

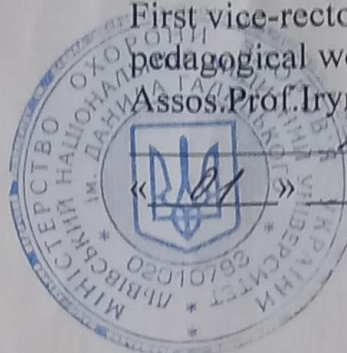
DANYLO HALYTSKY LVIV NATIONAL MEDICAL UNIVERSITY

Department of Microbiology

«APPROVED»

First vice-rector for scientific and pedagogical work

Assos.Prof. Iryna SOLONYNKO



29

2023

WORKING CURRICULUM OF DISCIPLINE

Parasitology (elective course)

preparation of specialists of the second (master's) level of higher education in the field of knowledge 22 "Health care" in the specialty 222 «Medicine»

Discussed and approved
on the methodical meeting
of the department of microbiology
Protocol No 14
Dated 12 June 2023
Head of the department
O.P. Korniychuk, MD

«APPROVED» at the sitting of the cyclic
methodical commission
on the preventive medicine
Protocol No 4
Dated 15 June 2023
Head of the commission
Professor V.I. Fedorenko

PROGRAM DEVELOPERS :

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INTRODUCTION

Program of study of academic discipline

in microbiology of the optional course "Parasitology"

for the training of specialists of the second (master's) level of higher education, the educational qualification "Master of Medicine", the professional qualification "Doctor" in the field of knowledge 22 "Health care", specialty 222 "Medicine"

in accordance with the Education and Professional Program "Medicine" of the Standard of Higher Education of the second (master's) level of the field of knowledge 22 "Health Care" specialty 222 "Medicine"

Explanatory Note

The working curriculum in microbiology of the elective course "Parasitology" for the training of specialists of the second (master's) level of higher education, the educational qualification "Master of Medicine", the professional qualification "Doctor" in the field of knowledge 22 "Health care", specialty 222 "Medicine" was developed on the basis sample curriculum in the discipline "Microbiology, Virology and Immunology", for the training of specialists of the second (master's) level of higher education, specialty 222 "Medicine", approved by the director of the State University "Central Methodical Cabinet for Higher Medical Education of the Ministry of Health of Ukraine" I. Melnyk on April 28, 2017 and deputy V.O. Head of the Department of Education and Science of the Ministry of Health of Ukraine N. Oleksina on May 3, 2017.

The subject is studied during the V or VI semester of the 3-year study. In accordance with the following normative documents: the Law of Ukraine "On Higher Education" dated 07/01/2014 No. 1556-YII, the Cabinet of Ministers of Ukraine Resolution No. 266 dated 04/29/2015 "On Approval of the List of Fields of Knowledge and Specialties for which Higher Education Candidates are Trained" , order of Ukraine No. 47 dated 26.01.2015 "On peculiarities of curriculum formation", order of Danylo Halytskyi LNMU rector dated 06.02.2016. No. 1604 "On the approval of educational plans", the order of the Ministry of Education and Culture of the country dated 07.09.2009 No. 642 "On the organization of the study of humanitarian disciplines according to the student's free choice"; recommendations on the development of educational programs of educational disciplines, approved by the order of the Ministry of Health of Ukraine dated 24.03.2004 No. 15212.10.2004 and No. 492 "On making changes and additions to recommendations on the development of educational programs of educational disciplines".

Elective course "Parasitology": studies the origin, evolution and properties of parasites pathogenic for humans, patterns of their interaction with the macroorganism, the immune system and mechanisms against infectious immunity, diagnostic methods, principles of treatment and specific prevention of infectious diseases. The study of this educational discipline is necessary for understanding the role of parasites in the pathogenesis of infectious and a number of somatic diseases, the importance of microbiological methods in diagnosis, the basics of asepsis and antiseptics.

For the purpose of integration into the world educational and scientific space, the content of the program took into account the main directions of development of modern diagnostics, treatment and prevention of diseases caused by parasites and included in the educational material from the leading international textbooks on microbiology.

According to the curriculum, the subject is studied in IV-V semesters. The types of training classes according to the curriculum are: a) lectures, b) practical classes, c) independent work of students.

Topics of the lecture course reveal the problematic issues of the relevant sections of parasitology.

Practical classes according to the method of their organization are laboratory, as they involve:

- 1) research by students of the morphology and structure of parasites, carrying out sowing researched materials on nutrient media, research of cultural and biochemical properties, their hereditary and non-hereditary variability, staging of serological reactions;
- 2) solution of situational problems (laboratory diagnosis of infectious diseases, evaluation of immunity indicators), which have an experimental, clinical-diagnostic or sanitary-hygienic direction.

During practical classes, students should write down the protocols of the conducted research, where they should indicate the purpose of the research, the name of the method, the progress of the work, the results of the research, and the conclusions.

Current educational activities of students are monitored in practical classes in accordance with specific goals. The following means of diagnosing the level of students' training are used: testing, written or oral answers to control questions, solving situational problems, conducting laboratory studies, interpreting and evaluating their results, controlling practical skills.

The final control of students' knowledge is carried out after the completion of the study of the discipline. The evaluation of the student's success in the discipline is a rating, is presented on a multi-point scale and is defined according to the ECTS system and the scale adopted in Ukraine.

a) is based on the knowledge acquired by students in studying medical biology, medical chemistry, biological and bioorganic chemistry, morphological disciplines, normal and pathological physiology, integrates with these disciplines;

b) lays the foundations for students to study modern methods of diagnosing parasitic diseases, which are necessary in the process of further education and professional activity;

c) establishes an understanding of the modern features of the course, as well as the spread of human parasitic diseases;

d) examines the principles of treatment of parasitic diseases.

**Description of the curriculum in the discipline "Parasitology"
(elective course)**

for the training of specialists of the second (master's) level of higher education, the educational qualification "Master of Medicine", the professional qualification "Doctor"

Structure of the discipline	Quantity of hours			Year of study	Types of control	
	Total	Auditorium				SEW
		lecture	practices			
Parasitology	3,0 credits ECTS 90 hrs.	12	18	60	3d year V semester Credit	

The subject of study of the educational discipline is the properties of pathogenic representatives of the world of parasites, their interaction with the human body, mechanisms of the development of infectious diseases, methods of their diagnosis, specific prevention and treatment.

Interdisciplinary connections: Parasitology as an educational discipline (elective course) is based on the knowledge obtained during the study of general biology, biochemistry, biophysics, histology, cytology and embryology, physiology. Parasitology, in turn, is the basis for the study of epidemiology, infectious diseases, clinical immunology and allergology, pharmacology, general hygiene, internal medicine, surgery and pediatrics and other clinical disciplines, which involves the integration of teaching with these disciplines and the application of knowledge of microbiology, virology and immunology in the process of further education and professional activity. It lays the foundations of the doctrine of the physiological role of microbes in the human body and the prevention of changes in the normal microflora in the process of medical interventions.

For the purpose of integration into the world educational and scientific space, the main directions of development of modern diagnosis, treatment and prevention of diseases caused by parasites were taken into account in the content of the program and included in the educational material from the leading international textbooks on microbiology and parasitology.

According to the curriculum, the subject is studied in IV-V semesters. The types of training according to the curriculum are:

- a) lectures, b) practical classes, c) self work of students.

Topics of the lecture course reveal the problematic issues of the relevant sections of parasitology.

Practical classes according to the method of their organization are laboratory, because they include:

1) research by students of the morphology and structure of bacteria, cultivation of research materials on nutrient media, research of cultural and biochemical properties, pathogenicity factors of microorganisms, their hereditary and non-hereditary variability, as well as their sensitivity to antimicrobial agents, setting of serological reactions;

2) solving situational problems (laboratory diagnosis of infectious diseases, assessment of immunity indicators, sanitary-microbiological assessment of the state of the environment, etc.), which have an experimental, clinical-diagnostic or sanitary-hygienic orientation.

During practical classes, students should write down the protocols of the conducted research, where they should indicate the purpose of the research, the name of the method, the progress of the work, the results of the research, and the conclusions.

Current educational activities of students are monitored in practical classes in accordance with specific goals. The following means of diagnosing the level of students' training are used: testing, written or oral answers to control questions, solving situational problems, conducting laboratory studies, interpreting and evaluating their results, controlling practical skills.

The final control of students' knowledge is carried out after completing the study of the discipline with an exam. The evaluation of the student's success in the discipline is a rating, is presented on a multi-point scale and is defined according to the ECTS system and the scale adopted in Ukraine.

1. The purpose and tasks of the educational discipline

1.1. The **purpose** is to deepen and generalize information about the organization of parasitic systems, their main properties, ways of development and interaction between the parasite and the host. The study of medical parasitology and the final goals are established on the basis of the OPP for the training of a doctor in accordance with the block of its content module.

Natural and scientific training is the basis for building the content of the educational discipline.

The description of goals is formulated through skills in the form of target tasks (actions). On the basis of the final goals for each content module, specific goals are formulated in the form of certain skills (actions), target tasks that ensure the achievement of the final goal of studying the discipline.

1.2. The tasks of studying the discipline are:

- creation of a systemic approach to the understanding of parasitic organisms based on ideas about the structure, functioning and interaction between molecular, cellular, tissue, organ, population-species and biosphere levels of organization;
- the development of ideas about the unity of ontological and phylogeny processes in parasitic systems;
- formation of views on the evolution of parasites, which are an integral part of nature, have their own peculiarities of structure, functioning and development;
- integration of information on the development cycles of free-living and parasitic animals of various taxonomic groups;
- creation of a unified system of knowledge about the relationships between living organisms.

1.3 Competencies and learning outcomes, the formation of which contributes to the discipline

According to the requirements of the Higher Education Standard, the discipline ensures that students acquire the following competencies:

- *integral:*

The ability to solve complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy.

- *general:*

GC.1.- Ability to abstract thinking, analysis and synthesis.

GC.2.- The ability to learn and master modern knowledge.

GC.3. - Ability to apply knowledge in practical situations.

GC.4. -Knowledge and understanding of the subject area and understanding of professional activity.

GC.5.- Ability to adapt and act in a new situation.

GC.6.- Ability to make informed decisions.

GC.7. -Ability to work in a team.

GC.8. - Ability to interpersonal interaction.

GC.10.- Ability to use information and communication technologies.

GC.11.-Ability to search, process and analyze information from various sources.

GC.12.- Determination and perseverance regarding the assigned tasks and assumed responsibilities.

GC.13. -Awareness of equal opportunities and gender issues.

GC.14.- The ability to realize one's rights and responsibilities as a member of society, to realize the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of a person and a citizen in Ukraine.

GC.15.- The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, techniques and technologies, use different types and forms of motor activity for active recreation and leading a healthy lifestyle.

Integral:

According to the requirements of the Standard of Higher Education, the discipline ensures acquisition by students

competences: the formation of competences is facilitated by the discipline (the relationship with the normative content of the training of higher education applicants, formulated in terms of learning outcomes in the Higher Education Standard).

- *Special (professional, subject):*

SC.3. -Ability to establish a preliminary and clinical diagnosis of the disease.

SC.6. -Ability to determine the principles and nature of treatment and prevention of diseases.

SC.10 - Ability to perform medical manipulations.

SC.14.- Ability to plan and carry out preventive and anti-epidemic measures regarding infectious diseases.

SC.23. -Ability to develop and implement scientific and applied projects in the field of health care.

SC.24.- Compliance with ethical principles when working with patients and laboratory animals.

SC.25.-Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results.

Detailing of competencies according to the descriptors of the NRC in form of the "Matrix of competencies".

Matrix of competencies

№	Competence	Knowledge	Ability	Communication	Autonomy and responsibility
1	2	3	4	5	6
Integral competence					
The ability to solve complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy.					
General competences					
1	Ability to abstract thinking, analysis and synthesis	Specialized conceptual knowledge, including modern scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and research	Specialized skills/problem-solving skills required for research and/or proceedings innovative activity with the aim of developing new knowledge and procedures	Clear and unambiguous presentation of own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	Managing work or learning processes that are complex, unpredictable and demanding new strategic approaches
2	Ability to learn and master modern knowledge	Specialized conceptual knowledge that includes current scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and conducting research	Ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Use of foreign languages in professional activities	Ability to continue learning with a high degree of autonomy
3	Ability to apply	Specialized	Ability to integrate	Clear and	Managing work or

	knowledge in practical situations	conceptual knowledge that includes current scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and conducting research	knowledge and solve complex problems in broad or multidisciplinary contexts	unambiguous presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	learning processes that are complex, unpredictable and require new strategic approaches
4	Knowledge and understanding of the subject area and understanding of professional activity	Critical understanding of problems in the field and at the border of the fields of knowledge	Ability to integrate knowledge and solve complex problems in broad or multidisciplinary contexts	Use of foreign languages in professional activities	Responsibility for contributing to professional knowledge and practice and/or evaluating the performance of teams and collectives
5	Ability to adapt and act in a new situation		The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility		Liability for contribution to professional knowledge and practice and/or evaluation of the results of the activities of teams and collectives
6	Ability to make informed decisions	Specialized conceptual knowledge that includes current scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and conducting research	Ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Clear and unambiguous presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	Managing work or learning processes that are complex, unpredictable and require new strategic approaches.
7	Ability to communicate in the state	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited	Clear and unambiguous presentation of one's own knowledge, conclusions and arguments to	Liability for contribution to professional knowledge and practice and/or evaluation of the results of the

			information, taking into account aspects of social and ethical responsibility	specialists and non-specialists, in particular to people who are studying	activities of teams and collectives
8	Ability to interpersonal interaction	Specialized conceptual knowledge that includes current scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and conducting research	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Clear and unambiguous presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	Liability for contribution to professional knowledge and practice and/or evaluation of the results of the activities of teams and collectives
10	Ability to use information and communication technologies	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Use of foreign languages in professional activities	Ability to continue learning with a high degree of autonomy
11	Ability to search, process and analyze information from various sources	Critical understanding of problems in the field and at the border of the fields of knowledge	Ability to integrate knowledge and solve complex problems in broad or multidisciplinary contexts	Use of foreign languages in professional activities	Liability for contribution to professional knowledge and practice and/or evaluation of the results of the activities of teams and collectives
12	Determination and persistence in relation to assigned tasks and assumed responsibilities	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility		Ability to continue learning with a high degree of autonomy
13	Awareness of equal	Critical understanding of	Specialized skills/problem-	Clear and unambiguous	Managing work or learning processes

	opportunities and gender problems	problems in the field and at the border of the fields of knowledge	solving skills required for research and/or proceedings innovative activity with the aim of developing new knowledge and procedures	presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	that are complex, unpredictable and require new strategic approaches.
14	The ability to realize one's rights and responsibilities as a member of society, to be aware of the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of a person and a citizen in Ukraine	Specialized conceptual knowledge that includes current scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and conducting research	Ability to integrate knowledge and solve complex problems in broad or multidisciplinary contexts	Clear and unambiguous presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	Ability to continue learning with a high degree of autonomy
15	The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, equipment and technologies, to use various types and forms of physical activity for	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility		Ability to continue learning with a high degree of autonomy

	active recreation and leading a healthy lifestyle.				
Special (professional, subject) competence					
3.	Ability to evaluate laboratory and instrumental results research	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility		Managing work or learning processes that are complex, unpredictable and require new strategic approaches.
6.	Ability to establish a preliminary and clinical diagnosis of the disease	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility		Liability for contribution to professional knowledge and practice and/or evaluation of the results of the activities of teams and collectives
10	Ability to determine the principles and nature of treatment of diseases	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Clear and unambiguous presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	Managing work or learning processes that are complex, unpredictable and require new strategic approaches.
14	Ability to perform medical manipulations	Specialized conceptual knowledge that includes current scientific achievements in the field of professional activity or field of knowledge and is the basis for original thinking and	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Clear and unambiguous presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	Managing work or learning processes that are complex, unpredictable and require new strategic approaches.

		conducting research			
23	Ability to plan and carry out preventive them and anti-epidemic measures against infectious diseases	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Clear and unambiguous presentation of one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to people who are studying	Liability for contribution to professional knowledge and practice and/or evaluation of the results of the activities of teams and collectives
24	Ability to develop and implement scientific and applied projects in the field of health care	Critical understanding of problems in the field and at the border of the fields of knowledge	The ability to solve problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Use of foreign languages in professional activities	Ability to continue learning with a high degree of autonomy
25	Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results	Critical understanding of problems in the field and at the border of the fields of knowledge	Ability to integrate knowledge and solve complex problems in broad or multidisciplinary contexts	Use of foreign languages in professional activities	Ability to continue learning with a high degree of autonomy

Learning outcomes:

Integrative final program learning outcomes, the formation of which is facilitated by the educational discipline:

2. Learning outcomes:

Integrative final program learning outcomes, the formation of which is facilitated by the educational discipline:

Learning outcomes for a discipline are a set of knowledge, abilities, skills, and other forms of competence acquired by a person in the process of learning in accordance with the standard of higher education, which can be identified, quantified and measured.

PLO 1-. Have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.

PLO.2. -Understanding and knowledge of fundamental and clinical biomedical sciences, at a level sufficient for solving professional tasks in the field of health care.

PLO.3. -Specialized conceptual knowledge, which includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems.

PLO.19.- To plan and implement a system of anti-epidemic and preventive measures regarding the occurrence and spread of diseases among the population.

PLO.24.-Organize the necessary level of individual safety (own and the persons he cares about) in case of typical dangerous situations in the individual field of activity.

PLO.27.- Communicate freely in the state language and in English, both orally and in writing to discuss professional activities, research and projects.

Correspondence of learning outcomes and competencies defined by the standard

Program learning outcomes code	Learning outcome	Competency code
PLO - 1	Have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.	GC1 GC2 GC3 GC4 GC5 GC6 GC7 GC8 GC10 GC11 GC12 GC15 SC2 SC3 SC6 SC14 SC23 SC24 SC25
PLO - 2	Understanding and knowledge of basic and clinical biomedical sciences, at a level sufficient for solving professional tasks in the field of health care.	GC4 GC6 GC10 GC11 GC12 SC2 SC3 SC6 SC14 SC24
PLO - 3	Specialized conceptual knowledge, which includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems	GC1 GC2 GC3 GC6 GC7 GC10 GC11 GC12 SC2 SC3 SC23 SC24 SC25
PLO - 19	To plan and implement a system of anti-epidemic and preventive measures regarding the occurrence and spread of diseases among people.	SC14
PLO – 21`	Search for the necessary information in professional literature and databases of other sources, analyze, evaluate and apply this information.	GC2 GC10
PLO - 24	Organize the necessary level of individual security (own and the people you care about) in case of occurrence typical dangerous situations in the individual field of activity.	GC6
PLO - 27	Communicate freely with the state language and in English, both orally and in writing to discuss professional activities, research and projects.	GC5 GC6 GC7 GC8 GC15

As a result of studying the discipline the student must:

Know:

- morphofunctional features, the development cycle of parasites, their localization in the human body, pathogenic influence, ways of infection and prevention of diseases;
- morphology of cysts of the simplest pathogenic forms and eggs of helminths;
- methods of laboratory diagnosis of parasitic infestations;
- current orders, informational and methodical letters of the Ministry of Health, methodological developments on laboratory diagnostics;
- the importance of pathogenetic processes that occur under the influence of parasites, for understanding the mechanisms of the occurrence of pathological processes, somatic, infectious and other human diseases;
- morpho-physiological bases of the functioning of non-specific factors of protection and the immune system, explanation of the mechanisms of the immune response and immunopathological reactions, which are important in the development of parasitic diseases;
- ecological connections of parasitic organisms with the habitat and factors regulating their geographical distribution;
- methods of laboratory diagnosis of protozoan diseases;
- methods of laboratory diagnosis of helminthiasis;
- main groups of drugs and their representatives for the treatment and prevention of parasitic diseases.

Be able:

- to have the basic methods of diagnosing human parasitic diseases.
- to ensure the quality of material for research and its delivery to the laboratory;
- to interpret the meaning of the processes that occur at the molecular, genetic and cellular levels of the organization of parasitic organisms, in order to understand the pathogenesis of protozoan and helminthic human diseases;
- interpret the principles of etiotropic therapy and prevention of parasitic diseases.

The student must master practical skills:

- taking material for research and delivering it to the laboratory;
- production of drugs from the researched material;
- differentiate vegetative forms, cysts of pathogenic protozoan organisms;
- to differentiate different types of malaria plasmodium in a smear and a thick drop of blood;
- research of parasitological material for the detection of helminths by methods of native smear, thick smear, flotation, sedimentation methods;
- detection of larvae by the method of Berman, Horado, Mori;
- quantitative determination of helminth eggs;
- study of enterobiosis;
- research of trichinellosis, filariasis;
- serological research methods;
- research of environmental objects for contamination by helminths and pathogenic protozoa;
- skin examination for the detection of scabies and demodicosis;
- interpretation of research results.

3. Information volume of the academic discipline 3.0 ECTS credits, 90 hours are assigned to the study of the academic discipline.

CONTENT SECTIONS:

Medical parasitology, as a knowledge-based discipline, is maintained during the study of general biology, complexes of chemical disciplines, biophysics, the discipline of morphological and physiological cycle. Medical parasitology, in its activity, is the basis for the study of general pathology, hygiene, epidemiology, insectology, subjects of surgical and therapeutic cycle. Parasitology is a science that pursues zoological and environmental problems of studying parasites, patterns of their interaction with the macroorganism, immune response and mechanisms of antiparasitic immunity, diagnostic methods, principles of treatment and prevention of parasitic drugs.

The study of medical parasitology is necessary to understand the role of parasites in the pathogenesis of diseases, the importance of diagnostic methods, the knowledge gained is used in the study of problems of treatment and prevention of diseases. The applied value of this discipline is to develop methods of diagnosis, specific prevention and treatment of parasitic diseases.

1. Pathogenic protozoa.**Specific goals:**

- *To analyze* the biological properties of pathogenic protozoa and pathogenetic features of protozoonoses.
- *To explain* the etiological and epidemiological pathogenetic features of protozoonoses caused by pathogenic protozoa, which underlie the diagnosis, specific prevention and therapy.
- *To identify* methods of microbiological diagnosis, etiotropic therapy and prevention of diseases caused by pathogenic protozoa.

Indicative list of questions:**Topic 1. Biological features and classification of protozoa. Microbiological diagnosis of diseases caused by pathogenic protozoa (amebiasis, giardiasis, trichomoniasis, leishmaniasis). Drugs for prevention and treatment.**

Characteristic features and classification of the subkingdom The simplest.

Type Sarcodina, class True amoebae. Dysenteric amoeba, intestinal amoeba, oral amoeba. Medical geography, morphofunctional features and cycle of development of dysenteric amoeba, ways of infection, pathogenic influence, laboratory diagnostics and prevention of amoebiasis. Differential signs of dysenteric and intestinal amoebae.

Characteristics of flagellated. The structure of the flagellum.

Giardia (Giardia): medical geography, morphofunctional features and development cycle, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of giardiasis (giardiasis).

Trichomonas urogenital (vaginal) and intestinal Trichomonas. Medical geography, morphofunctional features and cycles of development of urogenital Trichomonas, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of urogenital trichomoniasis.

Tropical leishmaniasis *Leishmania tropica*, *leishmaniasis L. major*, *L. donovani* and *L. infantum*: medical geography, morphofunctional features, development cycles, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of leishmaniasis. Growing leishmaniasis on an artificial nutrient medium.

Trypanosomes *Trypanosoma brucei gambiense*, *T. brucei irhodesiense* and *T. cruzi*: medical geography, morphofunctional features, development cycles, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of trypanosomiasis.

Endemic and natural focal diseases. Natural center.

Topic 2. Microbiological diagnosis of malaria, toxoplasmosis. Drugs for prevention and treatment.

Characteristics, features of structure and reproduction of spores.

Plasmodium malariae *Plasmodium vivax*, *P. ovale*, *P. malariae* and *P. falciparum*: medical geography, morphofunctional features and development cycles, ways of infection, pathogenic influence, connection between the patient's temperature and the stage of malaria pathogen development. Laboratory diagnosis and prevention of malaria. Under what natural conditions can malaria outbreaks occur?

Toxoplasma: medical geography, morphofunctional features, development cycle, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of toxoplasmosis. What is the danger of *Toxoplasma* for humans?

How is a human laboratory test for toxoplasmosis, what material is taken in case of stillbirth?

Characteristics of ciliates. Nuclear dualism. Sexual process in ciliates.

Balantidia: medical geography, morphofunctional features and development cycle, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of balantidiasis.

Methods of laboratory diagnosis of diseases caused by parasitic protozoa.

What material is used to diagnose protozoa?

2. Human helminths

Specific goals:

- **To analyze** the biological characteristics of helminths that underlie the pathogenesis of diseases.
- **To explain** the etiological, epidemiological and pathogenetic features of helminthiasis caused by nematodes, trematodes, cestodes, their relationship with diagnosis, specific prevention and therapy.
- **To identify** methods of microbiological diagnosis, etiotropic therapy and prevention of helminthiasis.

Topic 3. Helminthiasis. Classification. Epidemiology and features of pathogenesis. Diagnostic methods. Principles of treatment and prevention of diseases. Nematodes: ascariasis, enterobiasis, trichinosis, strongyloidiasis, trichocephalosis.

Ascaris lumbricoides, *Enterobius vermicularis*, *Trichocephalus trichiurus*, *Ancylostoma duodenale*, *A. braziliense*, *Strongyloides stercoralis*, *Necator americanus* :medical geography, morphofunctional features and cycles of development, ways of infection, pathogenic effects. Migration of larvae. Features of the life cycle of *Ancylostoma duodenale*. Laboratory diagnosis and prevention of ascariasis, trichuriasis (trichocephaly), hookworm, necatorosis, strongyloidiasis and enterobiasis. Therapeutic and prophylactic measures for enterobiasis.

Trichinella: medical geography, morphofunctional features and cycles of development, ways of infection, pathogenic influence. Natural and synanthropic foci of trichinosis. Laboratory diagnosis and prevention of trichinosis (trichinosis). Rodents and methods of deratization.

Wandering larva syndrome. Toxocara Toxocaracanis; hookworm Ancylostoma braziliense.

Scaffolding, vuchereria, brugia, onchocerciasis, loa, heartworms: medical geography, morphofunctional features, development cycles, ways of infection, pathogenic influence. Circadian rhythm of filariasis larvae. Laboratory diagnosis and prevention of dracunculiasis and filariasis (vuchereriosis, brugiosis, onchocerciasis, loaosis and heartworm disease). Features of diagnosis and treatment of dracunculiasis.

Transmissible and natural focal helminthiasis.

Mollusks, crustaceans, insects and chordates are intermediate hosts of helminths. The importance of arthropods in the life of nematodes.

Principles and content of the main macro- and microhelminthoscopic methods of research of feces, water, soil, etc. Coprological analysis. Methods of ovohelminthoscopy: native smear, thick smear according to Kato, Fulleborn and Kalantaryan methods, Graham's method (adhesive tape): essence, advantages and disadvantages. Features of the structure of mammalian eggs, tapeworms and roundworms. Microscopic examination of urine, blood and sputum for helminthiasis. Trichinoscopy method. Immunodiagnosis of helminthiasis.

K. Scriabin's doctrine of deworming, devastation and disinfection of the environment is higher than the eggs and larvae of helminths.

Characteristics of the type Ringworms and the class Leeches. Medical leech: biology, application in medicine.

Topic 4. Features of the biology of trematodes. Trematodes: opisthorchiasis, schistosomiasis, fascioliosis. Microbiological diagnosis of diseases. Drugs for treatment.

Classification of flatworms. General characteristics of the type Flat worms and the class Mammals. The role of covers (tegument). Organ systems. Stages of development, morphology of larvae. Parthenogonia. Change of owners. Adaptation of parasites to hosts.

Hepatic sucker, feline sucker, Chinese sucker, lanceolate sucker and metagonym: medical geography, morphofunctional features and development cycles, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of fasciolosis, opisthorchiasis, clonorchosis, dicroceliosis and metagonimosis.

Think about whether the presence of eggs in the stool always indicates fasciolosis? How to clarify the diagnosis?

Pulmonary mammal, blood mammals - Manson's schistosome, blood schistosome and Japanese schistosome, nanofiet: medical geography, morphofunctional features, development cycles, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of paragonimosis, schistosomiasis and nanophytosis.

Comparative characteristics of mammals.

General characteristics of the class Tapeworms. Types of larvae: dense larvae and fins. Changes in morphology that are associated with the transition to parasitism.

The trail is wide: medical geography, morphofunctional features and cycles of development, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of diphyllotriasis.

Topic 5. Helminthiasis. Cestodes: diphyllotriasis, echinococcosis, hymenolepidosis, teniarinhosis. Features of the biology of pathogens. Epidemiology and pathogenesis. Microbiological diagnosis of diseases. Drugs for treatment.

Dipylidiosis (Dipylidium caninum), bull tapeworm (Taeniarhynchus saginatus), pig tapeworm (Taenia solium), dwarf tapeworm (Hymenolepis nana), broad tapeworm (Diphyllobothrium latum): medical geography, morphofunctional features, development cycles, ways of infection, pathogenic effects. Laboratory diagnosis and prevention of teniarinhosis, teniosis, cysticercosis and hymenolepidosis. Differential diagnosis of tapeworms. The need to check a patient with hymenolepidosis after treatment.

Echinococcus and alveococcus: medical geography, morphofunctional features, development cycles, ways of infection, pathogenic influence. Laboratory diagnosis and prevention of echinococcosis and alveococcosis (multichamberedechinococcosis). How are the features of the treatment of echinococcosis and alveococcosis related to the biology of the pathogen?

Which tapeworms are more dangerous to humans and why?

Topic 6. Helminthoses and parasitic allergy: current state of the problem and ways of solution.

Morpho - physiological features of helminths capable of causing allergic reactions. Morpho - physiological features of protozoa capable of causing allergic reactions. Characteristics of endogenous allergens - they arise and poison the body after the death and decomposition of the parasite. Characteristics of exogenous allergens - released by larvae and adults in the process of vital activity. Types of allergic reactions as symptoms of worm infestation. Mechanism of development of allergy to parasites. Rules for selecting material and working with it. Methods of microbiological diagnostics. Express diagnostics (IEA, PCR). Preparations for prevention, treatment and diagnostics.

4. The structure of academic discipline

The distribution of study time by forms of study and types of classes in accordance with the work study plan is presented.

№	Theme	Lectures	Practical classes	SEW	Indivi-dual SEW
1.	Introduction to medical parasitology. Parasitism and its forms. The effect of the parasite on humans. Features of classification of pathogens of parasitic diseases	2			
2.	Features of pathogenesis and immune response to parasitic diseases	2			
3.	Basics of etiotropic therapy and prevention of parasitic diseases	2			

4.	Biological features and classification of protozoa. Microbiological diagnosis of diseases caused by pathogenic protozoa (amebiasis, giardiasis, trichomoniasis, leishmaniasis). Drugs for prevention and treatment.		3		
5.	Microbiological diagnosis of malaria, toxoplasmosis. Drugs for prevention and treatment.		3		
6.	Biological properties of trypanosomes. Epidemiology, pathogenesis, diagnosis, prevention and treatment			6	
7.	Biological properties of Balantidium. Epidemiology, pathogenesis, diagnosis, prevention and treatment			6	
8.	Basics of etiotropic therapy and prevention of parasitic diseases	2			
9.	The role of parasites in immunodeficiency diseases (HIV)			6	
10.	Mollusks, crustaceans, insects and chordates are intermediate hosts of helminths. The value of arthropods in the life of nematodes.			6	
11.	Helminthiasis. Classification. Epidemiology and features of pathogenesis. Methods of diagnostics. Principles of treatment and prevention of diseases. Nematodoses: ascariasis, enterobiasis, trichinosis, strongyloidiasis, trichocephalosis.		3		
12.	Features of trematode biology. Trematodoses: opisthorchiasis, schistosomiasis, fascioliosis. Microbiological diagnosis of diseases. Drugs for treatment.		3		
13.	Helminthiasis. Cestodoses: diphyllobotriasis, echinococcosis, hymenolepidosis, teniarinosis. Peculiar biology. Epidemiology and pathogenesis. Microbiological diagnosis of diseases. Drugs for treatment.		3		
14.	The medical significance of ticks as a natural reservoir of infection and vectors of human pathogens	2			
15.	Acariform mites. Scabies, Acne gland. Dust mites are the inhabitants of people's homes, their medical significance.			7	
16.	Medical significance of lice, ways of infecting a person with diseases; methods of controlling these insects.			7	
17.	Parasitic diseases transmitted by direct contact (scabies, phthiriosis, trichomoniasis). Features of diagnosis and course of the disease, prevention and treatment.			7	
18.	KI Scriabin's teachings on deworming, devastation and disinfection of the environment from eggs and larvae of helminths.			7	
19.	Characteristics of type Ringworms, class Leeches. Medical leech: biology, application in medicine.			7	
20.	Helminth and parasitic allergy: current state of the problem and ways of solution.		3		
21.	Travel medicine. Protozoan and helminthic diseases of travelers	2			
Total hours 90 / 3.0 credits ECTS		12	18	60	

The system of organizing the educational process encourages students to study systematically during the academic semester. The types of classes according to the curriculum are: a) lectures, b) practical classes, c) independent work of students. The topics of the lecture course reveal the problematic issues of the relevant sections of medical

parasitology. Practical classes according to the method of their organization are laboratory. The final control of mastering topics is carried out after their completion.

Thematic plan of lectures on the discipline "Parasitology"

№	Theme	Quantity of hours
1	Introduction to medical parasitology. Parasitism and its forms. The effect of the parasite on humans. Features of classification of pathogens of parasitic diseases	2
2	Features of pathogenesis and immune response to parasitic diseases	2
3	Basics of etiotropic therapy and prevention of parasitic diseases	2
4	Principles of modern diagnosis of parasitic diseases	2
5	The medical significance of ticks as a natural reservoir of infection and vectors of human pathogens	2
6	Travel medicine. Protozoan and helminthic diseases of travelers	2
Total		12

Thematic plan of practical classes in the discipline "Parasitology"

№	Theme	Quantity of hours
1	Biological features and classification of protozoa. Microbiological diagnosis of diseases caused by pathogenic protozoa (amebiasis, giardiasis, trichomoniasis, leishmaniasis). Drugs for prevention and treatment.	3
2	Microbiological diagnosis of malaria, toxoplasmosis. Drugs for prevention and treatment.	3
3	Helminthiasis. Classification. Epidemiology and features of pathogenesis. Methods of diagnostics. Principles of treatment and prevention of diseases. Nematodoses: ascariasis, enterobiasis, trichinosis, strongyloidiasis, trichocephalosis.	3
4	Features of trematode biology. Trematodes: opisthorchiasis, schistosomiasis, fascioliosis. Microbiological diagnosis of diseases. Drugs for treatment.	3
5	Helminthiasis. Cestodes: diphyllobotriasis, echinococcosis, hymenolepidosis, teniarinhosis. Peculiar biology. Epidemiology and pathogenesis. Microbiological diagnosis of diseases. Drugs for treatment.	3
6	Helmintoses and parasitic allergy: current state of the problem and ways of solution	3
Total		18

Self - education work

In accordance with the current regulations on the organization of the educational process, independent work of the student is one of the forms of organization of education, the main form of mastering the educational material in the time free from mandatory educational classes according to the schedule. The independent work of university students is regulated by the "Regulations on independent work of students of Danylo Halytskyi LNMU" dated October 24, 2010, protocol No. 4.

Thematic plan of self extracurricular work on parasitology

N	Types of self-education works	Quantity of hours	Control
1	Biological properties of trypanosomes. Epidemiology, pathogenesis, diagnosis, prevention and treatment	6	Current control in practical classes
2	Biological properties of balantidia. Epidemiology, pathogenesis, diagnosis, prevention and treatment	6	Current control in practical classes
3	Mollusks, crustaceans, insects and chordates are intermediate hosts of helminths. The value of arthropods in the life of nematodes.	6	Current control in practical classes
4	Acariform mites. Scabies, Acne gland. Dust mites are the inhabitants of people's homes, their medical significance.	7	Current control in practical classes
5	The role of parasites in immunodeficiency diseases (HIV)	7	Current control in

			practical classes
6	Medical significance of lice, ways of infecting a person with diseases; methods of controlling these insects.	7	Current control in practical classes
7	Parasitic diseases transmitted by direct contact (scabies, phthiriosis, trichomoniasis). Features of diagnosis and course, prevention and treatment.	7	Current control in practical classes
8	K.I.Scriabin's teachings on deworming, devastation and disinfection of the environment from eggs and larvae of helminths.	7	Current control in practical classes
9	Characteristics of type Ringworms and class Leeches. Medical leech: biology, application in medicine.	7	Current control in practical classes
	Total	60	

7. Individual tasks

Individual tasks are not provided for in the curriculum.

8. Teaching methods

Traditional teaching methods: verbal, visual, practical. Methods of educational and cognitive activity: explanatory-illustrative method, reproductive method, method of problem statement, partial-search or heuristic method, the research method. Methods of stimulation and motivation of educational and cognitive activity: inductive and deductive teaching methods, methods of stimulation and motivation of learning. Interactive methods: "Brainstorming", "Competitive group method", "Case method", and other educational technologies used for the transfer and acquisition of knowledge and practical skills. Control methods are teaching methods (teacher control, self-control, mutual control, self-correction, mutual correction). Distance learning methods (" Misa " program) to prepare for the licensing exam "KROK-1".

9. Control methods

Academic integrity.

During the scientific-pedagogical process, students (applicants) and teachers are obliged to follow the Code of Academic Ethics of the Danylo Halytsky Lviv National Medical University, as a document that defines the standards generally accepted by the world community for the implementation of educational and scientific activities by applicants of higher education and university employees and creates an environment of intolerance to violations of academic integrity and ethics of academic relationships.

<https://nauka.meduniv.lviv.ua/wp-content/uploads/kodeks-akademichnoyi-etiki-2021.pdf>

The organization of the educational process is carried out on the basis of the credit-transfer system with the use of rating evaluation of students' success. Inadmissible: copying and plagiarism; absences and lateness to classes; using a mobile phone, tablet or other mobile devices during class (except for cases provided for by the curriculum and methodical recommendations of the teacher); untimely completion of tasks set by the teacher during the current, final control of knowledge, as well as independent work of students. The discovery of signs of academic dishonesty in a student's work is a reason for the teacher not to enroll it, regardless of the scale of plagiarism or deception.

https://nauka.meduniv.lviv.ua/wp-content/uploads/2019/11/plagiat_viyavlennya-ta-sanktsiyi-dlya-zdobuvachiv.pdf

Any form of violation of academic integrity will not be tolerated. In case of such events, respond in accordance with the Code

<https://nauka.meduniv.lviv.ua/wp-content/uploads/kodeks-akademichnoyi-etiki-2021.pdf>

The procedure and algorithm of the appeal.

The student has the right to get acquainted with the results of his examination (credit) written work no later than 2 working days after its writing and to receive an explanation of the received grade. In case of procedural violations, disagreement with the assessment, the student has the right to submit a written appeal to the head of the department, indicating the specific reasons for disagreement with the assessment. The appeal procedure and the evaluation rules and procedures are described in detail in the Regulations on Evaluation Rules and Procedures Criteria. The appeal regarding the results of the final control of the knowledge of the students of higher education is a component of the organizational support of the educational process, which is carried out to determine the objectivity of the given assessment. The main task of the appeal procedure is to overcome the elements of subjectivism during the evaluation of knowledge, to avoid misunderstandings and controversial situations, to create the most favorable conditions for the development and real provision of the legal rights and interests of the student. The head of the department together with the examiner, involving other specialists, forms a commission to consider the issue of compliance with the procedure and within three working days ensures consideration of the appeal and verbally informs the student of the results of the review. In the case of confirmation of the circumstances stated in the student's application, by order of

the rector (vice-rector for scientific and pedagogical work), a new control event is held with a different composition of the commission.

For subjects which form of the final control is the credit:

The maximum number of points that a student can get for current educational activity at studying a subject is 200 points.

The minimum number of points that a student should get for current educational activity for admission the subject is 120 points.

Calculating the number of points is based on received by the student marks by the traditional scale while studying a subject during the semester, by calculating the average arithmetic (AA), rounded to two decimal places. The resulting mark is converted into points for multipoint scale as follows:

$$x = AA \times 200/5$$

For convenience, a Table converting into 200-point scale is presented.

Students who have fully attended all classroom training sessions in the discipline provided for in the work curriculum and have completed all types of training tasks are admitted to the final inspection. A student who did not attend a part of the classroom training classes or did not complete a part of the training tasks provided for by the working training program for a valid reason, corrections are made to the individual training plan and it is allowed to work off the academic debt by the specified deadline.

At the end of the course, a credit is given. The student's theoretical training and the quality of acquired practical skills are monitored. Two variants of control are used: 1. Students perform written work. Each student receives a task consisting of: 10 theoretical questions; 2-3 control micropreparations.

11. Scheme of calculation and distribution of points received by students:

The grade for the discipline, which ends with the exam, is defined as the sum of the points for the current educational activity (at least 72) and the points for the exam (at least 50).

Points from the discipline are independently converted both to the ECTS scale and to the 4-point scale.

Points from the ECTS scale are not converted into a 4-point scale and vice versa.

Points of students studying in one specialty, taking into account the number of points scored in the discipline, are ranked on the ECTS scale as follows:

Points ECTS	Statistical index
A	The best 10 % of students
B	The next 25 % of students
C	The next 30 % of students
D	The next 25 % of students
E	The last 10 % of students

Discipline points for students who successfully completed the program are converted to a traditional 4-point scale according to absolute criteria, which are listed in the table below:

12. Conversion of the average mark for current activity in multipoint scale for the disciplines that ends with the credit:

4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale	4-point scale	200-point scale
5	200	4.45	178	3.92	157	3.37	135
4.97	199	4.42	177	3.89	156	3.35	134
4.95	198	4.4	176	3.87	155	3.32	133
4.92	197	4.37	175	3.84	154	3.3	132
4.9	196	4.35	174	3.82	153	3.27	131

4.87	195	4.32	173	3.79	152	3.25	130
4.85	194	4.3	172	3.77	151	3.22	129
4.82	193	4.27	171	3.74	150	3.2	128
4.8	192	4.24	170	3.72	149	3.17	127
4.77	191	4.22	169	3.7	148	3.15	126
4.75	190	4.19	168	3.67	147	3.12	125
4.72	189	4.17	167	3.65	146	3.1	124
4.7	188	4.14	166	3.62	145	3.07	123
4.67	187	4.12	165	3.57	143	3.02	121
4.65	186	4.09	164	3.55	142	3	120
4.62	185	4.07	163	3.52	141	Less then 3	Not enough
4.6	184	4.04	162	3.5	140		
4.57	183	4.02	161	3.47	139		
4.52	181	3.99	160	3.45	138		
4.5	180	3.97	159	3.42	137		
4.47	179	3.94	158	3.4	136		

The list of issues submitted for final control

1. Biological features and classification of protozoa.
2. Amebiasis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
3. Giardiasis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
4. Trichomoniasis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
5. Leishmaniasis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
6. Malaria. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
7. Toxoplasmosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
8. Helminth infections. Classification. Epidemiology and features of pathogenesis. Diagnostic methods. Principles of treatment and prevention of diseases caused by nematodes, trematodes, and cestodes.
9. Ascariasis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
10. Trichinellosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
11. Enterobiosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
12. Strongyloidiasis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
13. Trichocephalosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
14. Opisthorchosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
15. Schistosomiasis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
16. Fasciolosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
17. Diphyllotriosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
18. Echinococcosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
19. Hymenolepidosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.
20. Teniarinchosis. Biological properties of the pathogen. Methods of diagnosing diseases. Medicines for treatment.

List of practical skills and tasks for the summary lesson

1. Carry out microscopy of the preparation using an immersion lens, draw a conclusion about the morpho-tinctorial properties of the studied protozoa.
2. Prepare a preparation from feces, stain, perform microscopy, draw a conclusion.
3. Describe the cysts in the finished product.
4. Examine a blood smear to detect malarial plasmodium.
5. Choose drugs for the treatment of diseases caused by pathogenic protozoa.
6. Choose drugs for the treatment and prevention of malaria.
7. Choose drugs that are appropriate to use for the treatment of worm infestation.
8. Record the reaction with enzyme-labeled antibodies (ELISA). Explain the purpose of use in parasitology

Methodical maintenance.

All types of educational activities have methodological support: lectures, practical classes, independent work of students.

Methodological support of the lecture course:

1. Abstracts of lectures
2. Methodical developments of lectures
3. Lecture presentations

Methodical provision of practical classes:

1. Methodical development of practical classes for teachers.
2. Methodical instructions for practical classes for students.
3. Variants of test questions, theoretical questions and situational problems for current control (checking the level of knowledge on each topic).
4. Banks of test tasks for filling the "Misa" system for the purpose of ongoing control of students' knowledge.
5. Bank of test tasks for preparing students for the "Krok-1" licensing exam.
6. Presentations of practical classes.
7. Educational video materials.
8. Educational videos (videos and videos on topics).

Methodological support of students' self work:

1. Methodical instructions for performing independent work.
2. Workbook for independent work.
3. Methodical instructions for performing practical skills.

The following tools are used to diagnose learning success:

1. Variants of theoretical questions for final control.
2. Variants of test questions for final control.
3. Variants of situational problems for final control.
4. Variants of tasks for practicing practical skills for final control.
5. Banks of test questions with one correct answer for the final control of students' knowledge using the Misa system.
6. Banks of test questions with several correct answers for the final control of students' knowledge using the "Misa" system.
7. A bank of tasks with pictures for the final control of students' knowledge using the Misa system."

The recommended literature consists of basic and additional literature.

Basic:

1. V.P. Shyrobokov Medical Microbiology, Virology and Immunology. – Vinnytsia: «New book»- 2019. – 744p.
2. Accessible Version Diagnostic Laboratory Parasitology Laboratory User Handbook / Faculty of Infectious and Tropical Diseases London School of Hygiene & Tropical Medicine, 2020. - 43p.
3. Ruth Leventhal , Russell F. Cheadle Medical Parasitology : A Self-Instructional Text. 2019,- 312p.
4. Paul Schmid-Hempel Evolutionary Parasitology : The Integrated Study of Infections, Immunology, Ecology, and Genetics. 2011. – 544p.
5. Basic laboratory methods in medical parasitology. WHO Library, 1997.- 69p.

Links to professional periodicals:

1. https://fems-microbiology.org/about_fems/network-and-activities/journals/
2. <https://elibrary.escmid.org/>; <https://www.escmid.org/escmid-publications/manual-of-microbiology>
3. <https://asm.org/a/Microcosm-Digital-Magazine> 4. Microbiological journal <https://microbiolj.org.ua/ua/archiv>
5. The world of medicine and biology <https://womab.com.ua/ua/arcive>
6. Microbiology and biotechnology <http://mbt.onu.edu.ua/issue/archive>
7. Regulatory mechanisms in Biosystems <https://medicine.dp.ua/index.php/med/issue/archive>