**SYLLABUS**

**Fall semester 2022-2023 academic years**

**on the educational program “8D05101 - Biology”**

**Doctor’s degree 1 year, 1 semester**

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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)** | |
| **PMB** | **Problems of Modern Biology** | 56 | 15 | 15 | | 0 | | 3 | 4 |
| **Academic course information** | | | | | | | | | |
| **Form of education** | **Type of course** | **Types of lectures** | | | **Types of practical training** | | **Form of final control** | | |
| Full-time | Theoretical | problematic,  analytical lecture | | | solving problems,  situational tasks | |
| Lecturer | Amirova Aigul, candidate of biological science | | | | | | Exam  Writing / “Univer”. | | |
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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) |
| "Research methodology" provides teaching to doctoral students depth knowledge about the development of scientific and technological progress, training  a qualified professional implies the acquisition of skills like  independent scientific work and research activities as part of  collective, which is impossible without mastering the methodology and methods of scientific research. | 1. Assess achievements of fundamental sciences on which modern biotechnology is based in accordance with the specialty and specialization. | 1.1 Explain the relationship of modern biotechnology with other disciplines; Summarize the achievements of modern biotechnology.  1.2 Master the procedure for setting up an optimal experiment and processing measurement results |
| 2. Use advanced technologies in professional activities and systematize the results of scientific research by processing literary data. Explain the principle of modern methods of biotechnology. | 2.1 Apply the progressive biotechnology within the professional activity in the specialty of biotechnology;  2.2 Master the methodological foundations of scientific knowledge and creativity in practice. |
| 3. Improve qualifications in the professional field of biotechnology; in scientific and pedagogical work by the specialty. | 3.1 Apply the acquired knowledge in the professional field of biotechnology;  3.2 Use the acquired knowledge and skills in scientific and pedagogical work by the specialty. |
| 4 Summarize the information obtained from literary sources on biotechnology and related sciences. | 4.1 Analyze the information obtained from literary sources;  4.2 Master the modern information on the biotechnology and related sciences. |
| 5. Plan and manage projects; be able to find and make decisions among different opinions. | 5.1 Compose the projects and manage of them;  5.2 Identify the problems, find and make decisions in the context of different opinions. |
| **Prerequisites** | **“General and Molecular Genetics”, "Biochemistry", "Molecular Biology", "Genetic Engineering".** | |
| **Post requisites** | **PhD students can use an evolutionary approach in solving the specific scientific problems.** | |
| **Information resources \*\*** | **Literature:\*\***  1.Космин, В. В. Основы научных исследований (Общий курс) [текст] : учеб. пособие . - 2-е изд. - M. : Риор, 2014. - 214 с.  2. Герасимов, Борис Иванович. Основы научных исследований. - Москва ; Москва : Издательство "ФОРУМ" : ООО "Научно-издательский центр ИНФРА-М", 2013. - 272 с.  3. Леонова, Ольга Владимировна. Основы научных исследований. - 1. - Москва : Московская государственная академия водного транспорта (МГАВТ), 2015. - 72 с.  4. Шкляр, Михаил Филиппович. Основы научных исследований. - Москва : Издательско-торговая корпорация "Дашков и К", 2018. - 208 с.  5. Shanti Bhushan Mishra and Shashi Alok Handbook of research methodology. – India 2017. – 28 p.  6. В. А. Бакулев, Н. П. Бельская, В. С. Берсенева Основы научного исследования. - Екатеринбург: Изд-во Урал. ун-та, 2014. – 64 c.  **Internet resources:**  Internet resources (at least 3-5)   1. <http://elibrary.kaznu.kz/ru> 2. https://www.goodreads.com/ 3. https://www.coursera.org/ 4. https://www.edx.org/ | |

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| **Academic policy of the course in the context of university moral and ethical values** | **Academic Behavior Rules:**  All students are required to register for the MOOC. The deadlines for completing the modules of the online course must be strictly observed in accordance with the schedule for studying the discipline. Leave in case of current MOOC or SPOC courses.  **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, as well as in the MOOC. Leave in case of current MOOC or SPOC courses.  **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 Introduction. History and methodology of biology science.** | | | |
| 1 | **Lec 1.** Introduction. History and methodology of biology science. |  |  |
| 1 | **Sem 1.** Biology as a science. Scientific Research Methods. |  |  |
| 2 | **Lec 2.** What is the New Biology? Problems of modern biology. |  |  |
| 2 | **Sem 2.** The New Biology’s Great Potential. |  |  |
| 2 | IWST 1. Consultation on the implementation of IWS1 on the topic:  A new biology approach to the health challenge: understanding individual health. |  |  |
| 3 | **Lec 3.** Individual development of organisms. |  |  |
| 3 | **Sem 3.** The main problems of developmental biology. |  |  |
| 3 | **IWS 1.** Report. |  |  |
| **Module 2 Solving the problems of modern biology.** | | | |
| 4 | **Lec 4.** Questions and problems of development theories of evolution. |  |  |
| 4 | **Sem 4.** Origin of life. The development of organisms on the planet. |  |  |
|  | **IWST 2. Colloquium (essay).** |  |  |
| 5 | **Lec 5.** The problem of creating sufficient food potential for a growing human population. |  |  |
| 5 | **Sem 5.** A new biology approach to the food challenge. |  |  |
| 6 | **Lec 6.** The development of genetic engineering methods. |  |  |
| 6 | **Sem 6.** Genetic engineering in the future. Advantages and disadvantages of genetic engineering. |  |  |
| 7 | **Lec 7.** Decoding the genomes of plants, animals and humans. |  |  |
| 7 | **Sem 7.** The prospect of Human genome project. |  |  |
| 7 | IWST 3. Consultation on the implementation of the IWS 2. |  |  |
|  | **LEVEL CONTROL 1** |  | **100** |
| 8 | **Lec 8.** Rational organization of human life. |  |  |
| 8 | **Sem 8.** Development of the problem of life extension. |  |  |
| 8 | **IWS 2.** Make a structural and logical diagram of the read material |  |  |
| 9 | **Lec 9.** The study of the structure of macromolecules and the identification of its influence on their functions – key problems of modern biology. |  |  |
| 9 | **Sem 9.** The main biomolecules. Structure and functions of macromolecules. |  |  |
| 10 | **Lec 10** Problems of regulation of intracellular processes. |  |  |
| 10 | **Sem 10.** Regulation of cell functions. |  |  |
| 10 | **IWST 4. Colloquium (essay).** The main problems of developmental biology. |  |  |
| 11 | **Lec 11** Biological aging. Various theories of aging. |  |  |
| 11 | **Sem 11.** Theories about the reasons of aging and solutions of this problem. |  |  |
| 12 | **Lec 12** The study of the mechanisms of brain activity. |  |  |
| 12 | **Sem 12.** Cognition of the laws of thinking and memory processes. |  |  |
| 12 | IWST 5. Consultation on the implementation of the IWS 3. |  |  |
| 13 | **Lec 13** Biosphere and humanity. Prediction the future of the planet and humanity. |  |  |
| 13 | **Sem 13.** The study of the biosphere as a dialectical unity of living and non-living nature. |  |  |
| 13 | **IWS 3.** Topic, type of task. |  |  |
| 14 | **Lec 14** Biology and astronautics. Biology and problems of technology. |  |  |
| 14 | **Sem 14.** Reproduction and modeling of biological processes and design of new technical systems and devices. |  |  |
|  | **IWST 6. Colloquium (essay). Topic, type of task.** |  |  |
| 15 | **Lec 15** A new biology approach to the energy challenge. |  |  |
| 15 | **Sem 15.** Expand sustainable alternatives to fossil fuels. |  |  |
| 15 | **IWST 7. Consultation on examination issues** |  |  |
|  | **LEVEL CONTROL 2** |  | **100** |

Dean \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Zayadan B.K.

Head of Department \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Zhunusbayeva Zh.K.

Lecturer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Amirova A.K.

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