	SYLLABUS OF AN ACADEMIC DISCIPLINE **Academic degree - Master** **Specialty 211 Veterinary Medicine** **Academic programme «Veterinary Medicine»** **Year of study 2, semester 4** **Form of study full-time study** (full-time, part-time) **Number of ECTS credits 4** **Language(s) of instruction English** (Ukrainian, English, German)
Lecturer of the discipline	**Vygovska L., Professor at the Department of Veterinary Epidemiology and Animal Health, Doctor of Veterinary Sciences, Senior Researcher**
Lecturer's contact information (e-mail)	vygovska_lm@nubip.edu.ua
URL of the e-learning course on the NULES e-learning portal	**https://elearn.nubip.edu.ua/course/view.php?id=393**

ACADEMIC DISCIPLINE DESCRIPTION

(up to 1000 symbols)

The discipline "Veterinary Virology" is a mandatory component of the educational program "Veterinary Medicine". The study of the discipline "Veterinary Virology" provides Mastery of such general competencies as knowledge and understanding of the subject area, the ability to search, process and analyze information from various sources, the ability to apply knowledge in practical situations and at the Lab, and understand the morphology, physiology, genetics of viruses, their role in the circulation of substances in human, animal and plant pathology.

Students learn to study the properties of viruses, analyze the results obtained in laboratory diagnosis, predict the appearance of dangerous viruses, develop new methods and tools for diagnosis and prevention (vaccines, diagnostics, sera).

Acquisition of competencies

Integral competence (IC): the ability to solve complex tasks and problems in veterinary virology, which involves conducting research and/or innovation and is characterized by the uncertainty of conditions and requirements.

General competencies (GC):

- Ability to abstract thinking, analysis and synthesis.
- The ability to apply knowledge in practical situations.
- Knowledge and understanding of the subject field and profession.
- The ability to communicate in the state language both orally and in writing.
- Ability to communicate in a foreign language.
- Skills in using information and communication technologies.
- The ability to conduct research at the appropriate level.
- The ability to learn and actuate modern knowledge.
- Ability to make i substantiated decisions.

- The ability to communicate with representatives of other professional groups at different levels (with experts from other fields of knowledge/types of economic activity).

Professional (special) competencies (PC):

- The ability to establish the features of the structure and functioning of cells, tissues, organs, their systems and body apparatuses of animals of various classes and species - mammals, birds, insects (bees), fish and other vertebrates.
- The ability to use tools, special devices, devices, laboratory equipment and other technical means to carry out the necessary manipulations during professional activities.
- The ability to follow the rules of labor protection, asepsis and antiseptics during professional activity.
- The ability to conduct clinical research in order to formulate conclusions about the condition of animals or establish a diagnosis.
- The ability to organize and carry out laboratory and special diagnostic studies and analyze their results.
- The ability to apply knowledge of biosafety, bioethics and animal welfare in professional activities
- The ability to carry out educational activities among branches workers and the population.

Program learning outcomes (PL):

- ✓ Know and correctly use virological terminology.
- ✓ Know and master the methods and techniques of sanitary and virological research of food products and feed to determine their safety.
- ✓ Understand the logical sequence of actions and be able to draw up appropriate documentation during sanitary and virological research.
- ✓ Know the rules and requirements of biosafety, bioethics and animal well-being.
- ✓ Possess the methods of sanitary and virological control of the effectiveness of sanitation of various facilities for the production and processing of livestock products in accordance with the requirements of national and international regulatory acts.

СТРУКТУРА НАВЧАЛЬНОЇ ДИСЦИПЛІНИ

Теми	**Години** (лекції/ лабораторні/ самостійні)	**Результати навчання**	**Завдання**	**Оцінювання**
3 семестр				
Module 1.				
Theme 1. Topic 1. Introduction at the veterinary virology	2/2/2	*Know*: Safety rules and work with virus content materials. Equipment virology laboratory. *Be able* to grind, homogenize, filter and dose the test material. *Use* Seitz filters, syringes, thermostat, other modern laboratory devices	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing	**10**

			independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 2. The chemical structure and ultrastructure of viruses	2/2/2	*Know*: Shape, size and Ultrastructure of viruses (genom, capside, nucleocapside, nucleoid, supercapside), types of simmetria of viruses. Nucleid acids of viruses. *Be able* to Sampling, transportation and primary processing of pathological material for virological study. Fluorescent microscopy in virology. *Use* centrifuges, homogenizers, filters, scales, syringes, dispensers; thermostat, other modern laboratory devices, Fluorescent and Light microscopy	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 3. Reproduction of viruses	2/2/2	*Know*: The main stages of viral reproduction. Features of virus reproduction depending on the type of nucleic acid. Types of interaction between viruses and cells: productive, abortive, integrative.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 4. CLASSIFICATION	2/2/2	*Know*: Genetic of viruses. Structura of viruses genome.	Preparation for lectures (preliminary acquaintance with the presentation and	

AND GENETICS OF VIRUSES		Genotype and fenotyp of viruses, Stam, serotype, variant, klon. Methods of viruses selection. Mutation and its mechanism at the viruses. Reproduction viruses at the sensitive cells. *Be able* to Development of methods for infection of laboratory animals by the virus content material. Titration of virus *Use* of laboratory animals, syringes, calculator	full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 5. Pathogenesis of viruses infection Diseases	2/2/4	*Know*: The way of penetrated viruses at the organism. Mechanism of spread viruses at the organism. Tropism of viruses. Characteristic of viruses infection at the cell's level: autonome, integrated, producted, abortion, acute, chronic, lytic, non-lytic. Antiviruses immunity. *Be able* to Electron microscopic study of viruses, method of staining *Use* Electron microscopy	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Module 1.	**32**		Testing (including on eLearn).	**10**
Total 1.				**20**
Module 2.				
Theme 1. Biological drugs in veterinary virology	2/2/2	Know the classification of biological preparations and the main properties of diagnostic, therapeutic and prophylactic biological preparations. To be able to perform the characterization of a biological preparation in accordance with international standards	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in	**10**

			eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 2. Antiviral immunity	2/4/2	Know: the stages of formation of the body's immune response, reaction to an antigen. He will master the classification of the main representatives of cellular and humoral immunity. Be able to analyze the levels of the immune response and classify by the time of antibody formation.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 3. Laboratory Diagnosis of Virus Diseases.	2/2/2	Know: the basic principles of lifetime and posthumousdiagnostics, be able to select material for research according to the properties and tropism of the virus family. Be able to conduct retrospective diagnostics. Conduct an analysis of direct and indirect diagnostic methods.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 4. Oncolytic viruses	2/2/2	Know: The potential of viruses as anticancer agents, the basic	Preparation for lectures (preliminary acquaintance with the presentation and	

		principles of the action of oncolytic viruses on tumors. Ways to increase the effectiveness of oncolytic viruses. Methods of application of oncolytic viruses	full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 5. Characteristics of prions	2/2/2	Know: The morphology and structure of prions, the main diseases of prion etiology. Methods of diagnosis and prevention of prion diseases.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Module 2.	**32**		Testing (including on eLearn).	
Total 2.				**20**
Module 3.				
Theme 1. Viruses and biosecurity.	2/3/3	Know: the concept of existing sources of biological hazards, both natural and artificial, for the purpose of improving the health of people, plants and animals. Be able to develop a set of measures aimed at	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory	**5**

		preventing or reducing the impact of biological and/or other harmful factors, the source of which are objects of biological origin, both directly on the human body and indirectly - through impact on the environment.	employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 2. Family Herpesviridae, Family Poxviridae, Family Circoviridae, Family Adenoviridae	2/4/4	Taxonomy and characteristics of the family. Pathogens of diseases. Development of EM, preparation for EM, preparation of preparations for EM. Study of methods of obtaining primary cell cultures by trypsinization. Be able to: prepare dishes, solutions, buffers, nutrient media for the cultivation of cell culture, primary cell cultures. Use laboratory utensils, solutions and nutrient media, modern laboratory equipment.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 3. Family Parvoviridae, Family Asfarviridae, Family Iridoviridae, Family Papovaviridae	2/4/4	Taxonomy and characteristics of the family. Pathogens of diseases. Development of EM, preparation for EM, preparation of preparations for EM. Study of methods of obtaining primary cell cultures by trypsinization. Be able to: prepare dishes, solutions, buffers, nutrient media for the cultivation of cell culture, primary cell cultures. Use laboratory utensils, solutions and nutrient media, modern laboratory equipment.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	

Module 3.	28		Testing (including on eLearn).	**10**
Total 3.				**15**
Module 4.				
Theme 1. Family Flaviviridae, Family Coronaviridae, Family Arenaviridae, Family Picornavirida	2/4/4	Taxonomy and characteristics of the family. Pathogens of diseases. Development of EM, preparation for EM, preparation of preparations for EM. Study of methods of obtaining primary cell cultures by trypsinization. Be able to: prepare dishes, solutions, buffers, nutrient media for the cultivation of cell culture, primary cell cultures. Use laboratory utensils, solutions and nutrient media, modern laboratory equipment.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	**5**
Theme 2. Family Orthomyxoviridae, Family Paramyxoviridae, Family Rhabdoviridae, Family Retroviridae	2/4/4	Taxonomy and characteristics of the family. Pathogens of diseases. Development of EM, preparation for EM, preparation of preparations for EM. Study of methods of obtaining primary cell cultures by trypsinization. Be able to: prepare dishes, solutions, buffers, nutrient media for the cultivation of cell culture, primary cell cultures. Use laboratory utensils, solutions and nutrient media, modern laboratory equipment.	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations — during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn).	
Theme 3 Family Reoviridae, Family Arenaviridae, Family Caliciviridae, Family Bunijaviridae.	2/4/4	Taxonomy and characteristics of the family. Pathogens of diseases. Development of EM, preparation for EM, preparation of preparations for EM. Study of methods of	Preparation for lectures (preliminary acquaintance with the presentation and full-text lecture in eLearn). Execution and delivery of laboratory work (in methodical recommendations —	

		obtaining primary cell cultures by trypsinization. Be able to: prepare dishes, solutions, buffers, nutrient media for the cultivation of cell culture, primary cell cultures. Use laboratory utensils, solutions and nutrient media, modern laboratory equipment.	during laboratory employment, and independently — in eLearn). Doing independent work (tasks in eLearn). Preparation and writing of a modular test (descriptive part in the form of written / oral answer — in the classroom, test — in eLearn)..	
Module 4.	**30**		Testing (including on eLearn).	
Total 4.				**15**
Всього за 3 семестр/навчальна робота				**70**
Екзамен				**30**
Всього за курс				**100**

ASSESSMENT POLICY

Deadlines and exam retaking policy:	*EXAMPLE* 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:	*EXAMPLE* 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:	*EXAMPLE* 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. Netherton C. L., Wileman T. Virus factories, double membrane vesicles and viroplasm generated in animal cells. Current opinion in virology. 2011. № 1. P 381–387. Doi:10.1016/j.coviro.2011.09.008.

2. Калініна О. С. Таксономічна характеристика ДНК–геномних вірусів хребетних тварин і людини . *Науковий вісник ЛНУВМ та БТ ім. С. З. Гжицького.* 2016. Т. 18, № 2 (66). С. 83–87. doi:10.15421/nvlvet6618

3. Калініна О. С. Таксономічна характеристика РНК-геномних вірусів

хребетних тварин і людини . *Науковий вісник ЛНУВМ та БТ ім. С. З. Гжицького.* 2017. Т. 19, № 78. С. 30–35. doi:10.15421/nvlvet7807

1. Калініна О. С., Панікар І. І., Скибіцький В. Г. Ветеринарна вірусологія : підручник. Київ : Вища освіта, 2004. 432 с.

4. Лісова В. В., Радзиховський М. Л. Коронавірусна інфекція собак : монографія. Київ: ЦП «Компринт», 2019. 126 с.

2. Льотка Г.І., Радзиховський М.Л., Дишкант О.В. Загальна вірусологія основи ветеринарної та зоонотичної вірусології Ч. 1. / за ред. М.Л. Радзиховського. Вінниця : ТОВ «Друк», 2020. 400 с.

3. Люта В. А., Кононов О. В. Мікробіологія з технікою мікробіологічних досліджень, вірусологія та імунологія : підручник. 2-ге вид. Київ : ВСВ «Медицина». 2018. 576 с.

5. Медична мікробіологія, вірусологія та імунологія : підручник / за ред. В. П. Широкобокова. Вінниця : Нова книга, 2011. 952 с.

6. Поліщук В. П., Будзанівська І. Г., Шевченко Т. П. Посібник з практичних занять до курсу «Загальна вірусологія». Київ : Фітосоціоцентр, 2005. 204 с.

4. Практикум з ветеринарної вірусології / В. Г. Скибіцький та ін. Київ : Вища школа, 2005. 208 с.

5. Радзиховський М.Л., Дишкант О.В. Основи ветеринарної вірусології : Київ: НУБіП України, 2022. 180 с.

6. Скибіцький В. Г. Ташута С. Г. Посібник з ветеринарної вірусології. Київ. Електронний варіант на КД, 2003.