disposal and treatment methods; Characteristics of waste water, industrial pollutants and their effects; Open defecation; Manual scavenging; Innovative approaches of sewage disposal in urban areas and low cost appropriate technologies for sanitation; Storm water drainage networks, and network mapping; Estimations of sewer generation and network requirements; Elements of Solid Waste Management, Classification and Characteristics of Solid Wastes; Methods for Solid waste Collection, Storage, transportation and disposal; Processing and Treatment of Solid Wastes; Land Filling methods of Solid Waste Management.		
4.	**Social and Physical Infrastructure** Social infrastructure typologies; Planning norms and space standards for education, health, recreation and socio-cultural facilities; Amenities for urban and rural settlements such as road infrastructures; Significance of education and health infrastructure in planning; Locating education and health facilities; Understanding scalogram and other techniques. Planning of road infrastructures in rural and urban areas with respect to smart and sustainable infrastructural planning. Information Technological infrastructure planning for metropolitan areas as a way towards smart development.	12	**20%**
5.	**Policies, Programmes and Projects** Understanding prevalent policies, projects and missions, for example, JnNURM, AMRUT, HRIDAY, Smart Cities Mission, etc.; Norms and standards for different types of infrastructure; Nature and content of infrastructure in development plans at different geographical levels; Making assessment of infrastructure requirements in plans.	14	**25%**

Suggested Specification table with Marks (Theory/Practical):

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

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

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Text Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	Planning Sustainable Cities: An infrastructure-based approach	Spiro Pollalis	9781138188426	2016	1st
2	Advances in Human Factors, Sustainable Urban Planning and Infrastructure: Proceedings of the AHFE 2018 International Conference on Human Factors, ... in Intelligent Systems and Computing)	Jerzy Charytonowicz	Springer - 3319941984	2018	1st
3	Design and Construction of Smart Cities: Toward Sustainable Community (Sustainable Civil Infrastructures)	Moustafa Baraka	303064216X	2021	1st
4	Infrastructure Planning and Finance: A Smart and Sustainable Guide	Adam Leigland	978-0415693189	2013	1st

Course Outcome:

Sr. No.	CO Statement **After learning this subject, students will be able to**	Marks % weightage
CO-1	To identify the problems and issues related to infrastructure provision in a settlement. (U,R cognitive level)	30
CO-2	To appraise planning guidelines to tackle these problems, and extent of sustainable and smart infrastructure required for the future planning of settlements. (A,C cognitive level)	30
CO-3	To design and make recommendations for meeting the future needs of smart and sustainable infrastructure for a human settlement. (E cognitive level)	20
CO-4	To meet the universal standards of sustainable and green energy for the society (U,A,E cognitive level)	10
CO-5	To understand road and IT infrastructures for metropolitan areas	10

Major Equipment:

1. Bentley software and Computers with higher configuration and internet, server

List of Open Source/learning website:

- CAD drafting tools U S Army Corps of Engineers (http://www.hec.usace.army.mil/software/)
- MATSim (http://www.matsim.org/downloads)
- TRANSIMS (http://sourceforge.net/projects/transims/)
- EPANET (http://www.epa.gov/nrmrl/wswrd/dw/epanet.html)
- GHydraulics (http://epanet.de/ghydraulics/)
- Innovating for sustainable infrastructure (http://www.innovyze.com/)