

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY NATIONAL AGRICULTURAL UNIVERSITY**

**Department of Veterinary Examination, Microbiology, Zoohygiene and Safety and Quality of
Livestock Products**

**"Approve"
Head of Department**

 **Fotina T.I.
Protocol № 18**

from "25" June 2020

CURRICULUM WORK PROGRAM (SILABUS)

PP. 01 Veterinary radiobiology and hygienic examination

Specialty: 211 Veterinary medicine

Educational program: Veterinary medicine

Faculty: Veterinary Medicine

2020-2021 academic year

Work program on **Veterinary radiobiology and hygienic examination** for students majoring in 211 Veterinary Medicine

Developers: [Signature]
(Nagorna L.V., Doctor of Veterinary Science, Associate Professor)

The work program was approved at a meeting of the Department of Veterinary Examination, Microbiology, Zoohygiene and Safety and Quality of Livestock Products.

Protocol № 18 of "25" June 2020

Head of the Department [Signature] (T.I. Fotina)

Agreed:

Guarantor of the educational program [Signature] (L.G Ulko)

Dean of the Faculty [Signature] (O.L. Nechiporenko)

Methodist of the Department of Education Quality, licensing and accreditation [Signature] (N. Baranik)

Registered in the electronic database: date 22.09.2020

SNAU, 2020

1. Description of discipline

Name of indicators	Industry knowledge and direction of training, education level	Characteristics of discipline	
		full-time education	
Credits - 3	Branch of knowledge: <i>21 Veterinary Medicine</i>	<i>Regulatory</i>	
	<i>Veterinary Medicine</i>		
Modules - 3		Year of training:	
Content module 3		2020-2021	
		Course	
		3	
		Semester	
		5	
The total number of hours -90	Education level: <i>masters</i>	Lectures	
		6	
		Practical, seminar	
		-	-
		Laboratory and practical	
		10 hours	
		Independent work	
		64 hours	
A weekly hours for full-time: classroom – 1.1 self-learning -4.3		Type of control: <i>credit</i>	

The ratio of hours of classes to separate and individual work is: for full time – 17.8% / 82.2% (16/64)

2. The purpose and objectives of discipline

Goal: formation of future professionals deep theoretical knowledge and skills for control of radioactive contamination of objects of veterinary supervision and food produced by enterprises of meat and dairy industry, as well as export and import goods; in a complex of organizational measures for livestock in conditions of radioactive contamination.

Task: mastering the techniques of application of acquired knowledge in the study of general and special technology equipment, fundamentals of standardization and field practical training, performance NIRS, course and degree projects, future production and the practical and scientific research.

A study of discipline a student must:

know: Scientific - theoretical basis, objectives and problems of modern veterinary radiological hygienic examination; man-made sources of radiation contamination of the biosphere, the impact on public exposure accidents at nuclear power plants; contamination in Ukraine; the impact of radiation on humans, radioactive waste; radio-ecological pollution of the biosphere; migration routes of radionuclides in the food chain; radionuclides in the air, water and soil; eating foods contaminated with radionuclides; measures to reduce the exposure of people in the population control zone; Measures to reduce the accumulation of radionuclides at the sites of veterinary supervision; the role of veterinary medicine in terms of radioactive contamination; effect of the intake of radioactive iodine, feature a sampling of objects of veterinary control to determine contamination radiometric and dosimetric methods; sampling veterinary inspection of objects to determine their contamination; Radiological monitoring of agricultural production, methods of decontamination; flow and prevent the accumulation of radionuclides in agricultural products; the use of mineral and organic fertilizers; Making special substances and compounds; recommendations for maintaining crop and horticulture; flow and prevent the accumulation of radionuclides in agricultural products; the use of mineral and organic fertilizers; Making special substances and compounds; recommendations for maintaining crop and horticulture; flow and prevent the accumulation of radionuclides in agricultural products; the use of mineral and organic fertilizers; Making special substances and compounds ;, recommendations for maintaining crop and horticulture;

be able: assess the impact of radiation on humans, accidents at nuclear power plants; Ukraine contamination, radioactive waste, radiation contamination of the biosphere, migration of radionuclides in the food chain; radionuclides in the air, water and soil; eating foods contaminated with radionuclides; select test objects of veterinary control to determine contamination radiometric and dosimetric methods; able to carry out sampling of soil and water; sampling of plant products; Sampling of animal products; sampling food; veterinary and sanitary examination and assessment of products of slaughter animals with radiation injuries; the sequence and timing of slaughtering infected animals for meat; ante examination of animals during irradiation; order of primary processing of infected animals; sanitary assessment of carcasses exposed animals; especially the implementation of meat and slaughter products exposed animals; Radiological monitoring of the conduct of agricultural and forest products, their decontamination; flow and prevent the accumulation of radionuclides in agricultural products; use of forest berries, herbs, trees, aquatic, bee products after exposure; processing of agricultural and forest products, livestock products and fish, vegetables and potatoes, mushrooms, wool, hides in contaminated areas; use of medical and hygiene policies in the contaminated areas. flow and prevent the accumulation of radionuclides in agricultural products; use of forest berries, herbs, trees, aquatic, bee products after exposure; processing of agricultural and forest products, livestock products and fish, vegetables and potatoes, mushrooms, wool, hides in contaminated areas; use of medical and hygiene policies in the contaminated areas. flow and prevent the accumulation of radionuclides in agricultural products; use of forest berries, herbs, trees, aquatic, bee products after exposure; processing of agricultural and forest products, livestock products and fish, vegetables and potatoes, mushrooms, wool, hides in contaminated areas; use of medical and hygiene policies in the contaminated areas.

3.The program of discipline

Approved by the Academic Council of Official Minutes № 18 of 06.26.2017 year.

Content module 1. Sources of radiation pollution. Veterinary service animals in radioactive contamination

Theme 1.Sources of radiation pollution. Problems and tasks of modern Radiology. Man-made sources of radiation contamination of the biosphere. Migration routes of radionuclides in the food chain

2. Subject Veterinary service animals in radioactive contamination. The role of veterinary medicine in terms of radioactive contamination. Estimation of animals that were in the zone of

radioactive contamination. What measures must be implemented to reduce infection in animals.

Content module 2. Sampling facilities for veterinary control, veterinary and sanitary examination and assessment of products of slaughter animals with radiation injuries.

Theme 3. Sampling veterinary control facilities to determine their pollution radiometric and dosimetric methods. Feature sampling veterinary inspection of objects to determine their pollution radiometric and dosimetric methods. Sampling of plant products. Sampling of animal products

Theme 4. Veterinary and sanitary examination and assessment of products of slaughter animals with radiation injuries. Conducting inspection before slaughter the animals are exposed to external radiation. Slaughter of animals with radiation sickness. Postmortem veterinary-sanitary examination of animals with external irradiation

Content module 3. environmental radiation monitoring of agricultural production, methods of decontamination. Organization and livestock in conditions of radioactive contamination areas.

Theme 5. Environmental radiation monitoring of agricultural products. What means are used to reduce the radionuclides. Guidelines for preparation of feed for animals. Technology for clean production in contaminated areas

Topic 6. Organization and livestock in conditions of radioactive contamination areas. Standard permissible level of radionuclides in the daily feed ration of animals. Features livestock on the territory of radioactive contamination. Milk and meat in contaminated areas

Theme 7. Organization and management of cattle in conditions of radioactive contamination areas. Milk production in contaminated areas. Meat production in contaminated areas.

4. Structure of discipline

Names of content modules and topics	Number of hours											
	Full-time						Part-time					
	Us- th	including					all	including				
		l	n	lab	ind	SR		l	n	lab	ind	SR
1	2	3	4	5	6	7	8	9	10	11	12	13
Module 1. Sources of radiation pollution. Veterinary service animals in radioactive contamination												
Content module 1. Sources of radiation pollution. Veterinary service animals in radioactive contamination												
Theme 1. Sources of radiation pollution.	12	1	-	1	-	10						
Theme 2. Veterinary service animals in radioactive contamination.	12	1	-	1	-	10						
Together for the content modules 1	24	2	-	2	-	20						
Module 2. Sampling facilities for veterinary control, veterinary and sanitary examination and assessment of products of slaughter animals with radiation injuries.												
Content module 2. Sampling facilities for veterinary control, veterinary and sanitary examination and assessment of products of slaughter animals with radiation injuries.												
Theme 3. Sampling sites veterinary control to determine contamination radiometric and dosimetric methods.	12	1	-	1	-	10						

Theme 4. Veterinary and sanitary examination and assessment of products of slaughter animals with radiation injuries.	18	1	-	1	-	10						
Together for the content modules 2	30	2	-	2	-	20						
Module 3 environmental radiation monitoring of agricultural products methods of decontamination. Organization and livestock in conditions of radioactive contamination areas.												
Content module 3. Environmental radiation monitoring of agricultural production, methods of decontamination. Organization and livestock in conditions of radioactive contamination areas.												
Theme 5. Environmental radiation monitoring of agricultural products.	16		-	1	-	6						
Theme 6. Organization of livestock in conditions of radioactive contamination areas.	16	1	-	1	-	6						
Theme 7. Organization and management of cattle in conditions of radioactive contamination areas	14			1		4						
Theme 8. Decontamination methods of crop production	10	1		2		4						
Theme 9. Changing the radionuclide content in food during processing	10			1		4						
Total for 3 content modules	66	2		6		24						
Total hours	90	6		10	-	64						

5. Topics and plan of lectures

number	topics	Number hours
1	Topic 1: Sources of radioecological pollution. Plan. 1. Problems and tasks of modern radioecology. 2. Man-made sources of radioecological pollution of the biosphere 3. Ways of migration of technogenic radionuclides in the trophic chain	1
2	Topic 2: Veterinary care of animals in conditions of radioactive contamination of the territory. Plan. 1. The role of veterinary medicine in radioactive conditions pollution of the territory 2. Assessment of animals in the area of radioactive contamination. 3. What measures need to be implemented to reduce the infection of animals.	1

3	<p>Topic 3: Sampling of veterinary control objects to determine their contamination by radiometric and dosimetric methods.</p> <p>Plan.</p> <p>1. Peculiarity of sampling of veterinary control objects to determine their contamination by radiometric and dosimetric methods</p> <p>2. Sampling of plant products.</p> <p>3. Sampling of products of animal origin</p>	1
4	<p>Topic 4: Veterinary and sanitary examination and evaluation of products of slaughter of animals with radiation injuries</p> <p>Plan.</p> <p>1. Carrying out before slaughter inspection of animals that have been exposed to external radiation</p> <p>2. Slaughter of animals with radiation sickness</p> <p>3. Post-mortem veterinary and sanitary examination during external irradiation of animals.</p>	1
5	<p>Topic 5. Radioecological monitoring of agricultural products.</p> <p>Plan.</p> <p>1. What tools are used to reduce the flow of radionuclides</p> <p>2. Recommendations for the procurement of animal feed</p> <p>3. Technologies for obtaining clean products in the contaminated area</p>	1
6	<p>Topic 6. Organization and management of animal husbandry in terms of radioactive contamination of territories</p> <p>Plan.</p> <p>1. Standards for the permissible level of radionuclides in the daily diet of animals</p> <p>2. Features of animal husbandry in the territory of radioactive contamination.</p> <p>3. Milk and meat production in radiation-contaminated areas</p>	1
	Together	6

6. Topics laboratory classes

number	topic	Number hours
1	Topic 1. Objectives and challenges of modern radiobiological-veterinary hygienic expertise; man-made sources of radiation contamination of the biosphere.	1
2	Topic 2. Measures to reduce the exposure of people in the population control zone; Measures to reduce the accumulation of radionuclides at the sites of veterinary supervision.	1
3	Topic 3. Radiation sickness animals.	1
4	Topic 4. Sampling veterinary control facilities to determine their contamination.	1
5	Topic 5. Subject veterinary and sanitary examination and assessment of products of slaughter animals with radiation injuries of animals.	1
6	Topic 6. Features primary processing of animals in the event of radioactive contamination.	1
7	Topic 7. Subject to postmortem veterinary-sanitary examination of products of slaughter animals and poultry	1
8	Topic 8. Methods for decontamination of milk.	1

9	Topic 9. Veterinary radiologically-hygienic examination table eggs. Veterinary radiologically-hygienic examination of fish. Veterinary radiologically-hygienic examination of vegetables. Veterinary radiologically-hygienic examination of mushrooms and berries.	2
	Together	10

7. Independent work

number / p	topic	Number hours
1	The use of products contaminated; Measures to reduce internal exposure doses of the population in the control zone.	10
2	Measures to reduce the accumulation of radionuclides at the sites of veterinary supervision.	10
3	The order of primary processing of infected animals; health assessment of irradiated animals.	10
4	Veterinary and sanitary examination and assessment of products of slaughter animals.	6
5	Features of meat and slaughter products irradiated animals.	6
6	Quality and safety expertise of meat, eggs, fish; slaughter and processing of poultry with radiation.	14
7	Methods for decontamination of animal products.	8
	Together	64

8. Teaching methods

1. Methods of learning source of knowledge:

1.1. *Verbal*: Story, explanation, conversation (heuristic and reproductive), lecture, work with the book (reading, writing out, a plan, summarizing, making tables, graphs, etc.).

1.2. *Visual*: Demonstration, illustration, observation.

1.3. *Practical*: Laboratory method.

2. Methods of studying the nature of logic knowledge.

2.1. *Analytical*.

2.2. *synthesis*.

3. Methods of studying the nature and level of independent intellectual activity of students.

3.1. *problematic* (Problem-information)

3.2. *Part-search (heuristic)*

3.3. *exploratory*

4. **Active learning methods** - use of means of learning, problem situations, excursions, classes at work, self-assessment of knowledge, simulation teaching methods (built to simulate future careers), educational use and control tests using reference lectures and other)

5. **Interactive learning technologies** - the use of multimedia technologies.

9. Methods of control

1. Rating control a 100-point scale assessment ECTS

2. Implementation of the interim control during the semester (intermediate certification)

3. Polikriterialna assessment of current students:

- results of performance and protection of laboratory work;

- rapid control during classes;

- independent processing threads in general or specific issues;

- writing essays;
- test results;
- writing assignments during the tests;
- Production situation

10. Distribution of points receiving students

Routine testing and independent work						WITH R WITH	However, for modules and CPC	Ate- hundre d- tion	the accomp anying ma
Content module 1 25 points		Content module 2 25 points		Content module 3 - 20 ___baliv					
T1	T2	T3	T3	T5 7	T6	15	85 (70 + 15)	15	100
12	13	12	13	10	10				

Grading scale: national and ECTS

Total points for all the educational activities	Assessmen t ECTS	Evaluation of national scale	
		for examination, course project (work), practice	for scoring
90 - 100	A	perfectly	Accepted
82-89	B	okay	
75-81	C		
69-74	D	satisfactorily	
60-68	E		
35-59	FX	unsatisfactorily with possibility of re-drafting	not reckoned with the possibility of re-drafting
1-34	F	unsatisfactorily with the mandatory repeated study of discipline	not reckoned with the obligatory re-learning courses

11. Methodological Support

1. Radiation Safety Standards of Ukraine (NRBU- 97). K .: 1997. 120 p.
2. Radiation safety norms NRB-76/87 and sanytar Basic rules for work with substances Radioactive Sources and the second radiation yonyzuyuschyh CAP-72/87. - M .: Energoatomizdat, 1988.

12. Suggested Reading

Basic

1. Belov AD, VA Kyrshyn Veterynarnaya Radiobiology. - M .: Agropromizdat, 1987. - 287 p.
2. Gudkov IM, GM Tkachenko Fundamentals of Agricultural Radiology and Radiobiology. K .: High School. 1993. - 261 p.
3. Gudkov I. N. Tkachenko GM, Kytsno VE Workshop on selskohozyaystvennoy Radiobiology. - K .: Publishing House USHA, 1991 - 208
4. Kovalenko LI radiation veterinary-sanitary examination of objects of veterinary control. K .: High School, 1994. - 318 p.
5. Kovalenko LI Radyometrycheskyy veterinary and sanytarnyy controls on feed, animals and animal husbandry of products. K .: Harvest, 1987. - 192 p.

Support

1. Korneev NA, AN Sirotkina Fundamentals radyoekolohyy selskohozyaystvennyh animals. - M .: Energoatomizdat, 1987.
2. Maksimov MT, GO Odzhahov Radyoaktyvnye pollution and yzmerenyue.- s N .: Energoatomizdat, 1989.
3. Radiation Medicine /O.V. Kowalski, AP Lazarus, Y. Lyudvynskyy, A. Maxymchuk, VM Chizhik. K .: Health. 1993. - 224 p.

13. Information Resources

1. <http://ses.sumy.ua/struktura/26-radologchniy-vddl.html>
2. <http://vinoblvetmed.vn.ua/regionalna-laboratoriya/struktura-ta-pdrozdli1/radologchnij-vddl.html>
3. <http://cseswt.od.ua/uk/stranica/radiologichna-laboratoriya>
4. http://medportal.com/veterinariya_727/veterinarno-sanitarna-ekspertiza-otsinka-53426.html
5. <http://www.uia.org.ua/Ukr/seventh.htm>
6. <http://ses.gov.ua/index.php?p=articles&area=1&catid=3&name=san-tarno-ggn-chnii-monitoring>