

## SUSTAINABLE TRANSPORTATION

<b>Offering Branches</b>	CE	<b>Credits:</b>	3
<b>Course Category:</b>	HONOURS	<b>Lecture-Tutorial-Practical:</b>	3-0-0
<b>Course Type:</b>	Theory	<b>Continuous Evaluation:</b>	30
<b>Prerequisites:</b>	20CE3502 - Highway Engineering 20CE4705C – Urban Transportation Planning	<b>Semester End Evaluation:</b>	70
		<b>Total Marks:</b>	100

### Course Outcomes

Upon successful completion of the course, the student will be able to:

<b>CO1</b>	<b>Identify</b> a sustainable transportation system.	K1
<b>CO2</b>	<b>Consider</b> sustainability in providing mode choices for the public	K3
<b>CO3</b>	<b>Develop</b> and plan pedestrian facilities for sustainable transportation.	K3
<b>CO4</b>	<b>Plan</b> for bicycle facilities.	K6
<b>CO5</b>	<b>Explain</b> policies that improve the sustainability of transportation.	K2

### Contribution of Course Outcomes towards achievement of Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	2					1			1				2	
<b>CO2</b>	2					2			2				2	
<b>CO3</b>	3					2			2				3	
<b>CO4</b>	2					3			3				2	
<b>CO5</b>	2					2			2				2	
<b>Avg.</b>	<b>2</b>					<b>2</b>			<b>2</b>				<b>2</b>	

1- Low

2-Medium

3-High

### Course Content

<b>UNIT-1</b>	<b>Problem of Sustainability in Transport:</b> Energy use in the transport sector; Transport and climate change; Greenhouse gas emissions, urban air quality, Congestion, and sustainability, Sustainable Development Goals.	<b>CO1</b>
<b>UNIT-2</b>	<b>Planning for Sustainability:</b> Urban form, Indicator based planning, land use transport integration, Compact City, Public Transit, TOD, NMT, First and Last Mile Connectivity.	<b>CO2</b>
<b>UNIT-3</b>	<b>Evaluation of Non-motorized Transportation:</b> Surveys, Demand Estimation, and Analysis; Crash Data, Barrier Effect; Cycling Condition Evaluation Techniques; Pedestrian Condition Evaluation Techniques; Prioritizing Improvements and Selecting Preferred Options.	<b>CO3</b>
<b>UNIT-4</b>	<b>Planning for Pedestrians:</b> Types of pedestrians and Characteristics; Pedestrian facilities and planning; Pedestrian standards and improvements; Pedestrian facility Design, LOS; Pedestrian safety programs <b>Planning for Bicyclists:</b> Types of cyclists and Bikeways; Integrating cycling into roadway planning; Bicycle network planning; Accommodating cyclists on rural roads; Design of Bicycle boulevards/bike paths; Bicycle Parking/storage Facilities; Roadway maintenance for cyclists.	<b>CO4</b>
<b>UNIT-5</b>	<b>Sustainable Policies:</b> Continuum of Policies, speed and speed limit policies, national policies, sustainable travel demand management; public awareness; pricing transportation: total cost of transportation, pricing, and taxation. <b>Sustainable Technology:</b>	<b>CO5</b>

Telecommuting, Information and Communication Technologies, E-commerce, Alternative Cleaner Fuels, vehicle technologies, fuel cells, Intelligent Transport Systems.

### **Learning Resources**

<b>Text Books</b>	<ol style="list-style-type: none"><li>1. An Introduction to Sustainable Transportation: Policy, Planning and Implementation, Preston L. Schiller, Eric C. Brunn, and Jeffrey R. Kenworthy, Routledge, 2010.</li><li>2. Sustainable Transport: Planning for Walking and Cycling in urban environments, Rodney Tolley, Editor, CRC Press, 2003.</li><li>3. Sustainable Transport: Problems and Solutions, Black, W.R., Guilford Press, New York, 2010.</li></ol>
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. Accessible Cities and Regions: A Framework for Sustainable Transport and Urbanism in the 21st Century, Cervero, R., Center for Future Urban Transport, Institute of Transportation Studies, University of California, Berkeley, 2005.</li><li>2. Sustainable Transport: Definitions and Responses, In Transportation Research Board, Integrating Sustainability into the Transportation Planning Process, Conference Proceedings 37, Black, W. R., National Research Council, Washington, DC, 2005.</li><li>3. Transportation Technologies for Sustainability, Mehrdad Ehsani, Fei-Yue Wang and Gary L. Brosch (Eds.), Springer-Verlag, New York, 2013.</li></ol>
<b>e- Resources &amp; other digital material</b>	<ol style="list-style-type: none"><li>1. <a href="https://nptel.ac.in/courses/105/107/105107210">https://nptel.ac.in/courses/105/107/105107210</a></li><li>2. <a href="https://nptel.ac.in/courses/105/105/105105157">https://nptel.ac.in/courses/105/105/105105157</a></li></ol>