



СИЛАБУС ДИСЦИПЛІНИ «Veterinary radiobiology»

Ступінь вищої освіти - Bachelor
Спеціальність - 211 Veterinary medicine

Освітня програма «Veterinary medicine»

Рік навчання - 4 семестр- 7-th

Форма навчання full-time

Кількість кредитів ЄКТС – 4

Мова викладання - English

Лектор курсу

Контактна інформація

лектора (e-mail)

Сторінка курсу в eLearn

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<https://elearn.nubip.edu.ua/course/view.php?id=667>

COURSE DESCRIPTION

Radiobiology - the science of the effects of all types of ionizing radiation on living organisms, their totality and the biosphere as a whole in order to control the body's responses to the action of ionizing radiation. Veterinary radiobiology is a part of general radiobiology, its branch. Based on the data of nuclear physics on the nature, properties, sources of ionizing radiation and methods of their measurement, it studies the features of the biological action of ionizing radiation on farm animals, studies the behavior of radionuclides in productive animals and their transition to livestock products. radiation examination of objects of veterinary control, studies the possibilities of practical application of ionizing radiation in veterinary medicine and agriculture. Veterinary radiobiology has become a mandatory component of educational programs in agricultural universities after the Chernobyl radiation accident in 1986, when 12 regions (47 districts) of Ukraine were contaminated, more than 300 thousand hectares of agricultural production stopped, more than 100 thousand cattle were sent for forced slaughter and about 10 thousand tons of raw meat are buried as radioactive waste. Veterinary radiobiology provides basic concepts on the effects of ionizing radiation on various species of farm animals, classification of radiobiological effects, protection of animals from IP, obtaining good quality livestock products in radionuclide-contaminated areas, and studies the patterns of behavior of radionuclides in farm animals. The study of the discipline "Veterinary Radiobiology" provides the acquisition of such general competencies as the ability to use modern knowledge about the patterns of ionizing radiation on the body of farm animals to effectively manage livestock production processes in contaminated areas.

STRUCTURE OF COARSE

| Topic | Hours (lectures/ practical works) | Results of study | Task | Evaluation |
|--|--|--|--|---|
| Module 1. Introduction. Physical foundations of radiobiology and radioecology | | | | |
| Topic 1. Subject and tasks of veterinary radiobiology | 2/2 | <p>Know the basic concepts of the nature of ionizing radiation, the structure of the atom and its basic physical characteristics. The structure of electronic shells and the nucleus of the atom. Nuclear forces, mass defect. The phenomenon of radioactivity, sources of ionizing radiation of natural and artificial origin. Types of ionizing radiation - electromagnetic and corpuscular, their physical characteristics. Types of nuclear transformations and the law of radioactive decay.</p> <p>Be able to characterize the phenomena of radioactivity, use units of measurement of radioactivity, determine the specific activity.</p> | <p>Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations - in continuation of laboratory employment, and independently - in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part - in the classroom, test - in eLearn)</p> | <p>Execution and delivery of laboratory works - credited. Module: descriptive part 100; test part 30 * 0.1; Independent work - according to the evaluation journal in eLearn.</p> |
| Topic 2. Physical foundations of radiobiology and radioecology | 4/2 | | | |
| Topic 3. Types of ionizing radiation and their interaction with matter | 2/4 | | | |
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| Possibility to receive additional points: | Additional points can be obtained for preparing a report and participating in a student conference up to 10 points | | | |
| Module 2. Radiobiological effects and sources of ionizing radiation on Earth | | | | |
| Topic 1. Biological action of ionizing radiation | 2/2 | <p>Know the patterns of biological action of ionizing radiation on biological structures and the body as a whole, classification of radiobiological effects and their dependence on the dose of ionizing radiation, modern ideas about the causes of different radiosensitivity of organisms, theoretical foundations of radiation sickness in farm animals and methods of farming.</p> <p>Understand the patterns of formation of absorbed doses of ionizing radiation in the body of animals and individual organs. Be able to calculate radiation doses and predict the severity of radiation damage to animals. Use laboratory equipment to determine dose criteria.</p> | <p>Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations - in continuation of laboratory employment, and independently - in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part - in the classroom, test - in eLearn)</p> | <p>Execution and delivery of laboratory works - credited. Module: descriptive part 100; test part 30 * 0.1; Independent work - according to the evaluation journal in eLearn.</p> |
| Topic 2. Radiobiological effects in mammals. | 2/2 | | | |
| Topic 3. Radiosensitivity of organisms | 2/2 | | | |
| Topic 4. Radiation damage to farm animals | 3/4 | | | |

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| Possibility to receive additional points: | Additional points can be obtained for preparing a report and participating in a student conference | | | up to 10 points |
| Module 3. Conducting agricultural production in the area contaminated with radionuclides | | | | |
| Topic 1. Migration of radionuclides in agricultural ecosystems | 2/2 | To know the patterns of behavior of the main dose-forming radionuclides in agricultural ecosystems and ways of their entry into the body of farm animals, the danger of incorporated radionuclides. Understand the hazard criteria for incorporated radionuclides and the principles of standardization of levels of radioactive contamination of livestock products. Be able to determine the presence of radioactive contamination of farm animals and livestock products. Use laboratory equipment, modern laboratory devices to study the content of radionuclides in animals and products of animal origin. | Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations - in continuation of laboratory employment, and independently - in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part - in the classroom, test - in eLearn) | Execution and delivery of laboratory works - credited. Module: descriptive part 100; test part 30 * 0.1; Independent work - according to the evaluation journal in eLearn. |
| Topic 2. Receipt of radionuclides in the body of farm animals | 2/2 | | | |
| Topic 3. Biological action of incorporated radionuclides. | 2/2 | | | |
| Topic 4. Anti-radiation countermeasures in agricultural production and animal husbandry in particular. | 2/2 | | | |
| Module 4. Use of ionizing radiation in animal husbandry and veterinary medicine | | | | |
| Topic 1. Principles of use of ionizing radiation in animal husbandry and veterinary medicine | 2/2 | To know the basics of radiation protection from ionizing radiation, the main directions of introduction of radiation technologies in agricultural production, to have an idea of the mechanisms and basic advantages of radiation technologies in terms of their application in animal husbandry and veterinary medicine. Understand the main processes occurring under the influence of radiation and the registration of radioactive indicators in biological objects. Use laboratory equipment for registration of radioactive indicators. | Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations - in continuation of laboratory employment, and independently - in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part - in the classroom, test - in eLearn) | Execution and delivery of laboratory works - credited. Module: descriptive part 100; test part 30 * 0.1; Independent work - according to the evaluation journal in eLearn. |
| Topic 2. Use of radioactive indicators | 2/2 | | | |
| Topic 3. Radiation technologies in animal husbandry and veterinary medicine | 2/4 | | | |
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| Module 5. Standardization of radiation effects and basics of radiation safety | | | | |
| Topic 1 Principles of radiation safety and regulation of radiation effects | 2/4 | To know the basic principles of radiation safety when working with sources of ionizing radiation and the principles of normalization of the impact of radiation on humans (limits of radiation doses to the public and professionals). Understand the course of biological changes under the influence of radiation. | Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations - in continuation of laboratory employment, and independently - in eLearn). Doing independent work (tasks in eLearn). | Execution and delivery of laboratory works - credited. Module: descriptive part 100; test part 30 * 0.1; |
| Topic 2. The main dose limits and permissible levels of exposure of different categories of persons | 2/2 | | | |

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| Topic 3. Basic principles of protection when working with closed and open radiation sources | 2/2 | Be able to organize work in veterinary laboratories and determine the criteria for radiation hazard. Use modern laboratory instruments, reagents and equipment for research in veterinary radiological laboratories. | Preparation and writing of a modular test (descriptive part - in the classroom, test - in eLearn) | Independent work - according to the evaluation journal in eLearn. |
| Topic 4. Basic classes of works and types of radiological laboratories. | 2/1 | | | |
| Topic 5. Principles of normalization of uranium fission products in the body of productive animals | 2/1 | | | |
| Possibility to receive additional points: | Additional points can be obtained for preparing a report and participating in a student conference | | | up to 10 points |
| Total for the semester Exam | | | | 100*0,7 (max 70 points) |
| Total for the course | | | | 30 points 100 points |

EVALUATION POLICY

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| <i>Deadline and recompilation policy:</i> | Works that are submitted in violation of the deadlines for more than a week without good reason are evaluated at a lower score (maximum - 20% of the maximum). Rearrangement of modules takes place with the permission of the lecturer if there are good reasons (for example, hospital or family problems). |
| <i>Academic Integrity Policy:</i> | Writing while writing modular test papers and the final exam is prohibited. The use of mobile devices during these periods is also prohibited. |
| <i>Visiting policy:</i> | Attendance is mandatory. For objective reasons (for example, illness, international internship) training can take place individually (in online form in consultation with the dean of the faculty). In case of violations and abuses (non-attendance more than 50% of the time - non-admission to the exam) |

STUDENT EVALUATION SCALE

| Rating of the applicant of higher education, points | The assessment is national for the results of examinations | |
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| | exams | offsets |
| 90-100 | perfectly | credited |
| 74-89 | good | |
| 60-73 | satisfactorily | |
| 0-59 | unsatisfactorily | not credited |