**SYLLABUS**

**Fall semester 2023-2024 academic year**

**Educational program “6B05101-Biological engineering”**

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| **Discipline’s code** | **Independent work of students (IWS)** | **Number of credits** | **General****number** **of credits** | **Independent work** **of the student****under the guidance** **of a teacher (IWST)** |
| **Lectures (L)** | **Practical classes (PC)** | **Lab. classes (LC)** |
| **BRZh**Plant and animal biodiversity | 3 | 3 | 0 | 6 | 9 | 6 |
| **ACADEMIC INFORMATION ABOUT THE COURSE** |
| **Learning Format** | **Cycle,****component** | **Lecture****types** | **Types****of practical classes** | **Form and platform final control** written offline |
| **Offline** | core disciplines/universit 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 | offline |
| **e-mail** | karime\_58@mail.ruNazym.Sapargaliyeva@kaznu.kz |
| **Phone:** | 87016207040 |
| **Assistant - (s)** | Zaparina Yelena, teacher |
| **e-mail :** | zaparina.yelena06@gmail.com |
| **Phone:** | 87024616800 |
| **ACADEMIC COURSE PRESENTATION** |
| **Purpose****of the course** | **Expected Learning Outcomes (LO)\*** | **Indicators of LO achievement (ID)** |
| To generate 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 Internet4.2 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. Dogadina T.V., Gorbulin O.S., Gromakova A.B. Botany: Lower plants (= Thallobionta, Atracheophyta, Cryptogamen). - Kh.: KhNU named after V. N. Karazin, 2014. – 100 p.
3. Naumov N.P., Kartashev N.N. Zoology of vertebrates. M., 1979, part 1-2.
4. Brichetti P. 2004. Birds. Directory. M.: 1-319
5. Konstantinov V.M., Naumov S.P., Shatalova S.P. Zoology of vertebrates. M.: 2000: 1-495
6. Konstantinov V.M. (ed.). Laboratory workshop on vertebrate zoology. M.: 2001: 1-272

 **Professional scientific databases**1. [www.scopus.com](http://www.scopus.com)
2. www.springer.com www.link.springer.com

**Internet resources:**1. <http://elibrary.kaznu.kz/ru/>
2. https://botanydepot.com/2021/01/20/videos-plant-systematics-lectures-by-bruce-kirchoff/
3. zoology Books <http://www.freebookcentre.net/Biology/Zoology-Books.html>
4. [http://www.austincc.edu/sziser/Biol%201413/zoollec&ho.html](http://www.austincc.edu/sziser/Biol%201413/zoollec%26ho.html)
5. [http://www.pdfdrive.com/biology-zoology-textbooks-online-e10316820.html](http://www.pdfdrive.com/biology-zoology-textbooks-online-e15316820.html)
6. <http://sunny.moorparkcollege.edu/~econnolly/>
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| **Academic****course policy** | The academic policy of the course is determined by [the Academic Policy](https://univer.kaznu.kz/Content/instructions/%D0%90%D0%BA%D0%B0%D0%B4%D0%B5%D0%BC%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%B0%D1%8F%20%D0%BF%D0%BE%D0%BB%D0%B8%D1%82%D0%B8%D0%BA%D0%B0.pdf) and [the Policy of Academic Integrity of Al-Farabi Kazakh National University .](https://univer.kaznu.kz/Content/instructions/%D0%9F%D0%BE%D0%BB%D0%B8%D1%82%D0%B8%D0%BA%D0%B0%20%D0%B0%D0%BA%D0%B0%D0%B4%D0%B5%D0%BC%D0%B8%D1%87%D0%B5%D1%81%D0%BA%D0%BE%D0%B9%20%D1%87%D0%B5%D1%81%D1%82%D0%BD%D0%BE%D1%81%D1%82%D0%B8.pdf) Documents are available on the main page of IS Univer .**Integration of science and education.** The research work of students, undergraduates and doctoral students is a deepening of the educational process. It is organized directly at the departments, laboratories, scientific and design departments of the university, in student scientific and technical associations. Independent work of students at all levels of education is aimed at developing research skills and competencies based on obtaining new knowledge using modern research and information technologies. A research university teacher integrates the results of scientific activities into the topics of lectures and seminars (practical) classes, laboratory classes and into the tasks of the IWST, IWS, which are reflected in the syllabus and are responsible for the relevance of the topics of training sessions andassignments.**Attendance.** The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course. Failure to meet deadlines results in loss of points.**Аcademic honesty.** Practical/laboratory classes, IWS develop the student's independence, critical thinking, and creativity. Plagiarism, forgery, the use of cheat sheets, cheating at all stages of completing tasks are unacceptable.Compliance with academic honesty during the period of theoretical training and at exams, in addition to the main policies, is regulated by [the "Rules for the final control"](https://univer.kaznu.kz/Content/instructions/%D0%9F%D1%80%D0%B0%D0%B2%D0%B8%D0%BB%D0%B0%20%D0%BF%D1%80%D0%BE%D0%B2%D0%B5%D0%B4%D0%B5%D0%BD%D0%B8%D1%8F%20%D0%B8%D1%82%D0%BE%D0%B3%D0%BE%D0%B2%D0%BE%D0%B3%D0%BE%20%D0%BA%D0%BE%D0%BD%D1%82%D1%80%D0%BE%D0%BB%D1%8F%20%D0%9B%D0%AD%D0%A1%202022-2023%20%D1%83%D1%87%D0%B3%D0%BE%D0%B4%20%D1%80%D1%83%D1%81%D1%8F%D0%B7%D1%8B%D0%BA%D0%B5.pdf) , ["Instructions for the final control of the autumn / spring semester of the current academic year"](https://univer.kaznu.kz/Content/instructions/%D0%98%D0%BD%D1%81%D1%82%D1%80%D1%83%D0%BA%D1%86%D0%B8%D1%8F%20%D0%B4%D0%BB%D1%8F%20%D0%B8%D1%82%D0%BE%D0%B3%D0%BE%D0%B2%D0%BE%D0%B3%D0%BE%20%D0%BA%D0%BE%D0%BD%D1%82%D1%80%D0%BE%D0%BB%D1%8F%20%D0%B2%D0%B5%D1%81%D0%B5%D0%BD%D0%BD%D0%B5%D0%B3%D0%BE%20%D1%81%D0%B5%D0%BC%D0%B5%D1%81%D1%82%D1%80%D0%B0%202022-2023.pdf) , "Regulations on checking students' text documents for borrowings".Documents are available on the main page of IS Univer .**Basic principles of inclusive education.** The educational environment of the university is conceived as a safe place where there is always support and equal attitude from the teacher to all students and students to each other, regardless of gender, race / ethnicity, religious beliefs, socio-economic status, physical health of the student, etc. All people need the support and friendship of peers and fellow students. For all students, progress is more about what they can do than what they can't. Diversity enhances all aspects of life.All students, especially those with disabilities, can receive counseling assistance by phone / e- mail zaparina.elena06@gmail.com or via video link in MS Teams*.***Integration MOOC (massive open online course).** In the case of integrating MOOC into the course, all students need to register for MOOC. The deadlines for passing MOOC modules must be strictly observed in accordance with the course study schedule. **ATTENTION!** The deadline for each task is indicated in the calendar (schedule) for the implementation of the content of the course, as well as in the MOOC. Failure to meet deadlines results in loss of points. |
|  | **INFORMATION ABOUT TEACHING, LEARNING AND ASSESSMENT** |
| **Score-rating letter system of assessment of accounting for educational achievements** | **Assessment Methods** |
| **Grade** | **Digital****equivalent****points** | **points,****% content** | **Assessment according to the traditional system** | **Criteria-based assessment** is the process of correlating actual learning outcomes with expected learning outcomes based on clearly defined criteria. Based on formative and summative assessment.**Formative assessment is** a type of assessment that is carried out in the course of daily learning activities. It is the current measure of progress. Provides an operational relationship between the student and the teacher. It allows you to determine the capabilities of the student, identify difficulties, help achieve the best results, timely correct the educational process for the teacher. The performance of tasks, the activity of work in the classroom during lectures, seminars, practical exercises (discussions, quizzes, debates, round tables, laboratory work, etc.) are evaluated. Acquired knowledge and competencies are assessed.**Summative assessment** -type of assessment, which is carried out upon completion of the study of the section in accordance with the program of the course.Conducted 3-4 times per semester when performing IWS. This is the assessment of mastering the expected learning outcomes in relation to the descriptors. Allows you to determine and fix the level of mastering the course for a certain period. Learning outcomes are evaluated. |
| A | 4.0 \_ | 95-100 | Great |
| A- | 3.67 | 90-94 |
| B+ | 3.33 | 85-89 | Fine |
| B | 3.0 | 80-84 | **Formative and summative assessment** | **Points % content** |
| B- | 2.67 | 75-79 | Activity at lectures | 5 |
| C+ | 2.33 | 70-74 | Work in practical classes | 20 |
| C | 2.0 | 65-69 | Satisfactorily | Independent work | 25 |
| C- | 1.67 | 60-64 | Design and creative activity | 10 |
| D+ | 1.33 | 55-59 | Unsatisfactory | Final control (exam) | 40 |
| D | 1.0 | 50-54 | TOTAL | 100 |
| **Calendar (schedule) for the implementation of the content of the course. Methods of teaching and learning.** |
| **A week** | **Topic name** | **Number of hours** | **Max.****ball** |
| **MODULE 1 Botany** |
| 1 | **L 1.** General characteristics of Algae. Division of green algae. *Charophyta.* | 2 |  |
| **LC 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 | **L 2.** The kingdom of Fungi. General characteristics of the kingdom of Fungi. General characteristics of the division of Lichens | 2 |  |
| **LC 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 |  |
| **IWST 1.** Consultation on the implementation of IWS1 on the topic: Diversity of algae, their value, utilisation | 0,5 |  |
| 3 | **L 3.** General characteristics of the Mosses, Lycopodium, Horsetails. | 2 |  |
| **LC 3.** Give the morphological and biological characteristics of the mosses, lycopodium, horsetails. | 4 | 10 |
| 4 | **L 4.** Ferns. Division of Gymnosperms | 2 |  |
| **LC 4.** To research thegeneral characteristics of the Division of *Gymnosperms* and their origin | 4 | 10 |
| **IWST 2. Consultation on the implementation of exam tasks** | 0,5 |  |
| **IWS 1.** Diversity of algae, their value, utilisation | 1 | 30 |
| 5 | **L 5.** Class Dicotyledoneae. Family Ranunculaceae Family Brassicáceae. | 2 |  |
| **LC 5.** To familiarize with the main representatives of Family Ranunculaceae Family Brassicáceae. | 4 | 10 |
| 6 | **L 6.** Family Lamiaceae and Family Asteraceae | 2 |  |
| **LC 6.** Give the morphological characteristic of Family Lamiaceae and Asteraceae  | 4 | 10 |
| **IWST 3. Consultation on the implementation of exam tasks** | 0,5 |  |
| 7 | **L 7.** Class monocots, Family Liliaceae. Family Poaceae | 2 |  |
| **LC 7.** To study thecharacteristic morphological features of Family Liliaceae and Family Poaceae  | 4 | 10 |
| **Midterm 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 |  |
| **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 |
| **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 |  |
| **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 |  |
| **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 |
| **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 |  |
| **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 |  |
| **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 |
| **IWST 5**. **Consultation on the implementation of IWS 3** | 0,5 |  |
| 13 | **Lec 13** Amniotic origin and non avian reptiles | 2 |  |
| **Lab 13.** To study reptiles - form and function, taxonomy. Phylogeny and adaptive diversificatio. | 4 | 9 |
| **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 |  |
| **Lab 14.** To study diversity of birds. | 4 | 9 |
| **IWST 6. Consultation on the implementation of exam tasks** | 0,5 |  |
| 15 | **Lec 15** Mammals. | 2 |  |
| **Lab 15.** To study the structural and functional adaptations of mammals. | 4 | 9 |
| **Midterm control 2** | **100** |
| **Final control (exam)** | **100** |
| **TOTAL for course** | **100** |

**Dean \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Kurmanbayeva M.S.**

**Head of Department \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Kegenova G.B.**

**Lecturer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**