

B. Tech. Semester – VI
Professional Elective Course - III

Subject Name : Sustainable and Smart Infrastructure

Subject Code: BTCL14609

Type of course: PEC-III

Prerequisite : Building & Town Planning (BTCL13301)

Rationale : The basic objective of this course is to expose the students to the concepts of Smart City and Sustainable Development and its context, in infrastructure planning. The course also aims to expose the students, to the unique challenges that a planner faces in country, due to urbanization and population explosion.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	100
3	0	0	3	60	25	15	--	--	

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.	Urbanization : Basics Urbanization, Basic understanding, Scenario of country and world, Population explosion in country, scenario of country and world, statistics, Challenges faced by the planners	10	20%
2.	Sustainable Development Sustainable Development, Rio Summit 1992, agenda 21, Basic understanding and further discussion, SmartCity concept, brief history, in detail discussion of the topic, LandUse, Ideal LandUse pattern of a city,	15	30%

3.	Transportation infrastructure and Resilience Infrastructure, Its importance for a city, scenario of country, transportation, administration, commercial, industrial, social, recreational, safety, Sustainability in infrastructure, Creating a smart infrastructure, resilience, meaning, resilience of a city, Mass transportation, existing practices and innovations, BRTS, PBS, Metro, Green cover, Green building initiatives, various Green Building institutions of Country and world, Public participation, Why it is important, A case study of one city in India and one city abroad,	20	50%
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Suggested Specification table with Marks (Theory/Practical):

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	25	05	30	15	15

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
01	Agenda 21: Earth Summit: The United Nations Programme of Action from Rio	<u>United Nations Division for Sustainable Development</u> (Author)	Createspace Independent Pub (3 March 2013) 978-1482672770	2013	01 st



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02	Earth Summit, 92: The United Nations Conference on Environment and Development, Rio de Janeiro, 1992	<u>Richard Sandbrook</u> (Author), <u>etc.</u> (Author), <u>Joyce Quarrie</u> (Editor)	Regency Press Corporation Ltd. (1 December 1992) 978-0952046905	1992	01 st
03	The 'Earth Summit' Agreements: A Guide and Assessment An Analysis of the Rio '92 UN Conference on Environment and Development	, <u>Michael Grubb</u> , <u>Matthias Koch</u> , <u>Abby Munson</u> , <u>Francis Sullivan</u> , <u>Koy Thomson</u>	Published November 1, 2020 by Routledge ISBN 9780367222291	2020	01 st
04	Smart Cities & Urban Development in India Hardcover	<u>Dr N Mani</u>	New Century Publications; 1st edition (12 August 2016) 978-8177084320	2016	01 st



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05	Smart Cities Applications, Technologies, Standards, and Driving Factors	Editors: McClellan, Stan, Jimenez, Jesus, Koutitas, George (Eds.)	Springer ISBN 978-3- 319-59381-4	2017	01 st
06	Smart Cities: Foundations, Principles, and Applications	<u>Houbing Song, Ravi Srinivasan, Tamim Sookoor, Sabina Jeschke</u>	WILEY ISBN: 978-1- 119-22639-0	2017	01 st
07	Songdo Smart City: An Aerotropolis and a Ubiquitous City	Somayya Madakam (FORE School of Management, India) and Rajesh M. Holmukhe (Bharati Vidyapeeth University (Deemed), India)		2019	01 st
08	Transportation for Livable Cities Hardcover	Vukan R. Vuchic	Routledge; 1st edition (31 March 1999) 978- 0882851617	1999	01 st
09	Urban Transit Systems and Technology Hardcover	Vukan R. Vuchic	Wiley; 1st edition (6 March 2007) 978- 0471758235	2007	01 st

Urban Transit: Operations, Planning, and Economics Hardcover	Vukan R. Vuchic	Wiley; 1st edition (22 March 2005) 978-0471632658	2005	01 st
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Course Outcome:

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

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	.....Enumerate the meaning of urbanization and population explosion. Level R, U	15
CO-2	..... Enumerate the meaning of sustainable development and SmartCity. Level R, U	20
CO-3	..... Enumerate the critical need of new ideas in infrastructure planning. Level A, N, E	20
CO-4	.....infer the current situation of the country in context to urbanization, sustainable development and population explosion. Level A,N,E.	20
CO-5	.....infer the current situation of the country in context to SmartCity Initiative and propose solution to the problems.. Level A,N,E, C.	25

Mapping with POs:

	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PS O3
CO-1	--	02	--	--	--	03	03	--	--	--	--	03	--	--	--
CO-2	--	01	--	--	--	03	03	--	--	--	--	03	--	--	--
CO-3	02	02	01	--	02	03	03	--	--	--	--	--	--	02	03
CO-4	02	02	02	--	02	03	03	--	--	--	--	03	--	03	03
CO-5	02	02	02	--	02	03	03	--	--	--	--	03	--	03	03
Rational e*	06	09	05	--	06	15	15	--	--	--	--	12	--	08	09

Rationale*:

All CO's are compatible and matching to the derived POs to several extents. The Purpose of this subject is to expose the students to the fundamentals of sustainable development concept, historical significance of Rio Summit, Agenda 21 and SmartCity concept.

List of Open Source/learning website:

- <https://vlab.amrita.edu/?sub=2>
 - Detail of coverage as per syllabus
- <https://nptel.ac.in/courses/104/101/104101090/>
 - Detail of coverage as per syllabus
- <https://nptel.ac.in/courses/105/104/105104102/>
 - Detail of coverage as per syllabus
- <https://nptel.ac.in/courses/113/104/113104082/>
 - Detail of coverage as per syllabus
- <https://nptel.ac.in/courses/104/105/104105124/>
 - Detail of coverage as per syllabus
- <https://nptel.ac.in/courses/104/106/104106122/>
 - Detail of coverage as per syllabus

List of Open Source Software:

- <https://cityos.io>
- <https://todobi.com/list-of-open-source-solutions-for-smart/>
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