

Innovative Postgraduate Education in The Field of Environment Protection: Methods and Tools



URBAN ECOLOGY

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BIO Presenter



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Modernized/New Developed Course Objectives and Tasks



Urban Ecology is a subfield of ecology that deals with the interactions of plants and animals (including humans) within urban and suburban environments and study of how urban communities and other high-population developments affect the natural resources and ecosystems around them. Or Urban ecology studies the conditions for the survival of human society in a unique ecosystem, a city with man-made infrastructure that is simultaneously connected to natural components.

Course goal: This course intended for students is developing a science-based ecological perception, acquiring a comprehensive knowledge in building an environmentally friendly habitat, gaining relevant decision making skills.

COURSE OBJECTIVES:

- get acquainted with the environmental problems of the cities, as well as the components of urban systems
- study the magnitudes (volumes) of anthropogenic impact on the urban ecosystem and intensity (intensity),
- get acquainted with the measures of quality protection and regulation of water and air systems of cities, as well as land protection;
- master the theoretical and practical foundations of urban environment monitoring and management methods.

Course Prerequisites

Urban ecology course is designed for students aiming to develop a science-based ecological perception, acquiring comprehensive knowledge in building an environmentally friendly habitat, gaining relevant decision-making skills. Key issues to be addressed include the status of urban geo-sociosystem and forecasting the ways of its development as a whole, interaction of its components, the influence of urban environment on adjacent sites and their ecosystems.



URBAN ECOLOGY

Urban Ecology has already teaching in Department of Environmental Protection and Nature Management of ISEC NAS RA

<https://www.isec.am/en/departments/environmental-protection-and-nature-management>

Taking into account the global climate changes and considering the importance of urban systems in that context, there is a need to modify the subject of urban ecology, making it more ambitious in the current ecological challenges of cities. It is known that cities cover less than 1% of the planet's surface but they have very important significance connected with the population density (54% of the population) and economic (70–90%) activity. So, the information collected during the looking through different web sites of the EU Universities for the implementation of curricula comparative analysis allows to identify the most relevant and similar courses to that of “Urban Ecology” which will be modernized.

Course Comparative Analysis

In this context, it was also important to cover as much as possible about environmental laws and legislative acts in the subject

Here presented 3 similar Universities details which have been compared with the ISEC/CENS Urban Ecology course.

The following two Universities are:

1. University of Reading (<https://www.reading.ac.uk/module/document.aspx?modP=BI3EF7&modYR=1415>),
2. University College Dublin (<http://www.ucd.ie/>)
3. University of Tuscia (UNITUS) (<http://www.unitus.it/it/unitus>).

To conclude these courses comparison analysis the overall goal and main outcomes, teaching aspects, and other features of curriculum „Urban Ecology“ harmonized with the similar curricula taught in leading European universities. The differences are that in Reading University payed more attention to biological aspects but Dublin university main orientation is Geographical aspects and in the course of Tuscia University content also the question about forestry. As for ISEC the studied subject which name is Urban ecology has ecological character. Consequently, course load, applied tools, teaching resources, ECTS, etc. are specific for university and country as well.

*I would like to mention that in the subject taught by us, there is also a special section on urban greening, just like in Tuscia University, and it would be desirable to teach this comprehensive subject separately in the future.

Course Outcomes

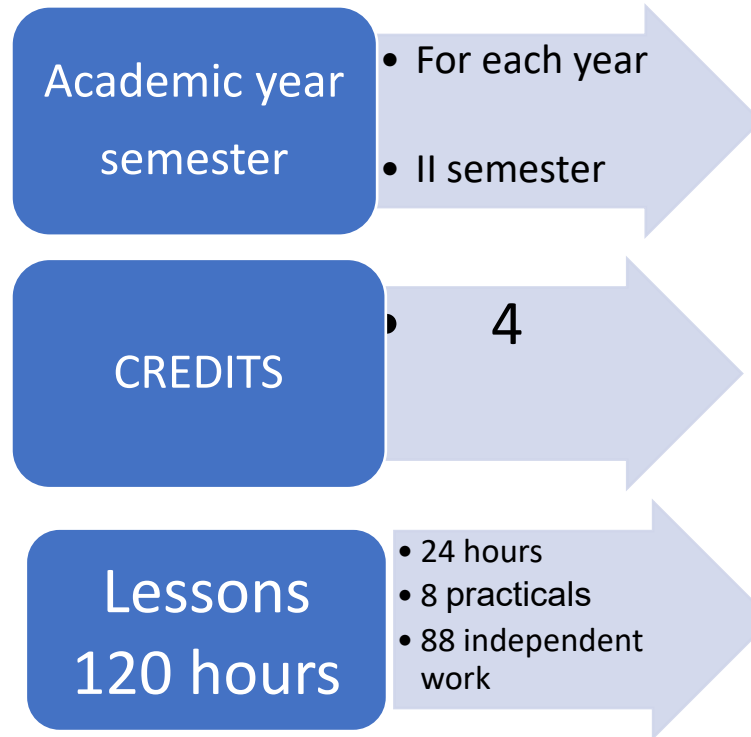
(according to the course curricula)

Students as a result of learning subject modules will

1. know urban infrastructure components of urban environment
2. be able to assess the problems in the cities
3. master all the necessary environmental measures that will lead to their effective solution

COURSE CONTENT

Total 120 hours,
out of which 24 hours,
8 seminars and practicals,
independent work: 88



<<Urban ecology>>

Subject: 1-6

1

- City and urban ecology

2

- Urban ecosystem

3

- Geological environment of the city

4

- Water environment of the city

5

- City air environment

6

- The flora and fauna of the city

- Familiarity with legal documents on the topic

Subject: 7

Basics of urban greening

7.1

- The role and importance of plants, biological and architectural and artistic properties of tree-shrub species

7.2

- The functions of vegetation in urbanized areas, the main environmental factors affecting plant

7.3

- Influence of anthropogenic factors on vegetation: influence of gaseous pollutants and heavy metals on plants, phytotoxicity and adaptation of plants to environmental conditions.

7.4

- The basic principles of greening areas, functional zoning of urbanized areas and structure planning.

7.5

- Design of urban landscaping system, classification of urban plantations & location in cities, basic principles of landscaping Green areas, functional zoning of urbanized areas & structure planning.

7.6

- Assessment of the condition of green areas: assessment and monitoring system, methods, phytoindication and phytomonitoring.

7.8

- Basics of functional greening: the sanitary and hygienic function of green plantation and their importance in the process of improving the ecological condition of cities, the main stages of functional greening, the selection and processing of plant species for the purpose of greening the urban areas.

- Familiarity with legal documents on the topic

HUMAN ECOLOGY AND URBAN ENVIRONMENT

8.1

- The effect of biotic, non-biogenic & anthropogenic superfluids on the human body.

8.2

- The advantages and attractions of city life.

8.3

- The negative impact of the urban environment on the population.

8.4

- Urban environment and population health.

- Familiarity with legal documents on the topic

SANITARY CLEANING OF CITIES

9.1

- Household and industrial wastes, their composition, properties and volumes.

9.2

- Collection, disposal and utilization of solid household and industrial waste.

9.3

- Waste sorting.

9.4

- Familiarization with legal documents related to the topic of waste and waste disposal.

Subject: 10 - Management of ecological safety in the cities

10.1

- The legal basis of management and the organizational system.

10.2

- Ecological monitoring of the urban environment.

10.3

- The Economics of Nature.

10.4

- The principles of ecological worldview formation.

- Familiarity with legal documents on the topic

Subject: 11. Conditions of ecological balance of the cities

11.1

- Adaptation survival strategy.

11.2

- Ecological compatibility of urban and natural environments.

11.3

- Methods of environment protection.

11.4

- The future development of cities.

11.5

- Sustainable development models of cities.

- Familiarity with legal documents on the topic

University of
Reading,
Berkshire,
England.

• Քաղաքային էկոլոգիա /
Urban ecology

University College
Dublin, Ireland

• Քաղաքային միջավայրի էկոլոգիա/
Urban Environment

University of
Tuscia (UNITUS)

• Քաղաքային միջավայրի
կիրառական էկոլոգիա / Applied
Ecology of Urban Environment

University of
Reading,
Berkshire,
England.

• Շրջակա միջավայրի դիսցիպլինի
հիմնական առարկաներից է/
MAIN SUBJECTS OF Environmental
discipline

University College
Dublin, Ireland

• Շրջակա միջավայրի դիսցիպլինի
ընտրովի առարկաներից է/
SELECTED SUBJECTS OF
Environmental discipline

University of
Tuscia (UNITUS)

• Քաղաքային շրջակա միջավայրի
որակ դիսցիպլինի առարկաներից է
/ Main subjects of URBAN
ENVIRONMENTAL discipline

University of
Reading,
Berkshire,
England.

• Orientation-Biological aspect

University College
Dublin, Ireland

• Orientation-Geographical aspect

University of
Tuscia (UNITUS)

Orientation-Forestry aspect
Green infrastructure course

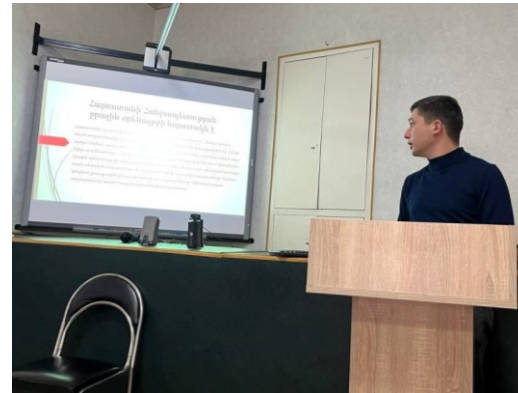
Interdisciplinary Connections With Other Courses

Subject of Urban ecology in **Bachelor degree** connects in the subject of Biology, Geography, or related natural and Earth Sciences, as well as physics, chemistry, biology, engineering, mathematics, or computing related subjects.

Subject of Urban ecology in **Master degree** connects in the subject of Environmental geochemistry; Complex Geoecological Mapping, Landscape Planning, Urban architecture



ERLEP Laboratory Involvement in the Course Curricula



THANK YOU !

Gayane / 05.10.2022

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UNIVERSITÀ
DEGLI STUDI DELLA
TUSCIA



NAS RA
INTERNATIONAL SCIENTIFIC
EDUCATIONAL CENTER



TÉCNICO
LISBOA

