



Urban Resilience and Adaptation for India and Mongolia

curricula, capacity, ICT and stakeholder collaboration
support green & blue infrastructure and nature-based solutions

Co-funded by the Erasmus+ Programme of the European Union



619050-EPP-1-2020-1-DE-EPPKA2-CBHE-JP



Template syllabus of the new course

Course Name: ECOL 485: ECOLOGY OF URBAN ENVIRONMENT

Number of credits: 3

Period: Monsoon semester

Coordinator	Dr. Gurjeet Kaur
Credits	3
Lecturers	--
Level	Postgraduate
Host institution	Pondicherry University
Course duration	18 weeks
New/revised	New

Summary

This 3 ECTS course provides students an in-depth theoretical knowledge on the interaction of between humans and their surroundings such as construction, housing, transport, etc. It will make students understand the impact of urbanization on various natural resources. It will also emphasis the need for maintaining urban biodiversity.

Target student audiences

Master students majoring in Ecology and Environmental Sciences, Social sciences, Environmental engineering, geosciences, will be the target audiences.

Prerequisites

Required courses (or equivalents): Basic understanding on environmental studies (school higher level), English language skill.

Aims and objectives

This course aims to provide students an overall understanding of the complex urban environment and its dynamics in response to human's actions. The objectives of the course are to introduce the importance of urban ecology and urban environment in the light of human health, to familiarize urbanization and its impacts on the natural resources, to introduce connection between urban greeneries and sustainable development goals, to explain the carbon and water cycle in urbanization, to elucidate the role of peri-urban environment in urbanization, to introduce the concept of green city, green building in the light of ecosystem services.



Urban Resilience and Adaptation for India and Mongolia

curricula, capacity, ICT and stakeholder collaboration
support green & blue infrastructure and nature-based solutions

Co-funded by the Erasmus+ Programme of the European Union



619050-EPP-1-2020-1-DE-EPPKA2-CBHE-JP



The Authentic Tasks are:

General learning outcomes:

By the end of the course, successful students will:

1. know about ecology of urban environment and the role of humans in urban ecology
2. be familiar with the role of urban environment on human health
3. be aware of the impacts of urbanization on the urban vegetation and aquatic habitats
4. know the potential of urban forestry and its role on sustainable development goals
5. be able to design urban forestry
6. be acquainted with response of urbanization at the community and ecosystem level
7. be familiar with the carbon cycle and water cycle in the urban environment.
8. know about indoor and outdoor air pollutions and health inequities in cities
9. be aware of the need for maintain the urban biodiversity for healthy living

Overview of sessions and teaching methods

The course will make most of interactive and self-reflective methods of teaching and learning.

Learning methods

- In class Lectures (face-to-face)
- Group work – Fieldtrip, data collection, analysis and report presentation
- Literature review and assignment submission

Course outline

Week - 1	Introduction to urban ecology
Week - 2	Urban environment and human well being
Week - 3	Urbanization and primary physical process
Week - 4	Impacts of urbanization on natural resources
Week - 5	Urban forestry and sustainable development
Week - 6	Community and ecosystem level response to urbanization
Week – 7	Niche theories and urban ecology
Week – 8	Habitat models and ecological guilds
Week – 9	Carbon and water cycle
Week – 10	Urban sprawl and neighborhood disorders
Week – 11	Air pollution and health inequities
Week – 12	Peri-urban environment, diversity and invasion
Week – 13	Ecosystem services in cities



Urban Resilience and Adaptation for India and Mongolia

curricula, capacity, ICT and stakeholder collaboration support green & blue infrastructure and nature-based solutions

Co-funded by the Erasmus+ Programme of the European Union



619050-EPP-1-2020-1-DE-EPPKA2-CBHE-JP



Week – 14	Urban ecology and urban planning
Week – 15	Green city, green building concepts and landscape connectivity

Literature

Compulsory

1. Kristen, MP, 2016, Ecology of Urban Environments, Wiley-Blackwell publications, USA.
2. Forman RTT, 2014, Urban Ecology: Science of Cities, Cambridge University Press,

Recommended:

1. Carreiro, MM, Song, YC, Wu, J., 2008, Ecology, planning, and management of Urban forests, Springer Publisher.
2. McCleery, RA, Moorman, CE, Peterson, MN, 2014, Urban Wildlife Conservation Theory and Practice, Springer Publisher.
3. Hall, P, 2020, Urban and Regional Planning 6th Ed. Taylor & Francis Ltd

New Syllabus DIGITAL IMAGE PROCESSING FOR ENVIRONMENTAL APPLICATIONS

ECOL: 485

CREDITS: 3

Unit – I: Introduction to urban ecology, urban environment and inherent ecological interest, testing ecological theory in urban environment, urban environment and human health and well being, conserving biodiversity. (8 hours)

Unit – II: Urban environments - Urbanization and primary biophysical processes, removal of vegetation, urban infrastructure, replacement of permeable with impermeable surfaces, destruction of aquatic areas. Urban forestry, potential benefits of urban forestry, contribution of urban forestry to sustainable development goals, designing urban forest, resilient cities and urban forest (8 hours)

Unit – III: Community and ecosystem -level responses to urbanization – niche theories in urban ecology, habitat models, ecological guilds and resource competitions models, movement of individuals through space. Urbanization and carbon cycle, mitigation strategies, urbanization and water cycle. (8 hours)

Unit – IV: Urban ecology of humans – Urban parks and open space, urban sprawl, neighborhood disorders, outdoor air pollution, indoor air pollution, health inequities in the cities. Peri-urban environment, peri-urban diversity and invasion. (8 hours)



Urban Resilience and Adaptation for India and Mongolia

curricula, capacity, ICT and stakeholder collaboration support green & blue infrastructure and nature-based solutions

Co-funded by the Erasmus+ Programme of the European Union



619050-EPP-1-2020-1-DE-EPPKA2-CBHE-JP



Unit – V: Conserving biodiversity – Maintaining ecosystem services in cities, integration of urban ecology and urban planning, protection of biodiverse landscape, green city, green building, terrace garden and forest, landscape connectivity, novel habitats and ecosystems. (8 hours)

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities (42 hours)			
Lectures	Understanding the concept of urban ecology and its importance for sustainable urban environment for human health and well being	Class participation	20 hours
Moderated in-class discussions	Understanding the process of urbanization in India and its impact on the natural resources	Class participation and preparedness for discussions	7 hours
In-class assignments, field assignment	Understanding the role of various natural resources in urban environment Understanding the impact of urban sprawl on vegetation, water body and vacant land	Class participation and preparedness for assignments	5 hours
Reading and discussion of assigned papers for seminars and preparation for lectures	Understanding the concept of green cities, green building towards achieving sustainable development goals and health living	Class participation, creative and active contribution to discussion	5 hours
Group project presentation	Ability to make presentation, effective communication, critical	Quality of group assignments	5 hours



Urban Resilience and Adaptation for India and Mongolia

curricula, capacity, ICT and stakeholder collaboration
support green & blue infrastructure and nature-based solutions

Co-funded by the Erasmus+ Programme of the European Union



619050-EPP-1-2020-1-DE-EPPKA2-CBHE-JP



	interpretation of data, response to audience	and individual presentations	
Independent work (100 hours)			
Group work: - Contribution to the group case-study projects - Contribution to the preparation and delivery of individual presentation	Ability to understand the ecological components of urban environment, team work, problem solving, discussion with members of the group, convey the ideas clearly	Quality of group assignments and individual presentations	30 hours
Course group assignment	Ability to conceptualize a method for data collection towards understanding the urban sprawl and its impacts on natural resources, quality standards, data integration, ability to understand the sustainable development goals and the concept of nature based solution	Quality of developed strategy and their presentation	20 hours
Group presentation	Ability to interpret data, to analyze audience, and to use the concepts, tools, and methods for communicating the strategy developed	Quality of group assignments and individual presentations	25 hours
Individual study	Ability to understand the fundamental problem in the urban environment and the key factors responsible for those problems Understanding the need for sustainable urban environment to protect the ecosystem services	Quality of answers to questions in the final examination	25 hours
Total			142 hours

Grading

The students' performance will be based on the following:



Urban Resilience and Adaptation for India and Mongolia

curricula, capacity, ICT and stakeholder collaboration support green & blue infrastructure and nature-based solutions

Co-funded by the Erasmus+ Programme of the European Union



619050-EPP-1-2020-1-DE-EPPKA2-CBHE-JP



Assessment

- Progress assessment (40%):
 - Exercise (10%): students have to complete the quiz or seminar of each topic.
 - Homework (10%): 1. Journal paper review (5%), Assignment on Sustainable city environment and human health (5 %) or one essay on Urban sprawl and its impact on the environment (5%)
 - Group report (20%): The entire class will be divided into groups of 5-6 students and be given an option to choose any one of the cities in India to conduct one of following studies
 - Urban sprawl and its impacts on environment
 - Status survey of urban ecology
 - People’s awareness on green city and green building concept
 - People’s awareness on sustainable development goals
 - Willingness of people to develop terrace garden
 - Role of invasive species in the urban vegetation and biodiversity
 - Urban Planner’s awareness on nature based solution
- Final assessment (60%):
 - Final examination (60%)

Evaluation

Performances of students in each paper are expressed in terms of marks as well as in Letter Grades. In case of fractions the marks shall be rounded off to nearest integer. The class interval for the purpose of awarding the grades can be arrived at by dividing the difference between the highest mark secured and the minimum pass mark by 6 as there are six passing grades. The formula is given below:

$$K = (X-50)/6$$

Where, K = class interval, X= the highest mark in the subject.

The grades may be awarded as given in the following Table II.

Table II

Range of Marks in %	Letter Grade	Points for Calculate of CGPA
X to (X-K)+1	O	10
(X-K) to (X-2K)+1	A+	9
(X-2K) to (X-3K)+1	A	8
(X-3K) to (X-4K)+1	B+	7
(X-4K) to (X-5K)+1	B	6



Urban Resilience and Adaptation for
India and Mongolia

curricula, capacity, ICT and stakeholder collaboration
support green & blue infrastructure and nature-based
solutions



Co-funded by the
Erasmus+ Programme
of the European Union



619050-EPP-1-2020-1-DE-EPPKA2-CBHE-JP

(X-5K) to 50	C	5
Below 50	F	0
Failure due to lack of attendance	FA	0

K should not be rounded off to less than two decimal places. The numbers given in Range of Marks column, (X-K), (X-2K), (X-3K), etc., can be rounded off to the nearest whole number.

In courses where the number of students who have secured 50 marks and above is less than 10 then grading may be given based on the Table III.

Table III

Range of Marks in %	Letter Grade	Points for Calculate of CGPA
81-100	O	10
71-80	A+	9
66-70	A	8
61-65	B+	7
56-60	B	6
50-55	C	5
Below 50	F	0
Failure due to lack of attendance	FA	0

In order to declare the pass, a Student should get

- a) A minimum of 40% marks in end-semester exam, and
- b) A minimum of 50% marks in aggregate when Internal Assessment and End-Semester marks are added.
