Додаток 2

до наказу від _____ 202_ р. № _____

НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ БІОРЕСУРСІВ І ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ

Кафедра епізоотології, мікробіології і вірусології

"**ЗАТВЕРДЖУЮ**"
Декан факультету ветеринарної медицини
_____ (Цвіліховський М. І.)
"____" _____20_ р.

"**СХВАЛЕНО**"
на засіданні кафедри епізоотології,
мікробіології і вірусології
Протокол №_5__ від "_5__" __05__2022_ р.
Завідувач кафедри
_____ (Мельник В. В.)

"**РОЗГЛЯНУТО** "
Гарант ОП «Ветеринарна медицина»
Гарант ОП
_____ (Грушанська Н.Г.)

РОБОЧА ПРОГРАМА НАВЧАЛЬНОЇ ДИСЦИПЛІНИ

VETERINARY VIROLOGY

спеціальність 211 Ветеринарна медицина _____
освітня програма 211 Ветеринарна медицина _____
Факультет ветеринарної медицини _____
Розробник: доктор ветеринарних наук, професор Яблонська О. В. _____
(посада, науковий ступінь, вчене звання)

Київ – 2022 р.

«VETERINARY VIROLOGY»

Industry knowledge, training direction, specialty, education level		
Educational qualification	*211 «Veterinary Medicine»*	
Training direction	*211 «Veterinary Medicine»*	
Specialty	*Veterinary Medicine*	
Education level	Master	
Description of the course		
Description	Normative	
Total hours	150	
Quantity of credits ECTS	5	
Quantity of content modules	3	
Course project (work) (if in your educational plan)	—	
Form of control	*Test*	
Descriptions of the course for full-time and external form of education		
	full-time education	external form of education
Semester	4	
Lectures	30 h.	
Practical, seminars	30 h.	
Laboratory classes	15 h.	
Independent work	75 h.	
Individual tasks		
Quantity of weekly hours for full-time students: Independent work:	 5 h. 5 h.	

1. Objectives of the course

The aim of the course “Veterinary virology” is a branch of science that studies the morphology, physiology, genetics of viruses, their role in the circulation of substances in human, animal and plant pathology. Veterinary virology provides the foundation for a veterinarian as an infectious disease specialist.

Target. A study of the course the student should:

know:

- main properties of vertebrate viruses, their taxonomy, modern classification;
- pathogens of viral diseases of animals;
- stages and methods of laboratory diagnosis of viral diseases of animals

be able to :

- take samples for virological tests;
- to produce the necessary reagents and nutrient media;
- to conduct research of environmental objects and products, the manufacture of which is controlled by the veterinary service;
- on the basis of the obtained results to determine their quality and safety;
- have the basic methods of indication and identification of viruses that cause animal diseases;
- analyze the results of virological research.

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.

3. The program and structure of study discipline:

Titles content modules	Hours					
	full-time					
	weeks	total	including			
			L	P	Lab	Ind
1	2	3	4	5	6	7
Content module 1. Determinate viruses at the pathological material						
Topic 1. *Introduction at the veterinary virology*	1	13	2	2	2	7
Topic 2. The chemical structure and ultra structure of viruses	2	10	2	2		6
Topic 3. Taxonomy of viruses	3	12	2	2	2	6
Topic 4. Genetic of viruses. Reproduction and cultivate of viruses	4	10	2	2		6
Topic 5. Pathogenesis of viruses infection. Antivirus immunity. Specific biological drugs, tests. Antivirus drugs.	5	13	2	2	2	7
Together for content module 1	*	58	10	10	6	32
Content module 2. DNA-content viruses. Viruses cultivation at the lab						
Topic 6. Family Herpesviridae & Family Poxviridae	6	10	2	2		6
Topic 7. Family Adenoviridae. Family Parvoviridae	7	13	2	2	2	7
Topic 8. Families Asfarviridae & Iridoviridae	8	10	2	2		6
Together for content module 2	*	33	6	6	2	19
Content module 3. RNA-content viruses. Methods of viruses determination						
Topic 9. Family Flaviviridae & Family Reoviridae.	9	12	2	2		6
Topic 10. Family Coronaviridae	10	12	2	2	3	6
Topic 11. Family Orthomyxoviridae & Family Paramyxoviridae	11	13	2	2		6
Topic 12. Family Rhabdoviridae	12	10	2	2	2	6
Topic 13. Family Picornaviridae	13	6	2	2		
Topic 14. Family Retroviridae	14	6	2	2	2	
Topic 15. Family Bunijaviridae & Family Arenaviridae. Priones	15	4	2	2		
Together for content module 3	*	59	14	14	7	24
Total hours	*	150	30	30	15	75

5. Topics for practical lessons

№	Topic name	hours
1	Safety rules and work with virus content materials. Equipment virology laboratory. Bacterial filters, filtration equipment	2
2	Sampling, transportation and primary processing of pathological material for virological study	2
3	Fluorescent microscopy in virology. Types of construction schematic diagram fluorescent microscope technique of flyuorohromation drugs	2
4	Use of laboratory animals in virology. Development of methods for infection of laboratory animals by the virus content material	2
5	Electron microscopic study of viruses. The design of EM, making	2

	preparations for EM, method of staining	
6	Module 1. Indication of viruses in pathological material.	2
7	Cooking utensils, salt and nutrient media for culturing cell culture	2
8	Titration of virus	2
11	Module 2. DNA-content viruses. Cultivation of viruses in vitro	2
9	Hemagglutination viruses. Study methods staging RHA. The development of serological methods for diagnosis of viral diseases. Setting RDHA. RHAD and RDHA.	2
10	Complement fixation test (CFT). Definitions and types of FMD virus variants using RPR	2
12	Immunosorbent assay (ELISA). Application of ELISA in laboratory practice. Study of standard diagnostics are used in veterinary medicine	2
13	Molecular genetic methods in virology (PCR)	2
14	Neutralization reaction. Methods of Production. Identification and determination of virus titer antibodies by RN	2
15	Module 3. RNA-content viruses. Methods of virus identification	2
Total		30

6. Topics for laboratory lessons

№	Topic name	hours
1	Detection of viruses using a light microscope. Detection of elementary cells, viral inclusions-cells	2
2	Primary cell cultures. Learning methods for primary cell cultures by trypsynization	2
3	Interweave cell culture. Study methods to maintain these cells in the laboratory	2
4	Cultivation of viruses in cell cultures. Study methods of infection of cell cultures, revealing cito-pathogen of viruses into cells.	2
5	Cultivation of viruses in chicken embryos developing countries. Assimilation techniques infection CE. Signs of viral replication in OM.	2
6	Autopsy CE, selection of virus content material. Neutralization CE	3
7	Reaction diffusion precipitation in agar gel (PRD).	2
Total		15

7. Test questions, test kits to determine the level of learning students

Test questions

1. Laboratory diagnosis of Newcastle disease. Characteristics of methods.
2. Neutralization reaction. Control and accounting of the result.
3. Laboratory diagnosis of infectious rhinotracheitis of cattle. Characteristics of methods.
4. Precipitation reaction. The principle of production and components.
5. Laboratory diagnosis of Aujeszky's disease. Characteristics of methods.
6. Precipitation reaction. Controls and results.
7. Laboratory diagnosis of swine flu. Characteristics of methods.
8. Precipitation reaction in agar gel.

9. Laboratory diagnosis of bird flu. Characteristics of methods.
10. Laboratory diagnosis of leukemia. Characteristics of methods.
11. Laboratory diagnosis of smallpox. Characteristics of methods.
12. Laboratory diagnosis of canine distemper. Characteristics of methods.
13. Laboratory diagnosis of panleukemia in cats. Characteristics of methods.
14. Laboratory diagnosis of INAN horses. Characteristics of methods.
15. Laboratory diagnosis of transmissible gastroenteritis of pigs. Characteristics of methods.
16. Laboratory diagnosis of avian bursitis. Characteristics of methods.
17. Laboratory diagnosis of reduced egg laying syndrome. Characteristics of methods.
18. Laboratory diagnosis of myxomatosis in rabbits. Characteristics of methods.
19. Laboratory diagnosis of viral hepatitis. Characteristics of methods.
20. The principle of serological reactions. Components and results.
21. Laboratory diagnosis of rabies. Characteristics of methods.
22. The principle of serological reactions. Components and results.
23. Laboratory diagnosis of Newcastle disease. Characteristics of methods.
24. Laboratory diagnosis of infectious rhinotracheitis of cattle. Characteristics of methods.
25. Laboratory diagnosis of Aujeszky's disease. Characteristics of methods.
26. Laboratory diagnosis of swine flu. Characteristics of methods.
27. Laboratory diagnosis of bird flu. Characteristics of methods.
28. Laboratory diagnosis of leukemia. Characteristics of methods.
29. Laboratory diagnosis of smallpox. Characteristics of methods.
30. Laboratory diagnosis of canine distemper. Characteristics of methods.
31. Laboratory diagnosis of transmissible gastroenteritis of pigs. Characteristics of methods.
32. Laboratory diagnosis of avian bursitis. Characteristics of methods.
33. Precipitation reaction. Controls and result.
34. Laboratory diagnosis of reduced egg laying syndrome. Characteristics of methods.
35. Precipitation reaction. The principle of production and components.
36. Laboratory diagnosis of myxomatosis in rabbits. Characteristics of methods.
37. Neutralization reaction. Control and accounting of the result.
38. Neutralization reaction. The principle of production and components

The set of tests

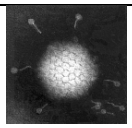
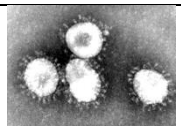
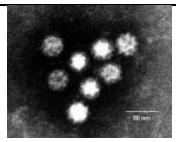
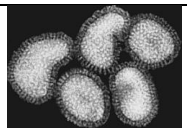
1. Arrange the names of pathogens of viral diseases in accordance with the names of families in which they are included:	
1. Virus fo Africans swine fever	А- Family Herpesviridae
2. Pox Virus	Б - Family Asfarviridae
3.Virus of cats panleucopenia	В - Family Adenoviridae
4. Vaxina Virus	Г - Family Parvoviridae
5.Virus of dog's hepatitis	Д- Family Poxviridae
Right answer:	

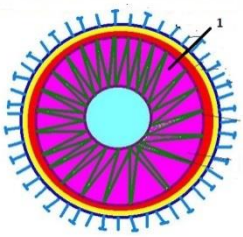
3. Viruses from the family Arenaviridae by the complexity of the structure belong to…:
Right answer:

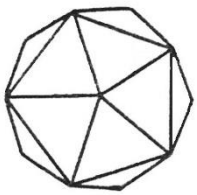
4. Viruses from the family Iridoviridae by the complexity of the structure belong to…:
Right answer:

5. Viruses from the family Arenaviridae have a type of symmetry…:
Right answer:

6. Put the names of the viruses shown in the pictures:

1. Coronavirus	A 	 C	3. Calicivirus
2. Adenovirus	B 	 D	4. Orthomyxovirus
Правильна відповідь:			

7. Which structural component is shown in the figure?	

8. What type of symmetry is shown in the figure?	
	A - cubic B – icosahedron C - icosadeltahedron

9. Genetic heterogeneity of viral populations is due to:
fragmentation of the viral nucleus. Acids
influence of mutagenic factors
the presence of enzymes
there is no supercapsid
thermolability of the virus

10 The smallest functionally equivalent unit of the capsid:
protein unit
chemical unit
capsometer
icosahedron peplomer

11 Simply organized virions consist of:
nucleic acid
nucleocapsid
capsid and nucleic acid
nucleocapsid and supercapsid
capsids

12 In which RNA-containing viruses does genomic RNA perform the function of mRNA?
viruses with single-stranded RNA
viruses with double-stranded RNA
plus-filamentous viruses

minus-filamentous viruses
all listed

13 The transfer of genetic information in retroviruses is as follows:
DNA protein
RNA-RNA protein
RNA-DNA-RNA protein
RNA-RNA-DNA protein
DNA-RNA protein

14 Name the sequence of stages of reproduction of viruses:
replication
adsorption, penetration, deproteinization
transcription, translation
transcription, translation, replication
assembly of virions and their exit from a cell

15 What is the process of translating genetic information from virus-specific mRNA to the sequence of amino acid residues in the polypeptide chain of a protein?
adsorption
replication
broadcast
transformation
transcription

16 Selection of viruses is carried out by the following methods:
infection of virus-insensitive bioobjects
consecutive passages in cell culture
centrifugation
hybrid technology
cloning from individual plaques

17 Non-genetic interaction of viruses can be represented by:
complementation
heterozygosity
cross reactivation
transapsidation
phenotypic mixing

18 What is the name of a virus of the same species that differs in neutralizing infectious activity?
wild type (natural isolate)
type (serotype)
clone
spin
version

19 Slow infections include:
rabies
spongiform encephalopathy of cattle
infectious anemia of horses
clamps
Aleutian mink disease

20 The functions of interferon include:
immunomodulatory
phagocytic
providing the adsorption of the virus on the cell
antivirus
reduction of the body's resistance to viral infections thirteen

21 Upon receipt of inactivated vaccines as inactivants use:
ethanol
acetone
formaldehyde
pepton
gamma radiation

22 Monoclonal antibodies produce:
myelocytes
splenocytes
hybridomas
bacteria
lymphocytes

23 The following biosystems are used to cultivate FMD virus:
culture of pig kidney cells
embryos of chickens developing 5-day incubation
culture of hamster kidney cells
culture of Vero cells
fibroblasts of chicken embryo

24 Rabies is diagnosed by:
using RIF
staging a bioassay on dogs
by detecting Taurus inclusions
histological method
bioassay on white mice

25 Newcastle disease virus belongs to the family:
Poxviridae
Paramyxoviridae
Reoviridae
Herpesviridae
Adenoviridae

26 The cytopathic effect of viruses can be manifested:
formation of symplasts
increase in the index of cell proliferation
rounding of cells
destruction of all culture cells
all listed

27 The hemadsorption reaction is used to:
indications in cell culture of cytogenetic viruses
detection of tank cell culture contamination. flora
detection of the virus in the culture fluid
indication of viruses that do not cause JRS
all listed

28 What is the name of the immunity provided by T lymphocytes?
active
humoral
natural
secretory
cellular

29 What cell populations are involved in immunogenesis?
T- and B-lymphocytes
killers (K-cells)
natural killers (NK cells)

system of mononuclear phagocytes
all listed

30 What is the ability of an antigen to selectively interact only with homologous antibodies and sensitized lymphocytes?
foreignness
affinity
antigenicity
specificity
immunogenicity

31 Antibodies to the primary immune response are:
IgM IgD IgG IgE IgA

32 As the set of reactions of interaction of a virus with an organism of the owner is called, what causes the disease and determines the pattern of its development?
infectious process
viral disease
pathogenesis of viral infection
viral infection

33 As the virus is called, it is deprived of a part of the genome that reproduces only in the presence of an infectious virus and inhibits its reproduction?
provirus
virus-satellite
epivirus
defective interfering particle (CI particle)
prion

34 The diameter and mass of viruses are measured in:
newtons
daltons
micrograms
nanometers
micrometers

35 The course of viral infection can be:
integration
sharp
autonomous
latent
chronic

36 What is the name of the mechanism of transmission of the pathogen, which proceeds in a three-phase type: the release of the virus from the infected organism, its presence in the environment and penetration into the body of a new host?
aerogenic
contact
transmittable
horizontal
vertical

37 What is the name of the set of processes aimed at protecting the body from genetically foreign substances and maintaining the stability of the internal environment?
non-specific (natural)
resistance
38 Chicken embryo fibroblasts are:
vital nutrient medium
culture of myeloma cells
culture of HE-2 cells

primary trypsinized cell culture
organ culture

40 Morphological unit of the capsid, visible in EM:
peplomer
capsometer
chemical unit
protein unit
nucleoid

41 Minus strand of viral DNA or RNA:
performs mRNA
does not perform the function of mRNA
has the same nucleotide sequence as viral mRNA
complementary viral mRNA

42 Forms of viral DNA:
single-chain
two-chain
linear
ring

43 Which viruses have single-stranded plus-stranded RNA (positive genome)?
picorna-,
toga-,
flavi-,
arteries-,
caliciviruses
reo-,
birnaviruses
corona-,
astro- and retroviruses
arena- and bunyaviruses
paramyxo-,
orthomyxo-, philo and rhabdoviruses

44 What is the period between the disappearance of the parent virions due to disintegration and the emergence of viral offspring?
phase of maturation
stage of deproteinization
stage of translation
eclipse phase
stage of transcription

45 What processes occur during the adsorption of the virion on the cell surface?
increased lipid fluidity
formation of receptor fields at the point of contact of the virion with the cell
aggregation of intramembrane particles
increasing the permeability of the plasmolemma

46 What is the process of transcribing genetic information from the viral genome to mRNA called?
replication
broadcasting
transformation
transcription
adsorption
48 What are the properties of viruses whose information is encoded in genes?
genome – genetic traits – genotype gene – pool phenotype

49 What is the exchange of parts of the same gene between viruses in the process of mixed infection called?

reasorting
resort genes
intergenic recombination
intragenic recombination
gene flow

50 What are the names of progeny virions that contain two parental genomes?
mutants
complete heterozygotes
recombinants
Pseudotypes
serotypes

8. Teaching methods

The organization of education in National University of Life and Environmental Sciences of Ukraine means a combination of classroom and extracurricular learning, such as:

- Lectures;
- Seminars;
- Workshops (laboratory work, laboratory practice);
- Independent classroom hours;
- Independent class work of students;
- Advice;
- Graduation design (thesis);
- All types of practices.

To control the quality of knowledge and skills students are used:

- Control of work;
- Individual interview;
- Colloquiums;
- Tests;
- Examinations;
- Protection projects and dissertations;
- State exams;
- A comprehensive examination in the specialty.

During the study course "Veterinary Virology" use the following teaching methods:

- Lectures;
- Laboratory classes;
- Independent classroom hours;
- Independent class work of students;

9. Forms of control

Monitoring and evaluation of academic performance of students is an important part of the educational process in higher education. Control (from Fr. Control) in the didactics of higher education should be understood as a pedagogical support, monitoring and verification of successful teaching and learning of students. Process control exercised by the teacher involves several steps:

1) test (detection level obtained by the students' knowledge and skills);
2) assessment (measurement of knowledge, skills, and compare them with certain standards defined curriculum requirements);
3) accounting (fixation results in the form of ratings, scores, rankings magazine student's record book, scoring or examination information). By controlling teaching and learning activities of students, faculty aims to address the following objectives:
- Identify the quality of learning, the extent to which the obtained skills goals and objectives of the course;
- Identify difficulties in mastering educational information and standard errors for the purpose of correction and elimination;
- Determination of efficiency of organizational forms, methods and means of education;
- Diagnosing the level of students' readiness to accept new material. Normal control the following functions:
- Training (education), which is to control measures contributed to the deepening, widening, improvement and systematization of knowledge and skills students provide feedback on learning;
- Diagnostic and corrective aimed at determining the level of knowledge, skills, and common errors, gaps and difficulties in learning, causes of failure and ensure corrective action;
- Estimates, which is to clarify the state of knowledge, skills and abilities of individual students and academic group as a whole, and provides accounting and transparency control results, contributing to the objective evaluation and better training;
- Stimulating, providing for the approval of the students achieved success and formation of positive motivation for learning, systematic teaching and learning activities, developing a sense of responsibility for its effectiveness;
- Developing, which consists in the fact that under systematic, developing pedagogically appropriate control memory, attention, thinking, oral and written expression, ability, educational interests, activity and independence of students;
- Educational, aimed at shaping discipline, organization, self-discipline skills, positive attitudes to learning, the need for ongoing formation of selfeducation and self-improvement;
- Prognostic and methodical, which refers both to the teacher (who is very precise information on the effectiveness of the activity), and students as an optimal teaching, improve teaching methods, can significantly affect the outcome
- the quality of vocational training graduates.
The following types of controls: previous, current, topical, final.
Ante control is carried out to identify the level of student preparedness to accept new material. Such verification may be conducted in the form of tests, written tests, oral questioning front on practical exercises, individual or group counseling.
Content Knowledge test is aimed at determining the level of mastering a particular topic or more related subjects (modules). One of the main objectives is to create a

content check prerequisite for understanding and synthesis of a sufficiently large volume of training data. For the thematic control, which can be done at the final seminar or colloquium in the module or content tests, tasks are selected and constructed so as to eliminate the elements of chance and objectively assess the educational progress of students in all sections of the theme.
Final control is to check the level of learning, practical abilities and skills of students over a long period of time learning semester, the entire period of study at the university. The purpose of the final control is to identify the knowledge structure and knowledge of students. The components of the control – terminal control and state certification. Allow the student to the final control if the performance of all types of work, the curriculum for the semester in this discipline.
Credit – special means to implement the final inspection and assessment of academic achievement of students.
Semester credit – a form of total control from a single discipline per semester, which aims to test the assimilation of theoretical and practical material. Credits are for the paper, approved by the department. Teacher necessarily introduces students to the content exam questions.
To control the quality of knowledge and skills of students in the discipline "Veterinary Virology", the following control measures:
- Module tests;
- Individual objectives;
- Individual interview;
- Summative assessment.

10. Distribution Points that receive students.

Targeting the student is in accordance with the provisions of "On the examinations and tests NUBiP in Ukraine" dated 02/20/2015. The protocol №6 from the table. 1

Grading scale: national and ECTS

<table>
<tr><td rowspan="2">Total points for all the educational activities</td><td rowspan="2">Mark ECTS</td><td colspan="2">Assessment on a national scale</td></tr>
<tr><td>for examination, course project (work) practices</td><td>for credit</td></tr>
<tr><td>90 – 100</td><td>A</td><td>excellent</td><td rowspan="5">Accepted</td></tr>
<tr><td>82-89</td><td>B</td><td rowspan="2">good</td></tr>
<tr><td>74-81</td><td>C</td></tr>
<tr><td>64-73</td><td>D</td><td rowspan="2">satisfactorily</td></tr>
<tr><td>60-63</td><td>E</td></tr>
<tr><td>35-59</td><td>FX</td><td>unsatisfactory with the possibility of recompiling</td><td>not accepted with the possibility of recompiling</td></tr>
<tr><td>0-34</td><td>F</td><td>unsatisfactory with mandatory re-learning</td><td>Fail with mandatory re-learning courses</td></tr>
</table>

11. Methodological support

1. Lecture course from «Veterinary Virology».

2. Калініна О.С. Ветеринарна вірусологія: Підручник. / О.С. Калініна, І.І. Панікар, В.Г. Скибіцький. — К.: Вища освіта, 2004. — 432 с.

3. Яблонська О. В. Ветеринарна мікробіологія: навчальний посібник / О. В. Яблонська, Т. В. Мазур, Ф. Ж. Ібатулліна — К.: ТОВ «НВП «Інтерсервіс», 2017.—432 с.

4. Методологія і методи наукових досліджень у тваринництві та ветеринарній медицині: Навчальний посібник. Друге видання / Укладачі: професор В.А.Яблонський, професор О.В.Яблонська.—Київ: 2014.— 512 с.

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

6. Скибіцький В.Г. Практикум з ветеринарної вірусології. / Скибіцький В.Г., Панікар І.І., Ткаченко О.А та ін. — К.: Вища освіта, 2005.

7. Ташута С.Г. Курс лекцій з ветеринарної вірусології: Навчальний посібник. / С.Г. Ташута. — К.: «ФОП Нагорна І.Л.», 2010. — 401 с.

12. Recommended reading

1. Ротавірусна інфекція великої рогатої 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 В.Г., Козловська Г.В., Ібатулліна Ф.Ж. -Київ, НАУ,2002.

5. 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.

6. 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.

7. 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.

8.Реакція ензиммічених антитіл (РЕМА) для студентів ФВМ: методичні вказівки /Бортнічук В.А.

13. Information resources

1. Електронний курс “Veterinary Virology” https://elearn.nubip.edu.ua/course/view.php?id=393

2. http://vet.in.ua/ — Ветеринарний інформаційний ресурс України/ Імунобіологічні препарати.

3. http://veterinaryvirology.com/

4. http://www.virology.net/big_virology/bvdiseaselist.html. The Big Picture Book of Viruses

5. http://www.microbiologybook.org/book/virol-sta.htm