DISCIPLINE SYLLABUS
«VETERINARY VIROLOGY»

Degree of higher education — Master
Specialty — 211 Veterinary Medicine
Educational program «Veterinary Medicine»
Year of study — 2, semester — 4
Form of full-time study — full-time study
Number of ECTS credits — 5
The language of instruction is English

Course lecturer	**Vyhovska I.M.**, Professor of the department of Epizootology, Microbiology and Virology
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Course page in eLearn	**https://elearn.nubip.edu.ua/course/view.php?id=393**

DESCRIPTION OF THE DISCIPLINE

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:

- 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 apply creativity, adaptability, sociability and tolerance , persistence in achieving the goal and the ability to assess the quality of work performed;

- study of the discipline " Veterinary virology " provides the mastery of such professional competencies as the ability to use modern knowledge and methods of virological examination about the environmental objects and products, the manufacture of which is controlled by the veterinary service and on the basis of the obtained results to determine their quality and safety; study of nature, taxonomy; structure, chemical structure, genetics, reproduction and methods of culturing viruses; acquaintance with the pathogenesis of viral diseases, with the features of antiviral immunity, means and methods of diagnosis and prevention of infectious diseases of animals; study of the immune system, means of specific diagnosis and prevention of infectious diseases of viral nature.

Competences acquisition:

- *general competences (GC):*
- 1. Ability to abstract thinking, analysis and synthesis.
- 2. The ability to apply knowledge in practical situations.
- 3. Knowledge and understanding of the subject field and profession.
- 4. The ability to communicate in the state language both orally and in writing.
- 5. Ability to communicate in a foreign language.
- 6. Skills in using information and communication technologies.
- 7. The ability to conduct research at the appropriate level.
- 8. The ability to learn and actuate modern knowledge.
- 9. Ability to make i substantiated decisions.

- 10. The ability to communicate with representatives of other professional groups at different levels (with experts from other fields of knowledge/types of economic activity).
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- ***professional (special) competences (PC):***
  - 1. 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.
  - 2. The ability to use tools, special devices, devices, laboratory equipment and other technical means to carry out the necessary manipulations during professional activities.
  - 3. The ability to follow the rules of labor protection, asepsis and antiseptics during professional activity.
- 4. The ability to conduct clinical research in order to formulate conclusions about the condition of animals or establish a diagnosis.
  - 5. The ability to organize and carry out laboratory and special diagnostic studies and analyze their results.
  - 6. The ability to apply knowledge of biosafety, bioethics and animal welfare in professional activities
  - 7. The ability to carry out educational activities among branches workers and the population.

Programmatic learning outcomes (PLO):

- ✓ 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.

COURSE STRUCTURE

Theme	Hours (lectures / Lab + practical)	Learning outcomes	Tasks	Assessment
Fourth semester				
Thematic Module 1. Determinate viruses at the pathological material				
Topic 1. Introduction at the veterinary virology	1 / 1	*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 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**
Topic 2. The chemical structure and ultra structure of viruses	**1 / 1+1**	*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).	**5**

Topic 3. Taxonomy of viruses	**1 / 1**	*Know*: The principles of taxonomy viruses, criteria of modern taxonomy viruses. Short characteristic of modern taxonomy viruses of vertebrales, nonvertebrales, plant, fungy, bacteria. *Be able* to Detection of viruses using a light microscope. Detection of elementary cells, viral	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).	**5**
		inclusions-cells. *Use* Fluorescent and Light microscopy	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).	
Topic 4. Genetic of viruses. Reproduction and cultivate of viruses	**1 / 1+1**	*Know*: Genetic of viruses. Structura of viruses genome. 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	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**
Topic 5. Pathogenesis of viruses infection. Antivirus immunity. Specific biological drugs, tests. Antivirus drugs.	**1 / 1**	*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).	**5**
Thematic Module 2. DNA-content viruses. Viruses cultivation at the lab				

Topic 6. Family Herpesviridae & Family Poxviridae	**1 / 1+1**	*Know*: Taxonomy and characteristic of the family. Pathogens of Aujeszky disease, infection rinotracheit of cattle, rinopneumonia of horse, malignum catarrhally fever of cattle, Marek disease, infection larynx and tracheitis of birds. Family Poxviridae. Taxonomy and characteristic of the family. Pathogens of the pox of sheep, birds, pigs, cows; mixomathoses and fibromatoses of rabbit, paravaxcine of cattle and contagiose pustule dermatitis. The design of EM, making preparations for EM. Learning methods for primary cell cultures by trypsynization. *Be able* to Cooking utensils, salt and nutrient media for culturing cell culture, Primary cell cultures. *Use* Cooking utensils, salt and nutrient media,	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**
		laboratory glassware		
Topic 7. Family Adenoviridae. Family Parvoviridae	**1 / 1**	*Know*: Adenovirus at the cattle, horse, pathogen of infection dog's hepatits and fox encephalites, adenoviruses of sheep and goat, pigs, birds. Family Parvoviridae. Taxonomy and characteristic of the family. Pathogens of the parvoviral infection of dogs, cats panleucopenia, parvoviral infection of pigs parvoviral infection of cattle, mink enteritis, enteritis of geese and Aleutian mink. Study methods of infection of cell cultures, revealing citopathogen of viruses into cells. *Be able* to Cultivation of viruses in cell cultures *Use* Cooking utensils, salt and nutrient media, laboratory glassware, 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).	**5**

Topic 8. Families Asfarviridae & Iridoviridae	**1 / 1+1**	*Know*: Taxonomy and characteristic of the family. Pathogens of the African plaque of pig *Be able* to Cultivation of viruses in chicken embryos developing countries. Assimilation techniques infection CE. Signs of viral replication in OM. Autopsy CE, selection of virus content material. *Use* CE, syringes.	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**
Thematic Module 3. RNA-content viruses. Methods of viruses determination				
Topic 9. Family Flaviviridae & Family Reoviridae.	**1 / 1**	*Know*: Taxonomy and characteristic of the family. Pathogens of the classic plaque of pig, viruses diarrhea of cattle. Family Reoviridae. Taxonomy and characteristic of the family. Rotaviruses infection of cattle, pigs, African plaque of horse. *Be able* to Hemagglutination viruses. Study methods staging RHA. The development of serological methods for diagnosis of viral diseases. Setting RDHA. RHAD and RDHA. *Use* laboratory glassware	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**
Topic 10. Family Coronaviridae	**1 / 1.5+1**	*Know*: Taxonomy and characteristic of the family. Pathogens of the transmissive gastroenteritis of pigs, neonatal diarrhea of calves, infection bronchitis of birds. Study methods to maintain these cells in the laboratory	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**

		Be able to Complement fixation test (CFT). Definitions and types of FMD virus variants using RPR. *Use* Cooking utensils, salt and nutrient media, laboratory glassware	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).	

Topic 11. Family Orthomyxoviridae & Family Paramyxoviridae	**1 / 1**	*Know*: Taxonomy and characteristic of the family. Pathogens of the influence, Newcastle disease of birds and plaque of the carnivores.. *Be able* to Neutralization CE *Use* Cooking utensils, salt and nutrient media, laboratory glassware	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**
Topic 12. Family Rhabdoviridae	**1 / 1+1**	*Know*: Taxonomy and characteristic of the family. Pathogens of the rabies *Be able* to Immunosorbent assay (ELISA). Application of ELISA in laboratory practice. Study of standard diagnostics are used in veterinary medicine, immunofluorescence reaction. *Use* 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).	**5**
Topic 13. Family Picornaviridae	**1 / 1**	*Know*: Taxonomy and characteristic of the family. Pathogens of the murrain, vesicles disease of pigs, Teschen disease. Viruses hepatitis of ducklings. *Be able* to Molecular genetic methods in virology (PCR). *Use* Cooking utensils, salt and nutrient media, laboratory glassware	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**
Topic 14. Family Retroviridae	**1 / 1+1**	*Know*: Taxonomy and characteristic of the family. Pathogens of the infection anemia of horse, leucosis of cattle *Be able* to Neutralization reaction. Methods of Production. Identification and determination of virus titer antibodies by RN.	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).	**5**

		Use Cooking utensils, salt and nutrient media, laboratory glassware	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).	
Topic 15. Family Bunijaviridae & Family Arenaviridae. Priones	**1 / 1**	*Know*: Taxonomy and characteristic of the family *Be able* to Reaction diffusion precipitation in agar gel (PRD). *Use* Cooking utensils, salt and nutrient media, laboratory glassware	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**
Possibility to receive additional scores: Additional scores can be obtained for preparing a report and participating in a student conference				Up to 10 points
Total for the semester				70 points
Test				30 points
All together				100 points

EVALUATION POLICY

Deadline and recompilation policy:	Laboratory, independent and modular works must be submitted in the planned time before the end of the study of the current module. Violation of the deadlines without a good reason entitles the teacher to lower the grade. Reassignment of modular control work occurs in the presence of valid reasons (for example, hospital) and is allowed in the term before the end of the following module.
Academic Integrity Policy:	Copying, use of mobile devices, and additional literature when writing modular tests, tests and exams are strictly prohibited.

Visiting policy:	Attendance at lectures and laboratory classes is mandatory for all students in the group. Late classes are not allowed. A lab coat is a must in laboratory classes. For objective reasons (for example, illness, international internship) training can take place according to an individual curriculum approved in a certain order. Missed lectures, after their processing by the applicant of higher education, are worked out in the form of an interview with the teacher. Missed laboratory classes are worked out by students in the laboratory of the department, information about the practice is entered into the departmental journal of the practice of missed classes.

STUDENT EVALUATION SCALE

Rating of the applicant of higher education, points	**The national assessment is for the results of examinations, tests**	
	exam	**tests**
90-100	excellent	credited
74-89	good	
60-73	satisfactorily	
0-59	unsatisfactorily	not credited

Recommended reading

1. Ротавірусна інфекція великої рогатоїі худоби /Скибіцький В.Г.- 1994.
2. Полімеразна ланцюгова реакція. /Ташута С.Г.- Київ, НАУ, 2002.- 27 С.
3. Ветеринарна вірусологія: Метод. вказівки /Онуфрієв В.П., Міськевич С.В.- К.,1994.
4. Пріонні інфекції тварин (трансмісивні губкоподібні енцефалопатії) / Скибіцький
5. В.Г., Козловська Г.В., Ібатулліна Ф.Ж. -Київ, НАУ,2002.
6. Методичні рекомендації з діагностики гострих гастроентеритів сільськогосподарських і домашніх тварин методами прямої та імуноелектронної мікроскопії / Скибіцький В.Г., Ташута С.Г., Постой В.П.- Київ, 2002.
7. Методичні рекомендації по діагностиці, заходах профілактики і боротьби з ротавірусною, коронавірусною та змішаними рота-коронавірусними інфекціями великої рогатої худоби. / В.П.Онуфриев, С.В.Миськевич, В.Г.Скибіцький, С.Г. Ташута та інші.- Київ, НАУ, 1999.
8. Методичні рекомендації діагностики гострих гастроентеритів сільськогосподарських і домашніх тварин вірусної етіології методами прямої та імуноелектронної мікроскопії. /В.Г.Скибіцький, С.Г. Ташута, Постой В.П.– Київ, 2003.- 27 С.
9. Реакція ензиммічених антитіл (РЕМА) для студентів ФВМ: методичні вказівки

10. /Бортнічук В.А.
11. Електронний курс ―Veterinary Virology‖
12. https://elearn.nubip.edu.ua/course/view.php?id=393
13. http://vet.in.ua/ — Ветеринарний інформаційний ресурс України/ Імунобіологічні препарати.
14. http://veterinaryvirology.com/
15. http://www.virology.net/big_virology/bvdiseaselist.html. The Big Picture Book of Viruses
16. http://www.microbiologybook.org/book/virol-sta.htm