**SYLLABUS**

**Course title: URBAN GREEN FACILITIES /INFRASTRUCTURE/**

**Course Index:** EREC324

**Course classification:**  Bachelor

**Course type:**  Specialization / Compulsory

**Course credit hour:**  6ECTS/ 3MCTS

**Study semester:** all semesters

**Total page number:**  5

**Online lesson:**  Full e-learning

[http://online.num.edu.mn/courses/course-v1:NationalUniversityofMongolia+ENVI+2020/about](http://online.num.edu.mn/courses/course-v1%3ANationalUniversityofMongolia%2BENVI%2B2020/about)

**Developed by:**

| Faculty | Department  | Name, title, degree of the lecturer  | Signature  |
| --- | --- | --- | --- |
| School of Natural Sciences and Technology | Department of Biology | Ganchimeg. B /Master/Enkhtuul. D /Master/ |  |

**Approved by:**

| Curriculum Subcommittee of Faculty/Department  | Date of meeting and approval  | Name, title, degree of the Head of Curriculum Subcommittee  | Signature |
| --- | --- | --- | --- |
| Curriculum Subcommittee, Department of Biology  |  | Erdenechimeg, N /Master/ Head, Curriculum Subcommittee  |  |
| Curriculum Subcommittee, School of Natural Sciences and Technology  |  | Tegshjargal, N /Ph.D./ Head, Curriculum Subcommittee  |  |

**Approved:**

The curriculum was discussed and approved at the meeting of the Sub-Committee of the School of Natural Sciences and Technology, Khovd State University on ................, 2022.

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**Information about the lecturers:**

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**INTERCONNECTION OF THE COURSES**

Name and index of the previous courses:

1. Plant ecology and taxonomy BECO305
2. Meteorology and hydrology METE312

Name and index of appropriate courses to study simultaneously:

1. Biodiversity conservation technology BIDT309

**COURSE OBJECTIVES AND SIGNIFICANCE**

The objective of the course is to teach about urban landscaping models, their diversity, methods, knowledge and skills for growing trees and shrubs suitable for urban landscaping.

1. Learn how to develop a management plan of green facilities in accordance with the standards
2. Acquire theoretical knowledge and skills on green facilities and gardening
3. To be trained on design of green facilities, re-formation suitable for landscape features, plantation of trees and shrubs suitable for urban ornament, as well as knowledge and skills on protecting them from pests and pest prevention methods

**CONTENT OF THE COURSE**

The course ‘Urban green facilities’ will offer fundamental theoretical understandings and concepts about classification of urban green facilities, choosing of trees and shrubs for urban green facilities, methodology of planting trees and shrubs, maintenance methods of trees and shrubs, fighting the pests, trimming of trees and shrubs, planting flowers and landscaping, as well as rehabilitation of urban green facilities.

**KNOWLEDGE AND SKILLS TO BE OBTAINED**

**Skills:**

By taking this course a specialist with in-depth knowledge of science-based theory and practice of gardening and green facilities, and the ability to work independently in the field of creating green facilities and gardening that meets the requirements of urban development and planning will be prepared. In addition, it aims to provide the skills on general requirements for urban green facilities and landscaping, plantation and use of trees and shrubs appropriate for urban ornament, their protection from pests, their maintenance and pest control methods.

**Attitude:**

* Ability to express own viewpoints and conclusions, and ability to express respect for the views and opinions of others and get the values in them.
* Be a member of a team and experience the development of the ability to represent others
* It seeks to develop attitudes toward differences of opinion, acceptance and disapproval.

**Knowledge:**

Graduates majoring in Environmental Protection Technology will obtain both theoretical and practical knowledge with scientific background in gardening and green facilities, as well as how to provide and implement them with planning and methodology

**TEACHING METHODOLOGY**

Learning activities are a combination of in-class and online trainings that support students' learning, allow opportunities for development, encourage their participation, and provide active, project-based learning through activities with the use of ICT.

*To organize a lecture course:*

It will be organized using self-directed learning and combined learning methods to provide new knowledge, to carry out discussions, raise issues, and get engaged in discussions.

*To organize a seminar course:*

Seminars will be organized in teams, which is different from traditional seminars in that they teach students the skills of teamwork and individual communication skills.

*To organize term paper and assignments:*

Students will do term paper assignments in this course on urban green facilities. Students will learn new skills to search information from sources, to conduct and organize independent research by choosing one of the following topics.

**COURSE ASSIGNMENT**

| 1 | Urban green facilities and our environment | Must meet the requirements of the essay writing | Essay  | 3rd week of the semester  |
| --- | --- | --- | --- | --- |
| 2 | Green facilities of our city | - Clear idea - Short video of 3 – 5 minutes - Illustrate in a simple and clear way relevant to the given topic- Must meet audio and video quality requirements | Make a short video  | 4th week of the semester  |
| 3 | Landscape and protection of green facilities | 1. In terms of term paper structure: *Introduction, content, conclusion, bibliography, appendix*2.Without spelling mistakes. Line spacing 1.5, page size 2cm from the bottom, 1.5cm from the right, and 3cm from the left, and the page number should not be less than 6 pages.  | Write a term paper  | 5th week of the semester  |

**COURSE ASSESSMENT (attendance, performance, examination)**

The main purpose of the course assessment is to objectively assess the knowledge gained during the course of urban green facilities, the ability to apply it in practice, and the changes in the orientation of intellectual values.

The semester exams will be assessed on the level of knowledge and skills required to be gained within the curriculum.

Standard assessment to assess each student's self-esteem, knowledge, skills, and abilities on this course will be provided.

Marks, points, and grades are used to assess students' knowledge, skills, and abilities. Marks, grades, and points are transferred as follows.

| Mark | Grade |
| --- | --- |
| A | 95-100  |
| A- | 90-94 |
| B | 85-89  |
| B- | 80-84 |
| C | 75-79 |
| C- | 70-74 |
| D | 65-69 |
| D- | 60-64 |
| F | 0-59 |

*Term examination evaluation procedure*

| **Grade** | **Evaluation type** | **Evaluation procedure** | **Evaluation score** |
| --- | --- | --- | --- |
| Grade О1  | Lesson attendance and active involvement | Attendance, active involvement in lessons, learning styles, skill changes and growth are assessed. | 20-30 |
| Grade О2 | Formative assessment, term paper, and laboratory work performance | It is evaluated by the sum of the scores on midterm test 1 and 2.It will be evaluated by the sum of the midterm test score and the score of term paper which is evaluated on the submission on time and quality. | 50-40 |
| Grade О3 | Summative assessment of the course  | Summative assessment test scores | 30 points |
| **Grade О** | **Total score** | **100 points** |

**BOOKS AND TEXTBOOKS TO BE USED IN THE COURSE**

*Basic textbooks:*

1. Batchuluun. Ts, Tsengel. B, Gerelbaatar. S. Gardening and Green Facilities. Ulaanbaatar. 2016

2. Chimid. B. Basics of Urban Gardening. Ulaanbaatar. 2008.

3. Chimed. B. Basics of Urban Green Facilities and Landscape Dendrology. Ulaanbaatar. 2014

*Additional books:*

1. Gombosuren, Tsengel. Botany of Woody Plants. Ulaanbaatar. 2005

2. Davaajamts. Ts, Sanchir. Ch. Basics of Planting and Maintaining Trees and Lawns. Ulaanbaatar. 1982

**MATERIALS TO BE USED FOR THE COURSE:**

* Handouts
* Manuals
* Posters
* Short videos
* Projector

**THEMATICAL LESSON PLAN**

**Lectures:**

| **Week** | Lesson topic/title | Content | Hours |
| --- | --- | --- | --- |
| I | Methodology of urban gardening | Establishing of green facilities to the extent specified in the norms and requirements of urban development and planning is an important factor in creating the hygienic living and working conditions of the residents of the city. | 2 |
| II | Classification of urban green facilities | Green facilities are built according to specific plans in different sizes and categories depending on the number and size of residents of that city. The work of green facilities or urban landscaping is divided into three types: *for* *public use, for limited use, and for special purpose.* | 2 |
| III | Biological features of woody plants | As woody plants are living organisms, they feed, breathe, feel, grow, and die. The more branches, the more leaves, the tree is more patulous and the more green mass, and therefore the better the metabolism becomes. | 2 |
| IV | Choosing trees and shrubs for urban green facilities | When choosing trees and shrubs to be planted in green facilities from forests and/or arboretums following characteristics should be considered: their age, height, crown thickness, leaf, flower, bark color, leaf discoloration, duration of flowering, deciduous and coniferous trees, leaf shedding, evergreen, and the root system. | 2 |
| V | Methods of planting ornamental trees and shrubs | Growing ornamental trees and shrubs is a very responsible job that need be done in a short period of tarboime. This work begins with preparing the soil and planting site for trees and shrubs. Seedlings of the age of 10-12 year are usually used for planting and the planting holes of such trees are 1 m in diameter and about 80 cm deep, with an average diameter of 60-70 cm and a depth of about 60 cm. | 2 |
| VI | Methods of trimming trees and shrubs | Landscaping of the greenery includes trimming the crown by pruning trees and shrubs to regulate crown thickening, smoothing out high and low forms, and fixing dry, sick, and abnormal branches. |  2  |
| VII | Transportation of trees and shrubs prepared for planting | In our country, coniferous and deciduous trees such as spruce, cedar, larch, fir and birch are harvested from the mountains, so it is necessary to pay special care to the logging that is 1.5-3 m tall trees with a diameter of 80 cm and a depth of not less than 60 cm can be dug and transported without damaging the roots.  | 2 |
| VIII | Soil developmentfor urban greenfacilities | It is important to cultivate the street soil to a depth of 30-40 cm for green facilities. | 2 |
| IX | Types of fertilizers and methods of their application | Fertilization of green facilities is one of the most important agro-technical measures aimed at increasing the growth of trees and shrubs and protection of them from diseases and pests. | 2 |
| X | Irrigation of green facilities | Particular attention should be paid to irrigation in the first year after planting trees and shrubs. After planting trees and shrubs and compacting the soil, irrigate 3-4 times a week with 40-50 liters per large tree and 20-30 liters per bush. | 2 |
| XI | Pests of trees andshrubs in urbangreen facilitiesand ways toprevent them | Disease and pest infestations in trees and shrubs can lead to loss of normal condition of plant physiology and morphology, impaired growth, even to death.When the study of the food relationship between trees and pesticides was conducted on the organs above the ground, 26.4 percent of insects feed on tree leaves, 57.8 percent feed on bark and wood tissues, while 15.8 percent feed on seed cones. | 2 |
| XII | The attractiveness of greenery trees and shrubs | In addition to the shape and height of the crown of the tree, the location of the leaves on the branches also plays an important role in the beautiful appearance of the shrubs. During the selection process of trees and shrubs for planting in the city, flowering plants should be chosen considering the importance of ornament. | 2 |
| XIII | Flowers and their maintenance  | Flowers play an important role in the urban landscaping. The main goal of urban development and landscaping should be to change the appearance of the city by decorating the park and micro districts with flowers using their the color, aroma and beauty, to create an architectural structure and design, and thus to establish a pleasant living and working environment for the citizens. | 2 |
| XIV | Landscaping and lawn care | Protecting urban soils from erosion and creating long-lasting greenery for hygienic and scenery purposes is part of urban landscaping. | 2 |
| XV | Landscaping of newly established area | Outdoor landscaping includes soil fertility work, building of indoor roads, sidewalks, exits, as well as fencing, establishing children's playgrounds, sports fields, recreational facilities, and other gardening activities. | 2 |
| XVI | Rehabilitation of urban green facilities | The city's underground facilities are constantly being renovated, expanded, and fixed, and these engineering facilities are often located under the city streets especially of the squares, sidewalks, lawns, and trees. It is easy to repair and replace in one hand, but on the other hand, earthworks are expensive to rehabilitate. | 2 |
| **Total**  | **32** |

**Seminars:**

| **Week** | Lesson topic/title | Content  | Hours |
| --- | --- | --- | --- |
| I | Life of woody lants | Woody plants create their own bodies from the environment, but they also affect the environment, enriching the soil, purifying the air, creating scenery in the city, and creating favorable conditions for people to work and live. | 2 |
| II | Features of ornamental trees and shrubs | In our country, except for 6 types of coniferous trees, such as pine, larch, ebony, spruce, cedar, fir and juniper, the others are deciduous trees and shrubs. The average height of a shrub depends on the plant's genus, breed, and lineage. In other words, no matter how favorable the growing conditions are, they do not exceed the average growth rate. | 2 |
| III | Arboretums for urban and rural gardening | Tree and shrub seedlings required for urban and rural gardening are grown in specialized arboretums. Arboretums are classified into urban, horticultural, afforestation, and orchard according to their purposes. | 2 |
| IV | Grass used for landscaping  | Many types of grass are used for urban landscaping which include turf, quack grass, bromegrass, wheat grass, Siberian stipa, festuca venusta | 2 |
| V | Landscaping and flower gardening of households | Landscaping and flower gardening should begin with a fence and/or household that is legally owned and located. In case of 50 percent of the 0.07 hectare area is a building, the remaining 50 percent should become a sidewalk, a toilet, a sewer, a coalhouse, or a garden. | 2 |
| VI | Design Project of Urban Gardening | As a component of urban development and an important element of urban architecture and planning, urban green facilities should be developed considering the general plan of the city and landscaping scheme.  | 2 |
| VII | Maintenance for diseased trees and shrubs | Cracks in the tree brunches, rough surfaces and damaged barks can create the favorable condition for pests to reproduce. Holes, tunnels and cracks in the surface of the tree trunk should be cleaned and treated. | 2 |
| VIII | Planting of fruit and berry bushes | Planting fruit and berry shrubs requires good technological knowledge and skills for site selection, soil preparation, proper placement of plants, selection of healthy seedlings of high-yielding varieties that are adapted to the local climatic conditions, as well as of planting and caring for seedlings. | 2 |
| IX | Growing seedlings of trees and shrubs in greenhouses and open areas | Seedlings and regrowth of fruit trees and shrubs are important to increase the size of the garden. With the purpose to shorten the growing time of planting materials and increase the number of seedlings per unit area, seedlings of trees and shrubs are grown in the greenhouse. | 2 |
| X | Technology for transplanting large trees | International experiences and practices show that growing large trees through transplanting is the most effective method. | 2 |
| XI | Flowering urban areas in gobi desert and steppe | Planting trees and shrubs, lawns and flower beds in the urban areas of Gobi and steppe will create a hygienic environment and pleasant views for the residents. | 2 |
| XII | Trees and shrubs that can be grown in Khovd aimag | According to the 2011 census, the forest area has increased from 13,770 hectares to 792,751 hectares, and in 2020 to 812,921 hectares. The grounds for this increase is an increased saxaul forest area. | 2 |
| XIII | Fighting ground vegetation | One of the main things to pay attention to in the framework of urban gardening and landscaping is the control of foot vegetation. | 2 |
| XIV | The growth rate of trees and shrubs | The faster a tree or shrub grows, the faster it will take effect and supply the needs of people. The growth and development of shrubs is determined by the height and thickness of the stem, the width of the crown or the increase in diameter. Tree growth is measured by the annual growth of stems and branches. | 2 |
| XV | The role of landscape architecture | Modern urban planning norms reflect the urban gardening its structure and role. Gardening areas include apartment blocks, squares, apartment complex gardens, and parks. | 2 |
| XVI | Origin of green facilities in Ulaanbaatar city | Urban gardening in the People's Republic of Mongolia began in the 1930s. Currently, even though there are 620 hectares of gardens and 1.3 million trees and shrubs are grown in Ulaanbaatar, but they are not growing steadily due to lack of irrigation and rehabilitation, human and animal overgrazing, the destruction by new buildings. | 2 |
| **Total hours**  | **32** |