|  |  |
| --- | --- |
|  | **SYLLABUS OF AN ACADEMIC DISCIPLINE**  **Environmental Monitoring** |
| **Academic degree - Bachelor's** |
| **Specialty 101 Ecology** |
| **Academic programme «Ecology»** |
| **Year of study 3, semester 5**  **Form of study full-time** |
| **Number of ECTS credits 5** |
| **Language of instruction English** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  |
| **Lecturer of the discipline** | **docent Rakoid O.O., PhD on agrarian sciences** |
| **Lecturer’s contact information (e-mail)** | **orakoid@nubip.edu.ua** |
| **URL of the e-learning course on the NULES e-learning portal** | **https://elearn.nubip.edu.ua/enrol/index.php?id=2246** |

**ACADEMIC DISCIPLINE DESCRIPTION**

*(up to 1000 symbols)*

Aim of discipline is to expand the object, methods and place of the discipline "Environmental monitoring" in the system of environmental knowledge as well as highlight its main principles; to introduce the main sections of the discipline; to promote ecological outlook for future environmentalists.

Objectives of the discipline is formation the theoretical knowledge and practical skills in the field of environmental monitoring, in particular on the modern problems of different components of the environment (surface and ground water, oceans and seas, atmospheric air, soils etc.), estimation of impact of anthropogenic stresses on them, prediction of changes in the state of environment as well as working out the scientifically-grounded recommendations for realization of nature protection measures.

**Competences of the discipline:**

*Integral competence (IC):* Ability to solve complex specialized problems and solve practical problems in the field of ecology, environmental protection environment and balanced environmental management, which involves the application of basic theories and methods of environmental sciences, characterized by complexity and uncertainty of conditions.

*General competencies (GC):*

GC02. Skills in the use of information and communication technologies.

GC06. Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge/economic activities).

*Special (professional) competences (SC):*

*SC07. Ability to conduct environmental monitoring and environmental assessment.*

SC10. Ability to use modern information resources for environmental research.

SC13. Ability to participate in the management of environmental actions and/or environmental projects.

*Professional (special) competencies (PC):*

PC07. Ability to conduct environmental monitoring and environmental assessment.

PC10. Ability to use modern information resources for environmental research.

PC13. Ability to participate in the management of environmental actions and/or environmental projects.

**Expected Learning Outcomes (ELO):**

ELO5. To know the conceptual basis of environmental monitoring and rationing of anthropogenic pressure on the environment.

ELO10. Be able to apply software tools, GIS technologies and Internet resources for information support of environmental studies.

ELO15. Be able to explain the social, economic, and political consequences of implementing environmental projects.

**ACADEMIC DISCIPLINE STRUCTURE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Topic** | **Hours**  (lectures/laboratory, practical, seminars) | **Learning outcomes** | **Tasks** | **Assessment** | |
| **1 Semester** | | | | | |
| **Module 1** | | | | | |
| **Topic 1**  **Basic concepts of environmental monitoring** | 4/- | To understand methods of grounding the net of observation of the components of biosphere;  To be able to ground the choice of methods and places of observation for the state of environment;  To be able to search for information using appropriate sources to make informed decisions | Submitting the laboratory work  Completing independent work (including in eLearn) | **5** | |
| **Definitions and historical background of monitoring. Classification of monitoring system** | -/4 |
| **Topic 2**  **The State Environmental Monitoring System of Ukraine** | 4/- | To have a knowledge about subjects, tasks and scheme of national monitoring system;  To understand normative basis of national environmental monitoring system;  To understand the basic environmental laws, rules and principles of environmental protection and nature management. | Submitting laboratory work  Completing independent work (including in eLearn) | **10** | |
| **Regulatory and policy framework of SEMS** | -/4 |
| **Topic 3.**  **Air pollution and air monitoring** | 4/- | To know programs of observation of the pollution sources and level of pollution;  To demonstrate an understanding of the basic principles of environmental management and/or environmental projects. | Submitting laboratory work  Completing independent work (including in eLearn) | **10** | |
| **Analytical research methods of air condition** | -/4 |
| **Topic 4.**  **Monitoring of surface water** | 4/- | To solve problems in the field of environmental protection using generally accepted and / or standard approaches and international and national experience.  To know programs of observation of the water pollution sources and level of pollution; | Submitting laboratory work  Completing independent work (including in eLearn) | **10** | |
| **Physical and chemical parameters of water quality monitoring** | -/4 |
| **Module 2** | | | | | |
| **Topic 5.**  **Land and soil monitoring. Assessment of land degradation** | 4/- | To be able to predict the impact of technological processes and industries on the environment;  To solve problems in the field of environmental protection using generally accepted and/or standard approaches and international and national experience. | Submitting laboratory work  Completing independent work (including in eLearn) | **10** | |
| **Agroecological monitoring. Methods for determining the contaminant concentration in soils** | -/4 |
| **Topic 6.**  **Climate change and climate monitoring** | 4/- | To be able to delate the results of activities to community of professionals and public in general, make presentations and messages.  To demonstrate skills in assessing unforeseen environmental problems and thoughtful choice of ways to solve them. | Submitting laboratory work  Completing independent work (including in eLearn) | **10** | |
| **Characteristics and uses of climate observations at the global and national levels** | -/4 |
| **Topic 7.**  **Monitoring of biodiversity (Biomonitoring)** | 4/- | To know the conceptual basis of monitoring and regulation of anthropogenic pressure on the environment and biodiversity.  To be able to predict the impact of technological processes and industries on the biota. | Submitting laboratory work  Completing independent work (including in eLearn) | **10** | |
| **International approaches to biomonitoring. Indicators used to conduct monitoring biodiversity at the global and national levels** | -/4 |
| **Topic 8.**  **Global approaches for environmental monitoring** | 2/- | To be able to ground the choice of methods and places of observation for the state of environment;  To use modern methods of analysis and prediction the state of environment;  To develop scientifically-grounded recommendations for supporting of managerial decisions in the field of environmental protection. | Submitting laboratory work  Completing independent work (including in eLearn) | **5** | |
| **World experience in organizing environmental monitoring systems** | -/2 |
| **Total for 1st semester** | | | | | **70** |
| **Examination** |  |  |  | **30** | |
| **Total for the course** | | | | | **100** |

**ASSESSMENT POLICY**

|  |  |
| --- | --- |
| ***Deadlines and exam retaking policy:*** | Works that are submitted late without valid reasons will be assessed with a lower grade. Module tests may be retaken with the permission of the lecturer if there are valid reasons (e.g., a sick leave). |
| ***Academic integrity policy:*** | Cheating during tests and exams is prohibited (including using mobile devices). Term papers and essays must have correct references to the literature used |
| ***Attendance policy:*** | Attendance is compulsory. For good reasons (e.g., illness, international internship), training can take place individually (online by the faculty dean’s consent) |

**SCALE FOR ASSESSING STUDENTS ‘KNOWLEDGE AND SKILLS**

|  |  |  |
| --- | --- | --- |
| **Student’s rating, points** | **National grading of exams and credits** | |
| **exams** | **credits** |
| 90-100 | excellent | pass |
| 74-89 | good |
| 60-73 | satisfactorily |
| 0-59 | unsatisfactorily | fail |

**RECOMMENDED SOURCES OF INFORMATION**

1. European Environment Agency: http://www.eea.europa.eu/

2. Національний портал відкритих даних: http://data.gov.ua

3. Громадський моніторинг стану якості повітря: https://eco-city.org.ua/

4. Програма Європейського Союзу Copernicus: https://www.copernicus.eu/en

5. Інтерактивна карта "Чиста вода": https://texty.org.ua/articles/86343/Chysta\_voda\_Interaktyvna\_karta\_rozpovist\_pro\_stan-86343/

6. Єдина екологічна платформа “ЕкоСистема”: https://eco.gov.ua/

7. Офіційний сайт Міністерства захисту довкілля та природних ресурсів України: http://www.menr.gov.ua

8. ЕкоЗагроза (офіційний вебресурс і мобільний додаток Міндовкілля, завдяки якому можна дізнатись достовірну інформацію про стан повітря, води, ґрунту та інші дані) https://ecozagroza.gov.ua/