**SYLLABUS**

**Fall semester 2022-2023 academic years**

**on the educational program “6B05101-Biological engineering”**

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| **Discipline’s code** | **Discipline’s title** | **Independent work of students (IWS)** | **Number of credits** | | | | | **Number of credits** | **Independent work of student with teacher (IWST)** |
| **Lectures (L)** | **Practical training (PT)** | | **Laboratory (Lab)** | |
| **BRZh** | Plant and animal biodiversity | 3 | 3 | 0 | | 6 | | 9 | 6 |
| **Academic course information** | | | | | | | | | |
| **Form of education** | **Type of course** | **Types of lectures** | | | **Types of practical training** | | **Form of final control**  written offline | | |
| Full-time | core disciplines/university component | Information with visualization | | | Solution of situational problems | |
| Lecturer | Abidkulova Karime Tolegenovna, senior teacher and  Sapargaliyeva Nazym, PhD, senior teacher,  department of biodiversity and bioresources | | | | | |  | | |
| e-mail | [karime\_58@mail.ru](mailto:karime_58@mail.ru)  Nazym.Sapargaliyeva@kaznu.kz | | | | | |
| Telephone number | 87016207040 | | | | | |

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| **Aim of course** | **Expected Learning Outcomes (LO)\***  As a result of studying the discipline the undergraduate will be able to: | **Indicators of LO achievement (ID)**  (for each LO at least 2 indicators) |
| knowledge about the biodiversity of plants and animals through the formation of ideological concepts and a systematic approach to the study of biodiversity at various levels of the organization of the biosphere for practical application in the field of biodiversity conservation, taking into account the main strategies for its restoration | 1. To demonstrate basic understanding of the diversity of biological objects | 1.1 to identify representatives of lower and higher plants.  1.2 to indicate the main taxonomic ranks of invertebrates and vertebrates |
| 2. to determine the features of the structure, reproduction, the main representatives of classes, families of the plant kingdom; be able to determine their ecological and biological characteristics and evolutionary relationships; | 2.1 to know the features of development, reproduction, ecology of representatives of the main classes and families of plants.  2.2 to indicate the position of the main plant families in the taxonomic nomenclature |
| 3. Be able to clearly and logically articulate their ideas in oral presentation | 3.1. to have skills to prepare a presentation according to requirements.  3.2 to have skills to introduce a presentation |
| 4. Be able to find reliable information about anatomy and morphology plants in the library or on the internet | 4.1 to have skills to find reliable scientific information in Internet  4.2 to have skills to work with Microsoft Office for preparing of presentations |
| **Prerequisites** | Course of Biology in school. | |
| **Post requisites** | Plant ecology | |
| **Information resources \*\*** | **Literature:**  The main sources:   1. Simpson M.G. Plant Systematics. Academic Press. – 2010. – 752 p. 2. Raven P., Evert R.F. , Eichhorn S.E. Biology of Plants. By W. H. Freeman and Company 2013. – 864 p. 3. Semple J.C. Flowering Plants Laboratory Manual (A guide to the morphology of flowers). – 2016. – 79 p. 4. Integrated principles of zoology / Cleveland P. Hickman, Jr. 14th ed. 2008. /Available as e-book/. 5. Biology 8th ed by Campbell and Reece – 5th ed.- 2008 /available in pdf/. 1.   Additional sources:   1. Nesterova S.G., Aidosova S.S., Pankiv I.G.Laboratory course on Biodiversity of plants. – Almaty: Kazakh University. - 2014. – 142 p. 2. Догадина Т. В., Горбулин О. С., Громакова А. Б. Ботаника: Низшие растения (= *Thallobionta, Atracheophyta, Cryptogamen*). - Х. : ХНУ имени В. Н. Каразина, 2014. – 100 с. 3. Наумов Н.П., Карташев Н.Н. Зоология позвоночных. М., 1979, ч.1-2. 4. Брикетти П. 2004. Птицы. Справочник. М.: 1-319 5. Константинов В.М., Наумов С.П., Шаталова С.П. Зоология позвоночных. М.: 2000: 1-495 6. Константинов В.М. (ред.). Лабораторный практикум по зоологии позвоночных. М.: 2001: 1-272   Internet resources:  <http://elibrary.kaznu.kz/ru/>  https://botanydepot.com/2021/01/20/videos-plant-systematics-lectures-by-bruce-kirchoff/  Zoology Books <http://www.freebookcentre.net/Biology/Zoology-Books.html>  <http://www.austincc.edu/sziser/Biol%201413/zoollec&ho.html>  [http://www.pdfdrive.com/biology-zoology-textbooks-online-e10316820.html](http://www.pdfdrive.com/biology-zoology-textbooks-online-e15316820.html)  <http://sunny.moorparkcollege.edu/~econnolly/>  **Available online:** Additional training materials and documentation for botany used for homework and projects will be available on your page on univer.kaznu.kz in E | |

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| **Academic policy of the course in the context of university moral and ethical values** | **Academic Behavior Rules:**  **ATTENTION!** Failure to meet deadlines results in loss of points! The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the training course.  **Academic values:**  - Practical trainings/laboratories, IWS should be independent, creative.  - Plagiarism, forgery, cheating at all stages of control are unacceptable.  - Students with disabilities can receive counseling at e-mail \*\*\*\*\*\*\*@gmail.com. |
| **Evaluation and attestation policy** | **Criteria-based evaluation:**  assessment of learning outcomes in relation to descriptors (verification of the formation of competencies in midterm control and exams).  **Summative evaluation:** assessment of work activity in an audience (at a webinar); assessment of the completed task. |

**CALENDAR (SCHEDULE) THE IMPLEMENTATION OF THE COURSE CONTENT:**

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| week | Topic name | Number of hours | Max.  score\*\*\* |
| **Module 1 Botany** | | | |
| 1 | **Lec 1.** General characteristics of Algae. Division of green algae. *Charophyta.* | 2 |  |
| 1 | **Lab 1.** To describe general characteristics of division, the structure of the cell green algae. Division of diatoms. Division of brown algae. To research the main features of the anatomical structure of the brown algae. | 4 | 10 |
| 2 | **Lec 2.** The kingdom of Fungi. General characteristics of the kingdom of Fungi. General characteristics of the division of Lichens | 2 |  |
| 2 | **Lab 2.** To study the features of the structure of mushroom. Mycelium. Reproduction. Symbiotic character of lichen. Morphological types. To explain the basic principles of the classification of lichen | 4 |  |
| 2 | **IWST 1.** Consultation on the implementation of IWS1 on the topic:  Diversity of algae, their value, utilisation | 0,5 |  |
| 3 | **Lec 3.** General characteristics of the Mosses, Lycopodium, Horsetails. | 2 |  |
| 3 | **Lab 3.** Give the morphological and biological characteristics of the mosses, lycopodium, horsetails. | 4 | 10 |
| 4 | **Lec 4.** Ferns. Division of Gymnosperms | 2 |  |
| 4 | **Lab 4.** To research thegeneral characteristics of the Division of *Gymnosperms* and their origin | 4 | 10 |
| 4 | **IWST 2. Consultation on the implementation of exam tasks** | 0,5 |  |
| 4 | **IWS 1.** Diversity of algae, their value, utilisation | 1 | 30 |
| 5 | **Lec 5.** Class Dicotyledoneae. Family Ranunculaceae Family Brassicáceae. | 2 |  |
| 5 | **Lab 5.** To familiarize with the main representatives of Family Ranunculaceae Family Brassicáceae. | 4 | 10 |
| 6 | **Lec 6.** Family Lamiaceae and Family Asteraceae | 2 |  |
| 6 | **Lab 6.** Give the morphological characteristic of Family Lamiaceae and Asteraceae | 4 | 10 |
| 6 | **IWST 3. Consultation on the implementation of exam tasks** | 0,5 |  |
| 7 | **Lec 7.** Class monocots, Family Liliaceae. Family Poaceae | 2 |  |
| 7 | **Lab 7.** To study thecharacteristic morphological features of Family Liliaceae and Family Poaceae | 4 | 10 |
| **7** | **LEVEL CONTROL 1** |  | **100** |
| **Module 2 Zoology** | | | |
| 8 | **Lec 8.** Major divisions of life and subdivisions of animal kingdom». Type Sponges (Porifera or Spongia) and type Coelenterates (Coelenterata) taxonomy, biology, ecology and distribution. | 2 |  |
| 8 | **Lab 8.** To study major Subdivisions of the Animal Kingdom. Classification of Protista. Structure of Sarcodina. Features of the structure and life cycle of sponges and coelenterates. | 4 | 9 |
| 8 | **IWS 2.** Disease caused by parasitic protozoa/ Biology of parasitic protozoa, life cycle. Radiate Animals. Cnidaria (Taxonomy. Adaptive diversification. Ecological significance. Coral reefs).  Insects and Human Welfare / Colonies in insects. | 1 | 14 |
| 9 | **Lec 9.** Type Flat worms (Ploathelminthes) and Type Round or aschelminth (Nemathelminthes) taxonomy, biology, ecology and distribution. Principles of organization arthropods. Taxonomy and phylogeny. Type of arthropods (Arthropoda) taxonomy, biology, ecology and distribution | 2 |  |
| 9 | **Lab 9.** To study the structural features of flat and round worms. Insecta. | 4 | 9 |
| 10 | **Lec 10** Shellfish type (Mollusca) taxonomy, biology, ecology and distribution. «Echinodermata. Principles of organization. Taxonomy and phylogeny. | 2 |  |
| 10 | **Lab 10.** To study the features of the structure lamellibranch and gastropods. Echinodermata. Astroides, Ecinoidea, Holothuroidea, Criniodea. Common and interesting species, ecological and practice importance. | 4 | 9 |
| 10 | **IWST 4. Consultation on the implementation of exam tasks** | 0,5 |  |
| 11 | **Lec 11** The Chordates». Jawless. Principles of organization. Taxonomy. Fishes. Form and function, taxonomy. Phylogeny and adaptive diversification of Cartilaginous fishes. | 2 |  |
| 11 | **Lab 11.** To study vertebrates. Taxonomy. The structural features of jawless. Determination of lampreys. Cartilaginous fishes. The structural features and determination of cartilaginous fishes. | 4 | 9 |
| 12 | **Lec 12** Form and function, taxonomy of bony fishes. Phylogeny and adaptive diversification of bony fishes. Early tetrapod’s and modern amphibians. | 2 |  |
| 12 | **Lab 12.** To study bony fishes. The structural features and determination of bony fishes. Amphibians - form and function, taxonomy. Phylogeny and adaptive diversification. | 4 | 9 |
| 12 | **IWST 5**. **Consultation on the implementation of IWS 3** | 0,5 |  |
| 13 | **Lec 13** Amniotic origin and non avian reptiles | 2 |  |
| 13 | **Lab 13.** To study reptiles - form and function, taxonomy. Phylogeny and adaptive diversificatio. | 4 | 9 |
| 13 | **IWS 3.** Fishes as object of biotechnology.  Poisonous fishes and amphibians. Biodiversity of reptilians, their importance in human life. | 1 | 14 |
| 14 | **Lec 14** Birds – behavior, form and function, taxonomy. Phylogeny and adaptive diversification. | 2 |  |
| 14 | **Lab 14.** To study diversity of birds. | 4 | 9 |
| 14 | **IWST 6. Consultation on the implementation of exam tasks** | 0,5 |  |
| 15 | **Lec 15** Mammals. | 2 |  |
| 15 | **Lab 15.** To study the structural and functional adaptations of mammals. | 4 | 9 |
|  | **LEVEL CONTROL 2** |  | **100** |

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Head of Department \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Lecturer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_