

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY NATIONAL AGRICULTURAL UNIVERSITY

Department of Therapy, Pharmacology, Clinical Diagnostics and Chemistry

Head of Department

Улько Л.Г.

2020р.

03.05

**CURRICULUM WORK PROGRAM
(SILABUS)**

PP.1.9 «Veterinary toxicology»

Specialty 211 «Veterinary Medicine»

Educational program: «Veterinary Medicine»

Faculty: Veterinary Medicine

2020 – 2021 academic year


Work program in the discipline «*Veterinary Toxicology*» for students
majoring in : 211 «**Veterinary Medicine**»

Developers:

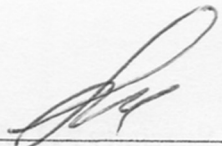
Dolbanosova RV , Candidate of Veterinary Sciences, Associate Professor

Work Program approved at the meeting of therapy, pharmacology, clinical diagnostics and chemistry


Minutes № 14 of 3 May 2020

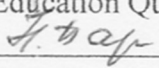
Head of the Department of Therapy,
Pharmacology, clinical diagnostics and chemistry _____  L.G. Ulko

Agreed:

Guarantor of the educational program _____  L.G. Ulko

Dean of the Faculty of Veterinary Medicine _____ A. L. Nechiporenko
(*which teaches the discipline*)

Dean of the Faculty of Veterinary Medicine _____  A. L. Nechiporenko
(*to which the department belongs*)

Methodist of the Department of Education Quality,
licensing and accreditation _____  N. Bananik

Registered in the electronic database: date: _____ 06.07. 2020

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1. Description of the discipline

Name of indicators	Field of knowledge, direction of training, educational and qualification level	Characteristics of the discipline
		full-time education
Number of credits - 3	Field of knowledge: 21 Veterinary medicine	<i>Normative</i>
Modules - 2	Specialty: 211 «Veterinary medicine»	Year of preparation:
Content modules: 2		2020-2021
Individual research task: Study of animal poisoning, treatment and prevention		Course
		4
		Semester
		7
		Lectures
The total number of hours is 90		16
		Practical, seminar
		-
		Laboratory
		30
		Independent work
		44
		Individual tasks
		Type of control: <i>credit</i>
Weekly hours for full-time study: classroom – 3,1 independent work of the student – 2,9	Educational degree: master	

Note

The ratio of the number of hours of classroom classes to independent and individual work is (%): for full-time education – 51,1 / 48,9

Purpose: to give students theoretical and practical knowledge on the diagnosis of animal poisoning, treatment of animals with poisoning by various toxic substances and prevention of poisoning.

The task is to study animal poisonings, which are widespread and cause significant economic damage. Master the theoretical foundations of veterinary toxicology and practical skills in the diagnosis and prevention of poisoning and treatment of animals with poisoning.

As a result of studying the discipline the student must:

know:

- safety rules, personal hygiene, asepsis and antiseptics when working in a toxicology laboratory;
- theoretical foundations and basic terminology used in toxicology;
- main stages of biotransformation of poisons in the body, ways of getting and removing poisons;
- methods of detecting poisons in feed, water, air, pathological material;
- rules for providing assistance in case of poisoning;
- toxicology of pesticides, organochlorine, organophosphorus compounds , pyrethroids , carbamates , compounds containing heavy metals (mercury, copper, lead, selenium, molybdenum, thallium, cadmium), toxic gases, poisons of animal and plant origin, mycotoxins ;
- methods and means of diagnosis of toxicoinfections;
- pharmacological agents for poisoning.

be able to:

- use the basic terminology used in toxicology,
- use information from domestic and foreign sources to develop diagnostic, treatment and business strategies;
- to monitor biological pollution of the environment with livestock waste, materials and veterinary products;
- detect poisons in feed, water, air, material ;
- to diagnose poisonings of various etiologies;
- provide assistance and develop treatment schemes for animals in case of poisoning;
- to carry out preventive measures aimed at preventing poisoning among animals.

Curriculum of the discipline

Approved by the Academic Council of Sumy National Agrarian University
Minutes № 12 of July 2, 2018

Content module 1. General toxicology. The concept of poisons and poisoning.

Topic 1. Parameters of toxicometry of toxic substances. Xenobiotics and pesticides are the main parameters of toxicometry of toxic substances: threshold dose, toxic dose, lethal doses, maximum permissible level, maximum permissible concentration.

Classification of toxic substances and poisonings. The main causes of animal poisoning, economic losses caused by poisoning for farm owners. Classification of pesticides by various parameters.

Topic 2. The essence of the effects of poisons on the body and the environment. The concept of the action of poisons, the mechanism of action of poisons. General principles of diagnosis of poisoning of animals, birds, fish, bees. Ways of getting poisons into the body. Rules for providing assistance in case of poisoning. Long-term effects of long-term effects of poisons.

Content module 2. *Special toxicology. Toxicological characteristics of pesticides. Feed additives, zoocides, heavy metals, mycotoxicosis* .

Topic 1. Toxicology of organochlorine and organophosphorus compounds . History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in environmental pollution and impact on entomofauna and flora of organochlorine compounds .

The mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at poisonings by organochlorine compounds.

History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in environmental pollution and impact on entomofauna and flora of organophosphorus compounds .

Mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at poisonings by organophosphorus compounds.

Topic 2. Toxicology of carbamates and phenoxy acids . History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in environmental pollution and influence on carbamate flora on entomofauna .

Mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at carbamate poisonings .

History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological

features, toxicodynamics and toxicokinetics , role in environmental pollution and impact on entomofauna and flora of phenoxy acids .

The mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at poisonings by phenoxy acids .

Topic 3. Toxicology of triazine, phenol and urea . Toxicology of synthetic pyrethroids and fluorinated pesticides. History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in environmental pollution and impact on entomofauna and flora of triazine, phenol and urea.

The mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at triazine poisonings.

History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in environmental pollution and impact on entomofauna and flora of synthetic pyrethroids and fluorinated pesticides.

Mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at pyrethroid poisonings .

Topic 4. Toxicology of heavy metals and arsenic compounds . History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in environmental pollution and impact on entomofauna and flora of heavy metals and arsenic compounds .

The mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at poisonings.

Topic 5. Toxicology of zoocides of different groups. History of synthesis, production purpose and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in environmental pollution and impact on entomofauna and flora of zoocides of different groups.

The mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at poisonings.

Topic 6. Phytocoxiosis , classification of poisonous plants. Poisoning by plants that accumulate nitrates. History of the use of poisonous plants., Main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , the role of poisonous plants in nature

The mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at poisonings.

Topic 7. Mycotoxicology . History of detection and application, main representatives, characteristics of chemical and physical properties, toxicological features, toxicodynamics and toxicokinetics , role in the nature of mycotoxins .

The mechanism of toxic action, features of pathogenesis of poisonings, diagnostics of poisonings, rendering of the help and treatment-and-prophylactic measures at poisonings.

4. The structure of the discipline

Names of content modules and topics	Number of hours						
	Full-time						total
	Evening	including					
L.		n	lab	ind	s.r.		
1	2	3	4	5	6	7	8
Module 1. General toxicology. Toxicological characteristics of pesticides.							
<i>Content module 1. General toxicology. The concept of poisons and poisoning.</i>							
Topic 1. Toxicometry parameters of toxic substances.	8	2		4		2	
Topic 2. The essence of the effects of poisons on the body and the environment.	8	2		4		2	
Together on the content module 1	16	4		8		4	
Module 1. Special toxicology.							
<i>Content module 2. Toxicological characteristics of pesticides, feed additives, zoocides, heavy metals, mycotoxicosis .</i>							
Topic 1. Toxicology of chlororanic and phosphororanic compounds .	8	2		2		4	
Topic 2. Toxicology of carbamates and phenoxy acids .	8			2		6	
Topic 3. Toxicology of triazine, phenol and urea . Toxicology of synthetic pyrethroids and fluorinated pesticides.	10	2		2		6	
Topic 4. Toxicology of heavy metals and arsenic compounds .	12	2		4		6	
Topic 5. Toxicology of zoocides of different groups.	12	2		4		6	
Topic 6. Phytocoxicosis, classification of poisonous plants.	12	2		4		6	
Topic 7. Mycotoxicology .	12	2		4		6	
for module 2	74	12		22		40	
Total hours	90	16		30		44	

5. Topics and plan of lectures

№ s / n	Name topics	Numb er hours
1	<p>Topic 1. Parameters of toxicometry of toxic substances.</p> <p style="text-align: center;">Plan.</p> <ol style="list-style-type: none"> 1. The concept of poisons and poisoning. 2. General patterns of toxic effects of poisons. 3. Definitions of LD₀, LD₃₀, LD₁₀₀, maximum permissible level (MRL), maximum permissible concentration (MPC), waiting time, etc. 4. Classification of toxic substances and poisonings. 	2
2	<p>Topic 2. The essence of the effects of poisons on the body and the environment.</p> <p style="text-align: center;">Plan.</p> <ol style="list-style-type: none"> 1. The main causes of animal poisoning. 2. Economic losses caused by animal poisoning. 3. Therapeutic and preventive measures in case of poisoning of animals with pesticides, chemical fertilizers, poisonous plants, feed during improper storage and with violation of cooking technology, feed additives, medicines 	2
3	<p>Topic 3. Toxicology of organochlorine and organophosphorus compounds .</p> <p style="text-align: center;">Plan.</p> <ol style="list-style-type: none"> 1. General characteristics of organochlorine compounds (HOS). 2. The main representatives of chlorinated derivatives of aliphatic, acyclic and aromatic hydrocarbons, derivatives of the polychlorocyclodiene series and polychloropinenes . 3. Features of physicochemical properties that determine toxicodynamics and toxicokinetics . 	2
4	<p>Topic 5. Toxicology of triazine, phenol and urea. Toxicology of synthetic pyrethroids and fluorinated pesticides.</p> <p style="text-align: center;">Plan.</p> <ol style="list-style-type: none"> 1. Toxicology of triazine herbicides. 2. Toxicology of fluoride. 3. Prevention of poisoning by synthetic pyrethroids . 	2
5	<p>Topic 6. Toxicology of heavy metals and arsenic compounds .</p> <p style="text-align: center;">Plan.</p> <ol style="list-style-type: none"> 4. Mercury toxicology. 5. Zinc toxicology . 6. Toxicology of copper. 7. Toxicology of selenium. 8. Toxicology of cobalt. 	2

6	<p>Topic 7. Toxicology of zoocides of different groups.</p> <p>Plan.</p> <ol style="list-style-type: none"> 1. Classification of zoocides. 2. Toxicodynamics of zoocides. 3. Treatment of zoocide poisoning. 	2
7	<p>Topic 8. Phytotoxicosis , classification of poisonous plants.</p> <p>Plan.</p> <ol style="list-style-type: none"> 1. Toxicology of poisonous plants. Toxicology of feed of plant origin, which can be dangerous to animals. 2. Distribution of poisonous plants on the territory of Ukraine and their veterinary and toxicological significance. 3. Principles of classification of plant poisonings - by the nature of the effect on the body, the nature of the active substance, botanical affiliation. 4. Features of the occurrence and course of plant poisoning. 	2
8	<p>Topic 9. Mycotoxigenesis . Classification of mycotoxins .</p> <p>Toxicology of poisons of animal origin - bees, vipers , spiders, fish, other poisons of biological origin.</p> <p>Plan.</p> <ol style="list-style-type: none"> 1. General characteristics of toxins of fungal origin. 2. Classification of mycotoxins . 3. Prevention, diagnosis and treatment of aspergilotoxicosis , clavicestotoxicosis , fusariotoxicosis . 	2
	Together	16

6. Topics of laboratory classes

No s / n	Name topics	Number of hours
1	<p>Topic 1: Safety and health at work in the chemical and toxicological laboratory. Rules of sampling, packing and sending of samples of a material and forages for the chemical and toxicological analysis</p> <ol style="list-style-type: none"> 1. Organization and conduct of classes in toxicology. 2. Technique of sampling of fodder and patmaterial for chemical and toxicological analysis. 3. Packaging, canning, storage of material subject to chemical and toxicological research. 4. Preparation of accompanying documentation and shipment of material subject to chemical and toxicological research 	2
2	<p>Topic 2. Chemical and toxicological analysis in veterinary medicine as a crucial stage in the diagnosis of poisoning of animals, fish and insects. Purpose, tasks and procedure.</p>	2

	<ol style="list-style-type: none"> 1. Characteristics of methods of isolation of toxic substances from various objects of veterinary control. 2. Analysis of modern laboratory methods of chemical and toxicological research -chemical, colorimetric, thin-layer and gas-liquid spectrometry, chromatomas -spectrometry and ion-selective potentiometry. 3. Devices and equipment of chemical and toxicological laboratories. The order of conducting documentation and registration of the conclusion. 	
3	<p>Topic 3. Post- mortem diagnosis of animal poisoning, veterinary and sanitary assessment of meat and offal. General scheme and procedure for chemical toxicological studies.</p> <ol style="list-style-type: none"> 1. Carrying out post-mortem inspection of organs and carcasses according to the rules. 2. Pathological changes in the organs and carcasses of animals. 3. The degree of bleeding. 4. The effect of the dose of poison on the internal organs. 5. ALL meat and offal in case of animal poisoning. 6. Toxic substances and their groups. 	2
4	<p>Topic 4. Methods of detecting toxic substances in water, feed, parenchymal organs.</p> <ol style="list-style-type: none"> 1. Methods of qualitative detection and quantitative determination of substances isolated by mineralization - mercury, copper, zinc, lead, barium, fluorine. 2. Methods for detecting substances that are isolated by liquids - acids and mugs , sodium chloride, nitrates and nitrites, urea, ammonia and ammonium salts. 3. Methods of mineralization of patmaterial . Express and quantitative methods for the determination of mercury, copper, lead, zinc and arsenic. 4. Technique of isolation of toxic substances by distillation with water vapor. Methods for detection of cyanides, formaldehyde and phenol. Classification of chemical reagents. 	2
5	<p>Topic 5. Toxicology of herbicides: general characteristics, classification. Toxicology of derivatives of dichlorophenoxyacetic acid (2,4-D), triazine, chlorocholine chloride .</p> <p>Plan:</p> <ol style="list-style-type: none"> 1. Appointment of herbicides. Classification. 2. Factors contributing to the accumulation of herbicides in plants. Withdrawal period . 3. The mechanism of action of herbicides on animals. 4. The main symptoms of poisoning by herbicides derived from dichlorophenoxyacetic acid, triazine, chlorocholine chloride 5. Therapeutic and preventive measures in case of herbicide poisoning. 	2

6	<p>Topic 6. Toxicology of compounds containing arsenic and heavy metals - mercury, copper, lead, selenium, molybdenum, thallium, cadmium.</p> <p>Plan:</p> <ol style="list-style-type: none"> 1. General information about compounds containing heavy metals. 2. Toxicodynamics and toxicokinetics . 3. Clinical signs and pathological changes in poisoning with compounds containing heavy metal salts. 4. Treatment of animals and veterinary assessment in case of poisoning by compounds containing salts of heavy metals. 	2
7	<p>Topic 7. Toxicology of fluoride. Therapeutic and preventive measures.</p> <p>Plan:</p> <ol style="list-style-type: none"> 1. Substances that contain fluorine compounds. 2. Toxicodynamics and toxicokinetics . 3. Clinical signs of poisoning by compounds containing fluor . 4. Pathological changes. 5. Therapeutic and preventive measures in case of fluoride poisoning. 	2
8	<p>Topic 8. Toxicology of zoocides of different groups.</p> <ol style="list-style-type: none"> 1. Zinc phosphide poisoning. 2. Methyl bromide poisoning 2. Sulfur dioxide. 	2
9	<p>Topic 9. Toxicology of heavy metals.</p> <ol style="list-style-type: none"> 1. Toxicology of iron compounds . 2. Toxicology of lead . 3. Toxicology of selenium. 	2
10	<p>Topic 10. Toxicology of plants containing essential oils, pigments, resins.</p> <ol style="list-style-type: none"> 1. Plants containing essential oils. 2. Plants containing pigments. 3. Plants containing resins. 4. Diagnosis of animal poisoning by plants containing essential oils, pigments, resins. 5. Clinical signs, pathological changes and treatment of animals with poisoning by plants containing alkaloids, glycosides , glycoalkoloids 	2
11	<p>Topic 11. Toxicology of plants that accumulate thiaminase , oxalates, sugars.</p> <ol style="list-style-type: none"> 1. Plants that accumulate thiaminase , oxalates, sugars. 2. Factors contributing to the accumulation of thiaminase , oxalates, sugars. 3. Diagnosis of animal poisoning by plants that accumulate thiaminase , oxalates, sugars. 	2

	4. Clinical signs, pathological changes and treatment of animals with poisoning by plants that accumulate thiaminase , oxalates, sugars.	
12	Topic 12. Toxicology of poisoning by nitrites and nitrates. Antidote therapy. Methods of laboratory diagnosis of poisoning. Plan: 1. Plants that accumulate nitrates and nitrites. 2. Factors contributing to the accumulation of nitrates and nitrites. 3. Pathogenesis and clinical signs of poisoning by plants that accumulate nitrates. 4. Therapeutic and prophylactic measures for nitrate and nitrite poisoning.	2
13	Topic 13. Toxicology of poisonous plants. Distribution of poisonous plants on the territory of Ukraine and their veterinary and toxicological significance. Principles of classification of plant poisonings. Plan: 1. Distribution of poisonous plants on the territory of Ukraine. 2. Classification of poisonous plants. 3. Principles of classification of plant poisonings.	2
14	Topic 14 . Mycoses and mycotoxicosis . Plan: 1. Diagnosis and treatment of animals with aspergilotoxicosis . 2. Diagnosis and treatment of animals with dendrochiotoxicosis . 3. Diagnosis and treatment of animals with clavicestoxicosis . 4. Diagnosis and treatment of animals with fusariotoxicosis .	2
15	Topic 15. Diagnosis and treatment of aspergillo -, dendrochio -, clavices -, fusario -, myrothecio -, penicillin -, mucoro -, rhizopustoxicosis . Plan: 1. Diagnosis and treatment of animals with myrotetiotoxicosis . 2. Diagnosis and treatment of animals with penicillitoxicosis . 3. Diagnosis and treatment of animals with mucorotoxicosis . 4. Diagnosis and treatment of animals with rhizopustoxicosis .	2
	Together	30

9. Independent work

No s / n	Topic title and list of questions	Number hours
1	Topic 1. Parameters of toxicometry of toxic substances. Removal of toxic substances from the body of animals. General principles of diagnosis, treatment and prevention of animal poisoning.	2

2	Topic 2. The essence of the effects of poisons on the body and the environment. General rules of veterinary and sanitary examination of food in case of animal poisoning.	2
3	Topic 3. Toxicology of organochlorine and organophosphorus compounds . Distribution of FOS and HOS by the nature of penetration into the body. General principles of diagnosis, treatment and prevention of animal poisoning FOS and HOS.	4
4	Topic 4. Toxicology of carbamates . General principles of diagnosis, treatment and prevention of carbamate poisoning of animals . Veterinary and sanitary examination of slaughter products for carbamate poisoning of animals .	6
5	Topic 5. Toxicology of triazine, phenol and urea . Toxicology of synthetic pyrethroids and fluorinated pesticides. General principles of diagnosis, treatment and prevention of animal poisoning by treasin , phenol and urea. Veterinary and sanitary examination of slaughter products for poisoning of animals with treasin , phenol and urea .	6
6	Topic 6. Toxicology of heavy metals and arsenic compounds . Historical background, etiology and pathogenesis of heavy metal and arsenic poisoning.	6
7	Topic 7. Toxicology of zoocides of different groups. Differential diagnosis, treatment and prevention.	6
8	Topic 8. Phytocoxicosis , classification of poisonous plants. Botanical characteristics. Features of biologically active substances of poisonous plants.	6
9	Topic 9. Mycotoxicology . Mycotoxicosis of other groups.	6
	Together:	44

11. Teaching methods

1. Methods of learning by source of knowledge:

1.1. *Verbal* : story , explanation , conversation (heuristic), lecture , instruction , work with a book (reading, writing, drawing up a plan, taking notes, making tables, graphs, reference notes, etc.).

1.2. *Visual* : demonstration , observation.

1.3. *Practical* : laboratory method, practical work, production and practical methods.

2. Teaching methods by the nature of the logic of cognition.

2.1. *Analytical* .

2.2. *Methods of synthesis*.

2.3. *Inductive method.* .

3. Teaching methods by the nature and level of independent mental activity of students.

3.1. *Problem* (problem-information)

3.2. *Partial search (heuristic)*

3.3. *Research*

4. **Active teaching methods** - the use of technical teaching aids, the use of problem situations, simulation teaching methods (based on the simulation of future professional activities), the use of training and control tests, the use of reference lectures and others)

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

12. Methods of control

1. Rating control according to the 100-point scale of ECTS assessment

2. Carrying out intermediate control during the semester (intermediate certification)

3. Polycriteria assessment of current work of students:

- the level of knowledge demonstrated in laboratory classes;
- activity during the discussion of issues raised in class;
- results of performance and protection of laboratory works;
- independent study of the topic as a whole or individual issues;
- writing essays, essays, reports;
- test results;
- written tasks during tests.

13. Distribution of points received by students

Current testing and independent work							Together for modules and VTS	Certification	Sum	
Meaningful module 1		Content module 2								CPC
T1	T2	T3	T4	T5	T6	T7	15	85 (70 + 15)	15	100
10	10	10	10	10	10	10				
20		50								

Assessment scale: national and ECTS

The sum of points for all types of educational activities	ECTS assessment	Score on a national scale	
		for exam, course project (work), practice	for offset
90 - 100	AND	perfectly	credited
82-89	IN	fine	
75-81	WITH	satisfactorily	
69-74	D		
60-68	IS		

35-59	FX	unsatisfactory with the possibility of reassembly	not credited with the possibility of re-assembly
1-34	F	unsatisfactory with mandatory re-study of the discipline	not enrolled with mandatory re-study of the discipline

14. Methodical support

1. Drawn VI, Dakhno GP Feed poisoning of farm animals. Sumy, 2008. - 31p. Drawn VI, Dakhno GP Feed poisoning of farm animals. Sumy, 2008. - 31p.
2. Dakhno IS, Dakhno GP, Risovany VI, Negreba Yu.V. Methodical recommendations for course work. Sumy, 2009. - 17p.
3. Drawn VI, Dakhno GP Nitrate and nitrite poisoning. Sumy 2009. - 18p.
4. Musienko VM, Candidate of Veterinary Medicine Sciences, Associate Professor, Ulko LG, Dr. Vet. Sciences, Professor, Musienko OV, Candidate of Veterinary Medicine Sciences, Associate Professor, Kisterna OS, Art. teacher. Guidelines for course work, Sumy, 2015. - 20 s.
5. Musienko VM, Candidate of Veterinary Medicine Sciences, Associate Professor, Ulko LG, Dr. Vet. Sciences, Professor, Musienko OV, Candidate of Veterinary Medicine Sciences, Associate Professor, Kisterna OS, Art. teacher. Methodical instructions for laboratory and practical classes and independent work, Sumy, 2016.-40 p.
6. Musienko VM, Candidate of Veterinary Medicine Sciences, Associate Professor, Ulko LG, Dr. Vet. Sciences, Professor, Musienko OV, Candidate of Veterinary Medicine Sciences, Associate Professor, Kisterna OS, Art. teacher. Methodical instructions Course of lectures, Sumy, 2016.-36 p.

15. Recommended literature

Basic

1. Argunov MN Veterynarnaya toxicology with the basics of ecology : Uchebnoe posobyie . - LNG: Lan Publishing House , 2007. - 416 p.
2. Dukhnytsky VB, Khmelnytsky GO, Boyko GV Veterinary mycotoxicology . - "Agricultural Education", Kyiv, 2011. - 240 p.
3. Zhulenko VN, Rabinovich MI, Talanov GA Veterinary toxicology . - M .: Колос. 2001 - 283 p
4. Malinin OA, Khmelnytsky GA, Kutsan AT Veterinary toxicology . K., - 2002. - 463 p.
5. Khmelnytsky GA Therapy of animals in case of poisoning : Handbook . - K .: Harvest. 1990 - 213 p.
7. Nephrology and Urology of Small Animals. Edited by Joe Bartges and David J. Polzin. c_ 2011 Blackwell Publishing Ltd.
8. VETERINARY TOXICOLOGY. Lecture notes and classes works// Gintaras Daunoras/ LSMU LEIDYBOS NAMAI, KAUNAS 2012, - 278.

9. A TEXTBOOK OF MODERN TOXICOLOGY // Ernest Hodgson / Printed in the United States of America, - 2004, - 582
10. VETERINARY TOXICOLOGY Basic and Clinical Principles // RAMESH C. GUPTA/ Copyright © 2007 Elsevier Inc. All rights reserved, - 45
11. Basic analytical toxicology.// R. J. Flanagan, R.A. Braithwaite, Geneva, 1995. - 298
12. California's Veterinary toxicology Service// California Veterinarian/ California Veterinarian | July/August 2011
13. Small Animal Toxicology Essentials, First Edition. Edited by Robert H. Poppenga, Sharon Gwaltney-Brant.© 2011 John Wiley and Sons, Inc. Published 2011 by John Wiley and Sons, Inc., 327
14. Veterinary Toxicology Radhey Mohan Tiwari, Malini Sinha Oxford Book Company Jaipur., p.289
15. CASARETT AND DOULL'S TOXICOLOGY THE BASIC SCIENCE OF POISONS Curtis D. Klaassen, Ph.D. University Distinguished Professor and Chair Department of Pharmacology, Toxicology, and Therapeutics University of Kansas Medical Center Kansas City, Kansas, p. 1331

Auxiliary

1. Verbitsky PI, Dostoevsky PP, Busol VO etc. Handbook of Veterinary Medicine. - К.: Урожай, 2004. - 1280 с.
2. Loit AO General toxicology . SPb.: ELBI - SPb., - 2006. S.224.
3. Rouder Dzh.D . Veterinary toxicology / Per. with English . M. Stepkin . - М.: « Аквариум-Принт », 2008. - 416 с.
6. Smiyan Yu.P. Handbook of a veterinary laboratory specialist . К. Harvest. - 2001. - 363 p.
7. Khmelevsky BN Prevention of mycotoxicosis of animals . - М.: Agropromizdat , 2000. - 271 p.

16. Information resources

1. Complete catalog of veterinary drugs registered in Ukraine. VET.in.UA - Veterinary information resource of Ukraine <http://vet.in.ua/menu/drugs.php>
2. Kanyuka OI, Faitelberg -Blank VR, Lizogub YP and others . Clinical Veterinary Pharmacology: Textbook PDF ... Textbook for students of higher agricultural institutions in the specialty "Veterinary Medicine" www.twirpx.com/file/820440
3. Index of veterinary drugs by pharmacological groups : <http://webmvc.com/vet/leki/>

