Course title: Urban Ecology and Environment			
Course code: MEU 121	**No. of credits:** 3	**L-T-P:** 35-6-8	**Learning hours:** 45
Pre-requisite course code and title (if any): none			
Department: Sustainable Engineering			
Course coordinator: Dr Chandrashekhar Azad Vishwakarma	**Course instructor:** Dr Chandrashekhar Azad Vishwakarma/ Dr Anand Madhukar/ Prof. Shaleen Singhal		
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Course type: Core	**Course offered in:** Semester 2		

Course description

This course provides an ecological perspective to the environmental challenges and opportunities related to urban development adopting an inter–disciplinary approach. Urban Ecology and Environment is a Semester I course offered to the M Tech Urban Development and Management programme students.

The course is structured under five modules: Module 1 introduces the concepts of urban ecology and Module 2 focuses on green spaces, bio-diversity conservation and conflicts. Module 3 focuses on the urban environmental issues such as air and water quality and Module 4 focuses on the analytical tools such as Environmental Impact Analysis. Module 5 deals with challenges of climate change and mitigation and adaptation measures for cities.

Course objectives

- To introduce the concepts and theories of ecology in urban context.
- To explain the principles and strategies for bio-diversity conservation and management for sustainable urban development and the associated conflicts.
- To impart the knowledge on evaluating the environmental and social impacts of urban development and introduce strategies dealing with global challenges of climate change in cities.

Course contents

Module	Topic	L	T	P
1	**Module 1: Concepts of urban ecology** a) Theories of urban ecology and linkages with sustainable urbanism b) Concepts of Eco cities, smart cities, compact cities etc. c) Challenges and opportunities of urban, rural and peri-urban growth d) Indicators and selection framework	5	2	
2	**Module 2: Green Spaces, bio-diversity conservation and conflicts** a) Urban greens: challenges and choices for management b) Human nature interactions and urban forest management c) Bio-diversity conservation conflicts d) Spatial dimensions of urban ecology	8	2	8
3	**Module 3: Urban Environment** a) Industrial ecology and symbiosis b) Management of air quality and noise c) Urban water ecological challenges	6		
4	**Module 4: Impact Analysis and Ecological Footprint Analysis** a) Environmental Impact Analysis b) Social Impact Analysis and Strategic Environmental Assessment c) Urban metabolism and Ecological Footprint Analysis	10	2	

5	**Module 5: Climate change, mitigation and adaptation** a) Climate modifications and managing climate change challenges in cities b) Adaptation and mitigation measures to make cities resilient	6		
	Total	35	6	8

Evaluation criteria

Minor test: 20%
Assignment: 40%
Major test: 40%

Learning outcomes

On completion of this course, the students would:

1. Gain a wider understanding of urban ecological and environmental issues ranging from bio-diversity to climate resilience and appreciate potential approaches for cities to deal with ecological and environmental challenges and threats of climate change.
2. Enhance abilities and skills relating to evaluation of environmental and social impacts of urban development.

Pedagogical approach

The course will be delivered through a mix of classroom lectures and case studies discussions and study visit.

Materials

Books

1. Mostafavi M. and Doherty G. (2010) Ecological urbanism, published by Baden: Harvard University Graduate School of Design.
2. Dale R. (2004) Evaluating Development Programme and Project, Second Edition, Sage Publication.
3. Morrison-Saunders A. and Arts J. (2004) (eds.) Assessing Impact: Handbook of EIA and SEA Follow-up, Earthscan James & James, London.
4. The World Bank (2009) Strategic Environmental Assessment in East and Southeast Asia, A Progressive and Comparison Country Systems and Cases, Washington D.C.
5. WWF India (2011) Impact of urbanization on bio-diversity: Case Studies From India
6. United Nations Human Settlements Programme (UN-HABITAT) (2011) Global report on human settlements - Cities and Climate Change: Policy Directions
7. Singhal, S. and Kapur, A. 2002. Industrial Estate Planning and Management in India-an Integrated Approach towards Industrial Ecology. Journal of Environmental Management, Elsevier Science Ltd., 66, 2002.
8. Cities and Bio-diversity Outlook (2013) Action and Policy: A Global Assessment of the Links between Urbanization, Biodiversity, and Ecosystem Services, by Secretariat of the Convention on Biological Diversity.

Select Papers from the following Journals:

1. Journal of Environmental Management
2. Journal of Environmental Impact Assessment Review

Advanced Reading Material

Additional information (if any): NA

Student responsibilities:
The students are expected to submit assignments in time and come prepared with readings when provided.

Course reviewers

1. Dr Harini Nagendra, ATREE
2. Dr Suneel Pandey, TERI, Lodhi Road, New Delhi – 110 003