

<b>Course title:</b> Sustainable Urban Transport			
<b>Course code:</b> MEU 144	<b>No. of credits:</b> 2	<b>LTP distribution:</b> 24-6-0	<b>Learning hours:</b> 30
<b>Pre-requisite course code and title (if any):</b> Basic knowledge of statistics			
<b>Department:</b> Sustainable Engineering			
<b>Course coordinator:</b> Dr Deepty Jain		<b>Course instructor:</b> Dr Deepty Jain	
<b>Contact details:</b> deepty.jain@terisas.ac.in			
<b>Course type:</b> Elective		<b>Course offered in:</b> Semester 3	
<b>Course description:</b> <p>Urban Transport is in a state of crisis today. Availability of mobility options or the lack of it has direct implications on the economic efficiency of our cities and overall well-being. Rising levels of air pollution and emissions, high dependency on fossil fuels, rising number of road accidents, high congestion levels, rising noise levels and health concerns are all negative impacts arising from the urban transport sector. Promoting sustainability in the transport sector is considered to be of vital importance in order to ensure that it meets the travel needs of all individuals, provide basic access to all services, and is energy efficient and environment friendly.</p> <p>This course aims to provide an advanced understanding of the concept of sustainable transportation introduced as a theme in the first semester core course on Sustainable Provision and Management of Urban Services. It will discuss in detail the need to promote sustainability in transport, elements and principles of sustainable transportation and various strategies to achieve sustainable transportation. To ensure a better understanding among the students, case studies from around the world will be discussed under the different topics.</p> <p>Students will be familiarized with the key aspects of transportation planning and policy making.</p>			
<b>Course Objectives:</b>			
<ol style="list-style-type: none"> <li>1. To provide understanding of sustainable transport and relevant policies and programs</li> <li>2. To introduce to the concepts and aspects of transport planning and differentiate between short-term and long-term strategies and impacts</li> <li>3. To provide understanding of travel demand models and demand management techniques</li> <li>4. To enable students to plan for integrated multi-modal transport systems</li> </ol>			
<b>Course contents</b>			
<b>Topic</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Module 1: Introducing the concepts of Transportation, accessibility and mobility planning</b> Conceptualizing key terminologies - transport, transport systems, travel behaviour, infrastructure and users/commuters Sustainable transport concepts – society, environment and economy, indicators based approach Policy initiatives and programs on sustainable transport - global perspectives (SUMP, KYOTO Protocol), national policies (NUTP, CMP and NAPCC) and local initiatives Transport system effectiveness and efficiency – service level benchmarks	5	1	
<b>Module 2: Transport economics, externalities and pricing</b> Demand – supply elasticity, factors that influence demand and Externalities of transport, quantification and value association <ol style="list-style-type: none"> <li>1. Energy consumption, emissions and air quality (Lifecycle assessment)</li> <li>2. Safety and security</li> <li>3. Land consumption and waste production</li> <li>4. Equity and inclusiveness</li> <li>5. Mobility and accessibility</li> </ol> Transport pricing and user costs - internalizing externalities	5		

<b>Module 3: Behaviour analysis and travel demand models</b> GIS-T Four-step travel demand model Data collection and travel surveys User and their choices – variables that influence travel behavior	8	3									
<b>Module 4: Strategies and regulations for sustainable transport</b> Integrated land use and transport planning and neighbourhood designs Planning and designing for pedestrians and bicycles Planning and design of a public transport systems Integrated multi-modal transport networks Regulations and Enforcements (Parking policy, Congestion pricing,	6	2									
Evaluation Criteria: <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;"></th> <th style="text-align: right;">Weightage (%)</th> </tr> </thead> <tbody> <tr> <td>Assignments*</td> <td style="text-align: right;">20%</td> </tr> <tr> <td>Project work**</td> <td style="text-align: right;">40%</td> </tr> <tr> <td>Major Test</td> <td style="text-align: right;">40%</td> </tr> </tbody> </table> <p>*Assignments- This shall cover review of mobility patterns and mobility planning process in different regions of the world  ** Project Work – This shall cover development of flow model and audit of transport facility</p>					Weightage (%)	Assignments*	20%	Project work**	40%	Major Test	40%
	Weightage (%)										
Assignments*	20%										
Project work**	40%										
Major Test	40%										
Learning outcomes On successfully completing this course the students will be able to: <ol style="list-style-type: none"> <li>1. Understand the impact of alternate transport infrastructure improvement strategies on society and environment</li> <li>2. Identify key variables that influence travel choices and behaviour</li> <li>3. Assess infrastructure quality and define strategies to achieve sustainable transport/mobility</li> </ol>											
Pedagogical approach: The course will be delivered through classroom teaching, research-based discussions, case-study discussions of both successful and unsuccessful practices. Site visits for assignments.											
<b>Essential Reading Material - Books</b> <ol style="list-style-type: none"> <li>1. Hensher, David A, Kenneth Button, Handbook of Transport Modelling, Pergamon Press, 2000.</li> <li>2. Button, K., 2010. Transport economics. Edward Elgar Publishing. (chapter 5, 6, 7 and 11)</li> <li>3. Ortuzar, J.D. and Willhumsen, L.G. Modelling Transport, 4th edition John Wiley, 2011.</li> <li>4. TERI (2013); Pro-poor mobility - Policy guidelines and case studies Available at: <a href="http://www.teriin.org/div/pro-poormobility_policy-guidelines-case-studies.pdf">http://www.teriin.org/div/pro-poormobility_policy-guidelines-case-studies.pdf</a></li> <li>5. Fundamentals of Transportation System Analysis, Volume -1: Basic Concepts by Manheim Marvin</li> <li>6. National Urban Transport Policy (2012)</li> </ol> <b>Preferred Reading Material – Papers</b> <ol style="list-style-type: none"> <li>1. Ahmad, S. &amp; Puppim de Oliveira, J.A. 2016. Determinants of urban mobility in India: Lessons for promoting sustainable and inclusive urban transportation in developing countries. Transport Policy, 50, 106-114</li> <li>2. Appleton, B., Davies, M., Tansey, J., Atwal, P., Dore, G. P., &amp; Muzyka, D. 2008, GreenApple Canada 2008: SMART Transportation Ranking Report, Appleton Charitable Foundation.</li> <li>3. Boussauw, K., Neutens, T., &amp; Witlox, F. 2012. Relationship between spatial proximity and travel-to-work distance: the effect of the compact city. Regional Studies, 46, (6) 687-706</li> <li>4. Cervero, R. 2003. Road expansion, urban growth, and induced travel: A path analysis., 69, (2) 145-164</li> <li>5. Cheng, L., Bi, X., Chen, X., &amp; Li, L. 2013. Travel Behavior of the Urban Low-income in China: Case Study of Huzhou City. Procedia - Social and Behavioral Sciences, 96, 231-242</li> <li>6. Commission of the European Communities 2009, Action Plan on Urban Mobility Brussels, COM(2009) 490 final.</li> </ol>											

7. Dablanc, L. 2009, Urban Freight: Freight Transport, a Key for the New Urban Economy, Department for International Development (DFID).
8. Demirel, H., Sertel, E., Kaya, S., & Seker, Z.D. 2008. Exploring impacts of road transportation on environment: a spatial approach. *Desalination*, 226, (1-3) 279-288
9. May, A.D., Kelly, C., Shepherd, S., & Jopson, A. 2012. An option generation tool for potential urban transport policy packages. *Transport Policy*, 20, 162-173
10. Sanches, S.d.P. & Serra de Arruda, F. 2002. Incorporating Nonmotorized Modes in a Mode Choice Model. *Transportation Research Record: Journal of the Transportation Research Board*, 1818, 89-93
11. Schmucki, B. 2012. If I Walked on my Own at Night I Stuck to Well Lit Areas - Gendered spaces and urban transport in 20th century Britain. *Research in Transportation Economics*, 34, (1) 74-85
12. Tiwari, G., Jain, D., & Ramachandra Rao, K. 2016. Impact of public transport and non-motorized transport infrastructure on travel mode shares, energy, emissions and safety: Case of Indian cities. *Transportation Research Part D: Transport and Environment*, 44, 277-291
13. Woodcock, J., Edwards, P., Tonne, C., Armstrong, B.G., Ashiru, O., Banister, D., Beevers, S., Chalabi, Z., Chowdhury, Z., Cohen, A., Franco, O.H., Haines, A., Hickman, R., Lindsay, G., Mittal, I., Mohan, D., Tiwari, G., Woodward, A., & Roberts, I. 2009. Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport. *The Lancet*, 374, (9705)

Course Reviewers:

Dr. Geetam Tiwari, Indian Institute of Technology Delhi

Dr. Mukti Advani, Central Road Research Institute, Delhi