MINISTRY OF EDUCATION AND SCIENCE OF the KYRGYZ REPUBLIC

Government-run Educational Institution of Higher Professional Education
Kyrgyz-Russian Slavic University
Institute of Clinical Medicine and Biomedical Technologies

Endorsed by
the Director, Assoc. Prof. *Abilova S.S.*
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MEDICAL PARASITOLOGY

Course Outline (Module)

Assigned to the Department of Academic Curriculum	**Physics, Medical Informatics and Biology** 560001 KR General Medicine (for foreign students)
Qualification	**Specialist**
Mode of Study	**Intramural**
Total Credit Value	1 credit point

Course hours **30** **cope of Testing Semesters:**
Including **credit** **2**
In class-learning **16**
Individual work **13,7**

The Course outline developed by: Kostritsyna T.V.

Course Hours Scheduling (per semester)				
Semester Academic Year	**2 (1.2)**		**Total**	
Weeks	**18**			
Type of Training	EP	WP	EP	WP
Lectures	8	8	8	8
Practical Session	8	8	8	8
Contact Work During the Period of Theoretical Training	0,3	0,3	0,3	0,3
including of Interactive Session	2	2	2	2
Total in Auditorium Session	16	16	16	16
Contact work	16,3	16,3	16,3	16,3
Independent Work	13,7	13,7	13,7	13,7
Total	30	30	30	30

The Course outline developed by:
Candidate of Biological Sciences, Associated professor, (Ph.D. in Biology& Genetics)
Kostritsyna T.V._____

Reviewers:
Candidate of Medical Sciences, Associated professor (Ph.D. in Medicine) Vishniakov D. V.
_____

Reviewers:
Candidate of Medical Sciences, Associated professor (Ph.D. in Medicine) Ibrayeva I. G.
_____

The Course Outline

Medical Biology

Is developed in accordance with the State Educational Standard of the Higher Professional Education of the Kyrgyz Republic in the specialty 560001: General Medicine (Order No. 1357/1 of the Ministry of Education and Science of the Kyrgyz Republic dated July 30, 2021).

In Accordance with the Academic Curriculum:

Confirmed by the KRSU Board of Academics on _____.2026 (Protocol №___).

The Course Outline endorsed
By the Department of Physics Medical Informatics and Biology

Protocol №1 by 28.08.2026
Valid Duration of the Program: 2026-2031 academic years
Head of Department, Docent, Ph.D. in Physics & Math., Kondratieva E. I.

Approved by the HEP: Zhamankulova M.K.

1. COURSE OUTLINE OBJECTIVES	
1.1	The main concept of a medical parasitology course is the study of parasites that infect humans, the diseases they cause, and the complex relationships between the host and the parasite. Students learn the methods used to combat parasitic diseases, which can range from low-tech to highly advanced. The course covers the major groups of human parasites, including multicellular helminths (worms). It also includes arthropods that cause disease or act as vectors.
1.2	The course examines the main groups of multicellular parasites that affect humans, including their distinctive features, life cycles, and habitats. A key focus is understanding the complex life cycles of these organisms and how they interact with their human hosts, including the effects they have on the body.
1.3	The main objective of medical parasitology is to provide students with knowledge of medically important parasites, including their biology, life cycles, and the diseases they cause. Develop the skills to identify parasites and their different life stages through microscopic examination and other diagnostic methods.

2. PLACE OF THE COURSE IN THE EDUCATIONAL PROGRAM	
Educational Program Units:	**B 1 .B.16.06**
2.1	**Students' Preliminary Training Requirements:**
2.1.1	Biology, anatomy and general biology which include in a high school level
2.1.2	Medical biology
2.1.3	Chemistry in the framework of a high school level
2.2	**COURSE UNITS AND PRACTICAL SESSIONS IMPOSING THE PRIOR PROFICIENCY**
2.2.1	Histology
2.2.2	Epidemiology
2.2.3	Immunology
2.2.4	Pathophysiology, clinical pathophysiology
2.2.5	General hygiene Normal physiology
2.2.6	Dermatovenereology
2.2.7	Zymotic diseases
2.2.8	Phthisiology
2.2.9	Forensic Medicine
2.2.10	Anesthesiology, resuscitation and intensive care
2.2.11	Nervous diseases
2.2.12	Ophthalmology

3. STUDENTS' COMPETENCIES, RESULTING FROM THE COURCE UNIT (MODULE)	
IC-l - is able and ready to analyze socially significant problems and processes, use the methods of natural sciences, mathematics and the humanities in various types of professional and social activities **PC-10 - able and ready to carry out preventive measures to prevent infectious, parasitic and non-communicable diseases**	
AFTER STUDY OF THE DISCIPLINE THE STUDENT MUST: **TO KNOW**	
Level 1	basic biological concepts of morphology and development of parasitic animals and their vectors
Level 2	the main scientific - medical and biological features of the development of parasitic animals and their vectors

Level 3	basic methods of comparative analysis of parasitic animals and their vectors
AFTER STUDY OF THE DISCIPLINE THE STUDENT MUST: BE ABLE TO:	
Level 1	to identify morphological features of parasitic animals and their vectors After studying medical parasitology, students must be able to identify and diagnose parasitic infections, understand the biology and life cycles of parasites, and comprehend their pathogenesis and public health implications.
Level 2	Practical and analytical skills. Laboratory identification: Perform practical laboratory work to identify parasite stages using techniques like microscopy.
Level 3	Analyze and interpret data: Critically analyze scientific data and interpret experimental results in an appropriate scientific format. Apply information, bibliographic resources, processing methods, search for scientific and technical information using general and specialized databases and use specialized software when carrying out theoretical calculations and processing experimental data to solve standard problems of professional activity
AFTER STUDY OF THE DISCIPLINE THE STUDENT MUST: OWN SKILLS	
Level 1	Elementary methods of work and safety instructions for laboratory equipment and chemical reagents in biological, parasitological laboratories; general safety rules for handling computers.
Level 2	***To know:*** Fundamental professional definitions, categories, and signs (symptoms) ***Be able to:*** Use fundamental professional definitions, categories, and signs (symptoms) to carry out professional activities. Solve clinical problems: Interpret clinical and investigational data to logically reason and solve clinical problems related to parasitic diseases.
Level 3	***Be able to*** use educational, scientific, popular science literature, reliable medical electronic resources for research activities, highlight the main thing in the flow of information

AS A RESULT OF LEARNING THE DISCIPLINE, THE STUDENT MUST

3.1	**KNOW:**
3.1.1	core concepts of Medical Helminthology and Medical Entomology.
3.1.2	Classification: Differentiate between the major groups of parasites that affect humans, including protozoa (single-celled organisms), helminths (worms), and parasitic arthropods (vectors).The general concepts that are fundamental to Medical Parasitology.
3.1.3	Life cycles: For each major parasite, describe its life cycle, including intermediate and definitive hosts, the infective stages, and how transmission occurs.
3.2	**BE ABLE**
3.2.1	Identify and classify parasites: Recognize and classify medically important metazoan parasites based on their morphology, biology, and clinical significance.
3.2.2	Recognizing the relationship between parasites and their hosts, including mechanisms of pathogenicity.
3.2.3	Applying basic techniques to examine parasites and interpret results.

	Recognizing the relationship between parasites and their hosts, including mechanisms of pathogenicity.
3.2.4	Safety: Demonstrating safe work practices, including proper handling of infectious materials and observing biosafety protocols.
3.2.5	Scientific communication: Preparing written reports, presenting research findings at conferences, and teaching scientific concepts to others.
3.3	**TO OWN SKILLS:**
3.3.1	To demonstrate awareness human parasites common in certain localities and other parts of the world. Classify parasites of medical importance in its broad scientific taxonomic positions.
3.3.2	To outline and discuss epidemiologic principles of parasitic disease. Describe and discuss the common parasitic diseases caused by protozoa as regards infective stage, mode infection and life cycle of parasites of medical importance. To identify medically important vectors or intermediary hosts and incriminate them in disease transmission
3.3.3	Critical analysis: Interpreting scientific literature and critically appraising data to form evidence-based conclusions. Ethical conduct: Understanding and applying ethical principles in research and professional practice.

4. COURSE (MODULE) STRUCTURE AND CONTENT							
Class Code	**Subject Name /Type of Lesson/**	**Semester/ Academic Year**	**Hours**	**Competencies**	**Literature**	**Interactive**	**Note**
	Section №1: Medical Helminthology and Medical Entomology						
1.1	Introduction to Medical helminthology. Classification of worms of medical importance. General characteristics Phylum *Platyhelminthes* (Flatworms), Class *Cestoda* (Tapeworms). *(lecture).*	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	0	
1.2	Phylum Platyhelminthes, General characteristics of class Trematoda. Life cycles of *Fasciola hepatica*, *Fasciolopsis buski; Paragonimus westermani.* biological features, epidemiology and clinical symptoms, infections prevention. View of microslides. *(practice).*	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	0	
1.3	Phylum *Platyhelminthes* (Flatworms), General characteristics of class *Trematoda (Flukes).* General characteristics of Phylum *Nemathelminthes, or* Nematodes (Roundworms). *(lecture).*	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	0	
1.4	Class Cestoda. Life cycles of *Taenia solium, Taenia saginata*. biological features, epidemiology and clinical symptoms, infections prevention. Microslides: of mature and young proglottids. Life cycles of *Echinococcus spp.:* biological features, geographic distribution, preventive measures *(practice).*	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	0	
1.5	Medical Entomology and Medical Arachnology. Classification of Phylum *Arthropoda* and its medical	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	0	

	importance. Classification and medical significance Class *Arachnida*. *(lecture).*						
1.6	Phylum Nematoda (Nemathelminthes).Life cycles of *Trichinella spiralis, Dirofilaria immitis.*, Lymphatic filariasis *Brugia malayai, Wuchereria bancrofti.* epidemiology and clinical symptoms, its infections prevention. (*practice).*	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	0	
1.7	General characteristics of 4 Orders of medical importance belonging class *Insecta*: 1. Orde*r Hemiptera* (bed bugs) 2. Order *Siphonaptera* (fleas) 3. Order *Anoplura* (lice); pediculosis. 4. Order *Diptera.* Epidemiology and prevention of insect-related diseases (plague, Dengue fever). *(lecture)*	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	2	Parasite Patrol: Lifecycle Game Parasite Patrol is a detective-style game about parasite lifecycles suitable for use in university or K-12 settings. The goal of the game is for participants to role-play parasite detectives
1.8.	Final control of the 1st Section: Formative assessment, Survey & Questioning of 1st Section *(practice).*	2/1	2	IC 1	L.1.4 L.2.1 L.2.2 L.2.3	0	Mcq testing
1.9	Credit	1	0			2	

5. ASSESSMENT TOOLS FUND

5.1. Control Questions and Assignments

Questions to check the Students' level of learning TO KNOW:

- The basic taxonomic categories of parasites, its morphology, systematics, life cycles.

Be able to:

Demonstrate knowledge and a critical understanding of key aspects of parasitology as applied to certain global health problems. Apply theoretical, methodological and practical skills in parasitology to study the basic concepts of practical medicine. Apply theoretical knowledge from the field of parasitology for the treatment and implementation of preventive measures among the population. Demonstrate knowledge from parasitological, clinical sphere for disease prevention, Health promotion and cure.

Own:

Main types of microscopy, Development of practical skills in measuring biological variables in a laboratory, recording, collating and analyzing the data statistically and graphically, and preparing concise summaries of the results. Reviewing, interpreting, integrating and discussing the findings in relation to published evidence, and presenting a referenced report as a project dissertation. Perform calculations using mathematical tools.

Skills:

Procedures for diagnostic medical parasitology. Methods of application of the acquired knowledge in the analysis of biological and medical information presented in different forms (graphical, presentations, etc.); methods of obtaining and researching natural science knowledge for solving standard tasks of professional medical activity. To integrate the results and achievements of medical parasitology to medical clinical practice of public health. Development of oral presentation skills within a team setting.

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Tasks to check the level of learning to BE ABLE and PROFICIENT

To check medical biology learning, use methods that assess knowledge recall and application, such as multiple-choice questions for basic knowledge, Blank Diagrams: Matching, alongside more complex tasks like patient case studies, simulation exercises, and a portfolio of research and clinical reports for proficiency. (Attachment 2)

Case Study

Case studies in medical biology illustrate how biological principles are applied to understand and treat diseases. They can cover a wide range of topics, from medical parasitology and medical biology to ethics. (Attachment 2)

5.2. Course Papers Themes

The discipline doesn't include writing coursework.

5.3. Assessment Fund

THEMATIC PLAN OF STUDENTS' INDEPENDENT WORKS

1st SECTION

1. Preventive and preventive measures against the spread of parasites – class Flukes.
2. Modern methods of controlling the spread of parasites of the Tapeworm class.
3. Measures to prevent the spread of representatives of the Roundworm type.
4. Modern methods of controlling the spread of infections transmitted by blood-sucking arthropods.
5. Prevention and measures to combat the spread of arthropod species of medical importance.
6. Monitoring of the epidemiological situation of parasitic tropical diseases.
7. Preventive and preventive measures against the spread of parasites – class Trematoda (Flukes).
8. Modern methods of controlling the spread of parasites of the class Cestoda (Tapeworms).
9. Measures to prevent the spread of representatives of the Phylum Nematoda
10. Modern methods of controlling the spread of infections transmitted by blood-sucking arthropods.

METHODOLOGICAL INSTRUCTIONS FOR THE IMPLEMENTATION OF INDEPENDENT WORK

on course

PARASITOLOGY

The basis of independent work of students is systematic, purposeful and thoughtful

reading of recommended literature. It is necessary to read what is recommended for each topic by the curriculum, seminar plans, other teaching materials, as well as by teachers. The basic literature includes the minimum of sources that is necessary for the complete and solid development of educational material.
Additional literature is recommended for a more in-depth study of the program material, expanding the horizons of the student. It is necessary to read literature systematically, according to the plan, correctly allocating time. Working with sources requires to:
1) focus on what you are reading;
2) highlight the main thoughts;
3) "embrace the thought" of the author quite clearly and distinctly, which helps to develop clarity and distinctness of your own thoughts;
4) think consistently;
5) imagine vividly and distinctly, as if experiencing what you read in the source;
6) consult with the instructor if facing difficulties during fulfilling practical tasks or something is not clear.

How to prepare an ESSAY (abstract)? It is worth following the order of preparation, which consists of several stages:

1. Choose and formulate a topic.
2. Find information sources.
3. Work out the basic materials.
4. Systematize the data obtained.
5. Make a detailed work plan.
6. Think over the content of each part.
7. Clarify how to issue an ESSAY (abstract) according to **INSTRUCTIONS**.

The plan corresponds to the structure of the work and consists of the following points:

- **INTRODUCTION;**
- **THE MAIN PART;**
- **CONCLUSIONS;**
- **LIST OF REFERENCES;**
- **APPLICATIONS** (If Any).

What should be the design of the ESSAY (abstract)?

The ESSAY (abstract) is made out in typewritten form on A4 sheets, font 14 pt, line spacing – 1.5. The volume of the abstract is 8-10 pages. On the title page in the center is the topic of the abstract, department name, on the right under the topic is the surname and initials of the student (course and group number), surname and initials of supervisor, the on the bottom in the center is the place and year of writing the abstract.

In conclusion it may be said: Independent work of students is an integral part of training and aims to consolidate and deepen the acquired knowledge, skills and abilities, search for and acquire new knowledge, perform training tasks, prepare for upcoming classes, ongoing monitoring of academic performance and intermediate certification.

GRADING SYSTEM FOR STUDENT'S ACHIEVEMENTS
Independent works

«Unsatisfactory level»
The student failed to fully review any of the independent work assignment questions (primary and/or secondary). The student refused to prepare the independent work assignment.
«Satisfactory level»

The student has mastered the required course material within the program, but the answers to the questions are not sufficiently comprehensive and accurate; the answers are based solely on data from the primary literature on the subject.

«Good level»

The student has studied the basic literature and he is known with the additional literature related to the program and uses this knowledge in their answers; when answering additional questions, the material is presented correctly, but without sufficient logical sequence; when answering, the student uses the necessary, carefully executed graphic material (diagrams, drawings, etc.); the instructor sometimes requires additional requests for clarifying answers.

«Excellent level»

The student has studied the basic and additional literature on the discipline and competently uses the knowledge gained when answering; in the answers he uses course materials from related disciplines, provides various examples as justification;

During the preparation process, he performs the necessary diagrams at a high level and uses them when responding;

does not need any help from a teacher;

He strives to independently replenish and update the knowledge necessary in his professional activity.

5.4. List of Assessment Tools

- Abstracts
- Situational Problems (Case Study)
- Multiple choice questions (Tests)
- Interviews
- Grading scales are provided in Appendix 3.

6. COURSE (MODULE) METHODOLOGICAL AND INFORMATIONAL SUPPORT

6.1 Recommended Reading

6.1.1 Required Reading List

	Authors, Compliers	Title	Book publisher, Year
L1.1	Campbell N.A.	Biology concepts and connections	University of California, Riversside, 2018
L1.2	David Sadava et al.	LIFE: The Science of Biology	Ninth Edition. 2011 by Sinauer Associates, Inc.
L1.3	Gil D. Brum, Larry K. McKane	Biology: Exploring Life	2010
L1.4	Apubra S. Sastry	Essential of medical parasitology	Jaypee Brothers Medical Publishers (P) LTD. New Delhi. London. Philadelphia. Panama. 2014.

6.1.2 Advanced Reading

	Authors, Compliers	Title	Book publisher, Year
L.2.1	Chiodini P.L.	Atlas of Medical Helminthology and Protozoology.	Churchill Livingstone, 2003
L.2.2	Gillespie S.H., Pearson R.D.	Principles and practice of clinical parasitology.	by John Wiley & Sons Ltd
L.2.3	Mehlhorn H.	Encyclopedia of Parasitology.	Vol. 1, Vol. 2. Heinrich-HeineUniversitat Institut fur

			Zoomorphologie, Zellbiologie und Parasitologie. Dusseldorf , Germany, 2008.
6.1.3 Guidance Papers			
	Authors, Compliers	Title	Book publisher, Year
6.2 Online Resources			
E1.	Diagnostic protocols for the identification of parasites	https://www.cdc.gov/parasites/az/index.html	
E2.	Silluvan J.T. Electronic atlas on parasitology	https://tech.msu.edu/about/guidelines-policies/afs-retirement/	
E3.	Genetics: A Conceptual Approach, 6th edition, Benjamin A. Pierce, W. H. Freeman, 2016	https://ru.b-ok2.org/book/3675893/565004?dsource=recommend	
E4.	Principles of Genetics, 6th edition, D. Peter Snustad, Michael J. Simmons, John Wiley and Sons, 2011	https://ru.b-ok2.org/book/2323413/983305?dsource=recommend	
E5.	Essentials of Medical Parasitology, Apurba Sankar Sastry, Jaypee Brothers Medical Publishers, 2014	https://ru.b-ok2.org/book/3562671/e55e1e?dsource=recommend	
6.3. List of Information and Education Technologies			
6.3.1 Competence-based Educational Technologies			
6.3.1.1.	To organize the study of the discipline, traditional educational technologies are used, aimed at providing knowledge and means of action transmitted to students in a finished form. Lecture material is provided to students using multimedia equipment. Explanatory and illustrative lectures, explanatory and introductory practical classes are traditional educational technologies.		
6.3.1.2.	Information educational technologies are: classes in an interactive form, forms a systematic thinking and the ability to generate ideas when solving various case-tasks. In accordance with the requirements of the State Educational Standards of Higher Professional Education for students in the specialty 560001 General Medicine of the Kyrgyz Republic, active and interactive forms of education are widely used in the educational process: conversations, cases, developing classes, explanatory and illustrative classes, business games. and role-playing games, lectures with elements of discussion, make up at least 50% of classroom lessons. Information and educational technologies include 5 business games, which are controlled in the form of independent work, case tasks in practical classes.		
6.3.1.3.	Information educational technologies - independent use by a student of computer equipment and Internet resources including video films for performance of tasks of practical training and independent work		
6.3.2 List of Information Reference Systems and Software			
6.3.2.1.	http://www.medlinks.ru/ - MedLinks.ru MedLinks.ru		
6.3.2.2.	https://elibrary.ru/defaultx.asp? - Scientific electronic library		
6.3.2.3.	https://pubmed.ncbi.nlm.nih.gov/ - US National library of medicine		
6.3.2.4.	http://rmic.med.kg/ru/ - Republic medico-information center Bishkek city		
7. COURSE (MODULE) LOGISTICS			
7.1	Lecture hall for 150 seats,		
7.2.	Computer class for 20 seats with connection to the Internet		
7.3.	3 classrooms for 14 seats for practical classes,		
7.4.	Multimedia projector,		
7.5.	Wall-mounted screen,		
7.6.	Microscopes,		
7.7.	A set of macro and micro preparations, albums, photo albums, models and tables on the topic under study,		

7.8.	Educational videos within the following sections: biology of development, medical parasitology, Ecology and biosphere,
7.9.	Biological museum

8. METHODOLOGICAL INSTRUCTIONS FOR STUDENTS ON MASTERING THE DISCIPLINE (MODULE)

Technological chart of the discipline «Parasitology» is placed in Attachment №1

To organize extracurricular (independent) medical parasitology study, create a system that encourages student independence through diverse, creative tasks and provide clear methodological guidance. Structure the work to progressively increase in complexity and integrate it with professional and research activities, especially at higher academic levels. Ensure students understand the goals, have access to necessary resources, and receive support through structured Q&A sessions or consultations to apply theory to practice.

METHODOLOGICAL INSTRUCTIONS FOR THE IMPLEMENTATION OF INDEPENDENT WORK

on course

MEDICAL PARASITOLOGY

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Methods and activities of teaching

- **Integrate theory with practice:**

Connect theoretical knowledge to practical applications through case studies, problem-solving, and projects.

- **Promote creative tasks:**

Assign creative and practical projects that require independent thinking, moving beyond simple memorization.

- **Encourage self-study:**

Guide students to use additional literature and resources to review topics and delve deeper into areas of interest.

- **Incorporate interdisciplinary work:**

Explore how biology connects to other fields to prepare students for the interdisciplinary nature of modern science.

- **Foster a positive attitude:**

Use extracurricular activities to build interest and enthusiasm for biology, which can lead to better academic performance.

Current control (CC)

Current (contemporary) control and assessment in biology lessons move beyond traditional written tests and aim to evaluate a wider range of skills, including conceptual understanding, practical application, and scientific reasoning. A balanced approach combines formative and summative assessments to provide continuous feedback and measure overall achievement.

Classroom engagement

- **Active participation:** Observe students during classroom discussions and small group work to gauge their understanding of concepts.
- **Quick checks and exit tickets:** Use brief quizzes or questions at the end of a lesson to provide real-time feedback and quickly identify areas where students need further support.

Visual and verbal methods

- **Concept maps:** Ask students to visually represent the relationships between key biological terms and concepts. This reveals the connections they have made between ideas.
- **Interactive demonstrations:** Have students participate in or explain a demonstration, allowing the teacher to observe their retention of knowledge in a dynamic way.
- **Oral reports:** Assess students' understanding and communication skills as they present their research or findings to the class.

Traditional written assessment

- **Varied tests and quizzes:** Move beyond basic recall with questions that require students to apply biological concepts to novel scenarios.

- **Comprehensive exams:** Use longer, higher-stakes tests to measure overall achievement at the conclusion of a unit or course.

TO PREPARE FOR A LECTURE, students should review the course outline to understand the topic, complete any pre-reading assignments, and download lecture slides to follow along. They should also review notes from previous lectures to ensure they understand how topics connect, organize their notes with clear headings, and set a goal for what they want to learn, such as specific questions to be answered.

Before the Lecture

- **Know the Topic**:

Check your course outline for the weekly topics to anticipate what the lecture will cover.

- **Do Pre-Reading**:

Engage with any assigned readings to become familiar with the material and new vocabulary.

- **Download Lecture Slides**:

If available, download the lecture slides beforehand. You can print them to write directly on them, or use them as a digital template.

- **Organize Your Notes**:

Set up a document or notebook with clear headings like "Date," "Week/Lecture #," and "Lecture Title" for easy organization.

- **Review Previous Notes**:

Go over notes from past lectures to see how the current topic relates to previous concepts.

- **Set Learning Goals**:

Determine one or two questions you want to explore or concepts you want to understand better to set a focus for the lecture.

During the Lecture

- **Be Present and Attentive**:

Pay close attention to the lecturer and minimize distractions, such as turning off notifications on your devices.

- **Take Effective Notes**:

Don't try to write down every word. Instead, focus on paraphrasing and summarizing the main points in your own words.

- **Use Shorthand and Abbreviations**:

This can help you write faster and capture more information.

- **Be Comfortable**:

Make sure you are in a comfortable position to help you concentrate for the entire lecture.

After the Lecture

- **Review and Revise Your Notes**:

Go back over your notes to make sure you've understood the core concepts and to fill in any gaps.

- **Share and Compare Notes**:

Discuss your notes with classmates to get a different perspective and ensure you've captured all key information,

- **Ask Questions**:

If anything is still unclear, reach out to your instructor or attend Q&A sessions to get your questions answered.

AFTER THE LECTURE

The learning process continues after the lecture ends. Reinforce what you've learned to cement it in your memory.

- **Review your notes within 24 hours.** To prevent yourself from forgetting the information, go over your notes shortly after the lecture while the material is still fresh.
- **Fill in any gaps.** Clarify any parts of your notes that are unclear or incomplete. If necessary, compare notes with a classmate or ask your lecturer for help.
- **Discuss with peers.** Reviewing the lecture with classmates can help you process the information more deeply. You can debate ideas and share different perspectives on the topic.
- **Revisit recordings.** If the lecture was recorded, use the recording to re-listen to confusing parts or to refine your notes. Use the pause function to learn at your own pace.
- **Keep practicing.** Continue building your English skills outside of class by watching movies, reading books, or using a language exchange app. This exposure will help you become more comfortable and fluent.

PREPARE FOR PRACTICE CLASS ON MEDICAL PARASITOLOGY

Thorough preparation for a biology practical class involves understanding the underlying theory, reviewing procedures, and familiarizing yourself with laboratory equipment and safety measures

. This hands-on experience reinforces your understanding of parasitological concepts and develops essential scientific skills.

BEFORE THE PRACTICAL LESSON

- **Study the theory.** Read your textbook and lab manual to understand the parasitological concepts behind the experiment. You'll get more out of the lab if you understand the purpose of each procedure and what results to expect.
- **Visualize the procedure.** Read the instructions carefully and mentally walk through each step of the experiment. This helps you understand the flow of the process and identify potential points of error.
- **Familiarize yourself with equipment.** Learn the names and proper usage of all equipment you will use, such as microscopes, microslides. Knowing how to use them correctly will help you feel more confident and efficient in the lab.
- **Plan your data recording.** Before you begin, create a table in your notebook to organize your data. Label the rows and columns clearly with the variables you need to measure and the units you'll use.
- **Review safety precautions.** Be familiar with all safety protocols, including the location of safety equipment and the proper handling and disposal of hazardous materials. You must always wear appropriate personal protective equipment, like safety goggles and a lab coat.

DURING THE PRACTICAL LESSON

- **Read instructions again.** Re-read the instructions one more time before starting. Take note of any specific details, such as exact measurements or timing.
- **Work safely.** Follow all safety instructions and keep your lab area tidy and organized.
- **Document everything.** Record all observations and measurements neatly and accurately in your lab notebook as you work. For microscopic work include detailed, labeled drawings.
- **Collaborate effectively.** If you are working in a group, communicate with your partners to ensure everyone understands the procedure. Share tasks and make sure all results are recorded accurately.
- **Ask questions.** If you are confused about a step or unsure of a result, ask your instructor for clarification. It's better to ask a question than to make a mistake that could compromise the experiment.

AFTER THE PRACTICAL LESSON

- **Review your data.** Immediately after the practical, look over your results to make sure they are complete and accurate. Compare your data with your lab partners if appropriate.
- **Reflect on the experiment.** Think about why you performed each step and whether your results made sense. Consider potential sources of error and how the experiment could be improved.
- **Write your lab report.** When writing your report, provide a clear, concise write-up that includes the aim, procedure, results (tables, graphs, and drawings), and a conclusion.
- **Connect theory to practice.** Analyze how the hands-on experience connected to the theoretical concepts you learned in lectures. This will help you solidify your understanding and move beyond simple memorization.

Distance learning in PARASITOLOGY

offers flexibility through online platforms, allowing students to study at their own pace without commuting. While theoretical aspects can be covered extensively, hands-on laboratory components remain a significant challenge in traditional, in-person biology education and require careful consideration or alternative arrangements. Teaching using web technologies: ZOOM, GOOGLE Classroom Platform, TEAMS, WhatsApp chats.

Attachment №1

Technological chart of the discipline «MEDICAL PARASITOLOGY »

Name of the modules discipline according to Academic Curriculum	Control	Form of control	Credit Minimum	Credit maximum	Control Schedule
Module № 1:					
Module №1 Medical Helminthology and Medical Entomology	Formative Assessment	Oral answers, interview, attendance, lecture notes, independent work	**20**	**35**	**26th week**
	Midterm examination	Formative assessment, Survey & Questioning of 2nd Module. MCQS Testing , Control work	**20**	**35**	
TOTAL points for the Semester			**40**	**70**	**43rd week**
Mindpoint assessment Intermediate control (credit)			**20**	**30**	
Summarative Assessment			**60**	**100**	

Attachment №2
Questions to Mid-term Control №1

Questions for Mid-term Control of 1st MODULE

1. Introduction to Medical Parasitology.
2. Foundational concepts. Parasite classifications and types
3. What are the three major groups of animals traditionally studied in medical parasitology?
4. Define the following terms: Parasite, Host, Symbiosis, Commensalism, Mutualism, Parasitism
5. Describe differences between ectoparasites and endoparasites. Provide an example for each.
6. . Explain the difference between an obligate parasite and a facultative parasite. Provide an example for each.
7. Differentiate between a definitive host and an intermediate host. Provide an example for each.
8. What is a paratenic (or transport) host? What is a reservoir host? Provide an example for each.
9. Provide an example of a human disease caused by a parasite from each group.
10. How are protozoa classified based on their method of locomotion? Provide an example for each type.
11. Parasites and Parasitism.
12. Describe the General problems of Helminthology.
13. Describe the major characteristics Phylum Platyhelminthes.
14. Describe the major characteristics Class Trematoda.
    - Systematic
    - Body structure
    - Life cycles and biology
15. Describe the major characteristics Class Cestoda.
    - Systematic
    - Body structure
    - Life cycles and biology

16. Describe the major characteristics of Phylum Nematoda.
    - Systematic
    - Body structure
    - Life cycles and biology

17. Describe the major characteristics of Taeniasis.
    - Causal agent
    - Life cycle,
    - clinical manifestation: : teniasis & cysticercosis
    - preventive measures (control), geographic distribution
18. Describe the major characteristics of Echinococcosis. Diphyllobothrium latum
    - Causal agent
    - Life cycle,
    - clinical manifestation,
    - preventive measures (control), geographic distribution
19. Describe the major characteristics of Fascioliasis& Schistosomiasis
    - Causal agent

- Life cycle,
- clinical manifestation,
- preventive measures (control), geographic distribution

20. Describe the major characteristics species of *Ascaris lumbricoides, Trichinella spirallis, Dirofilaria, Wuchereria bancrofti*..
    1. Causal agent
    2. Life cycle,
    3. clinical manifestation,
    4. preventive measures (control), geographic distribution

21. Introduction into Medical Entomology.
22. Parasitic Arthropods. Parasitic arthropods as parasites and/or micropredators. Classitication
23. Class Insecta. classification
24. Order Diptera - the true flies.
25. Order Diptera. Suborder Nematocera. Family Ceratopogonidae - biting midges.
26. Order Siphonaptera (the fleas). Describe the major characteristics of fleas.
27. Order Hymenoptera
28. Order Hemiptera (true bugs)
29. Order Anoplura, Family Pediculidae - the lice. Classification of biting lice.
30. Class Acari (ticks and mites). Mange & scabies.
31. Describe the major characteristics of Insect-Arthropod-Related Diseases
32. Describe the major characteristics of disease plague.
33. Describe the major characteristics of Lyme Disease.
34. Describe the major characteristics of disease Dengue Fever.
35. Describe the major characteristics of Artropod-borne viruses.
36. Describe the major characteristics of disease Arboviral Encephalitides.
37. Describe the major characteristics of disease Japanese Encephalitis.
38. Describe the major characteristics of disease Tick-Borne Encephalitis

Attachment №3

Assessment scales
Grading system for student's achievements

Grading criteria per discipline				
Maximum score	**Intervals**			
	«unsatisfactory»	**«satisfactory»**	**«good»**	**«excellent»**
Independent work (Abstract) -5 marks (points)	**0-2**	**3**	**4**	**5**
Interval description	The student failed to fully review any of the independent work assignment questions (primary and/or secondary). The student refused to prepare the independent work assignment.	The student has mastered the required course material within the program, but the answers to the questions are not sufficiently comprehensive and accurate; the answers are based solely on data from the primary literature on the subject.	The student has studied the basic literature and he is known with the additional literature related to the program and uses this knowledge in their answers; when answering additional questions, the material is presented correctly, but without sufficient logical sequence; when answering, the student uses the necessary, carefully executed graphic material (diagrams, drawings, etc.). the instructor sometimes requires additional requests for clarifying answers	The student has studied the basic and additional literature on the discipline and competently uses the knowledge gained when answering; in the answers he uses course materials from related disciplines, provides various examples as justification; During the preparation process, he performs the necessary diagrams at a high level and uses them when responding; does not need any help from a teacher; He strives to independentl y replenish and update

				the knowledge necessary in his professional activity.
Current control – 5 marks (points)	**0-2**	**3**	**4**	**5**
Interval description	The student does not know a significant part of the program material, makes significant blunders; the main content of the material is not disclosed; poor knowledge of terminology; there is no necessary theoretical knowledge and the ability to apply them to solve practical problems. It will be also marked "unsatisfactory" if the student refuses to answer.	The student has mastered only the basic program material, but does not know individual features and details; admits inaccuracies; violates the sequence in the presentation of the program material; the material is not systematized, incorrectly formulated; speech is mostly literate, but poor; has a minimum sufficient level of competence; solves professional practical problems with errors, mainly justifies the decisions made	The student has demonstrated the formation of competencies, has a sufficient level of professional terminology; correctly, logically and essentially sets out the answer, doesn't allow significant errors and inaccuracies when answering questions, but the presentation is sufficiently systematic and consistent; when solving a practical problem, basically justifies the decisions made correctly.	The student has demonstrated the formation of competencies and can apply them in professional activities; exhaustively, consistently, competently and logically harmoniously presents the answer, without errors; the answer does not require additional questions; good speech, fluency in professional terminology; does not have difficulties in answering when changing assignments; knows how to solve professional practical tasks; correctly justifies the decisions, is

				able to summarize and present the material independently
Control score -5 marks (points)	0-2	3	4	5
Interval descript	The student has identified gaps in his knowledge of the educational material provided by the program and cannot give clear answers to basic, additional, and leading questions.	The student has the necessary educational (study) knowledge within the framework of the program, but the answers to the questions are not complete and accurate enough; only data from the basic literature on the discipline is used in the answer.	The student fully discloses the educational (study) material provided by the program, small mistakes are made, inaccuracies that do not distort the content of the answers to the essence of the questions	The student presents the program material in a deep and complete manner at a high scientific level, answers all questions and additional queries with full understanding and without errors.

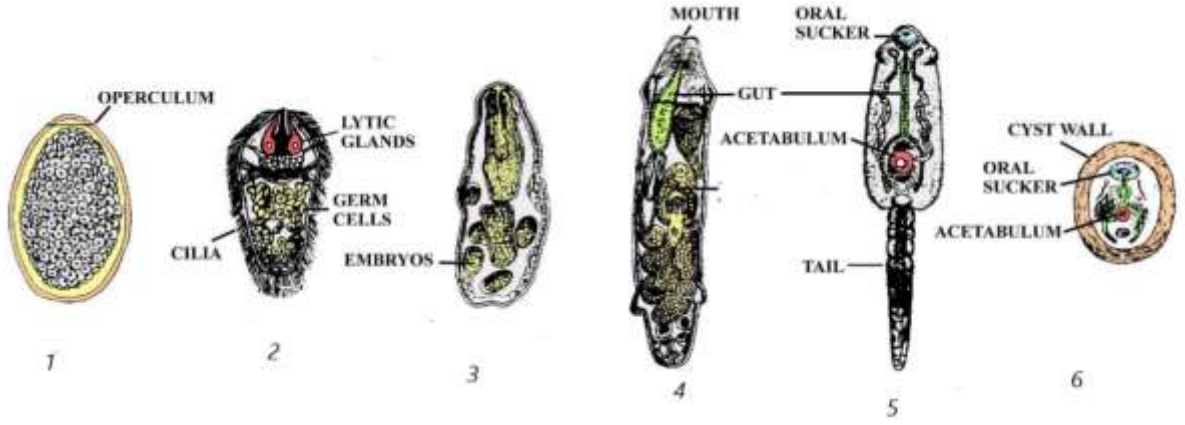
90- 85 % – 5 marks (points)
84 – 71 % – 4 marks (points)
70 – 54 % – 3 marks (points)
Less 54 % – 2 marks (points)

Criteria for evaluating tasks in the MCQs form

5 points – 85 - 100% correct answers
4 points – 76 - 85% correct answers
3 points – 60 - 75% correct answers
2 points – 0 - 59% correct answers

Tests for 1st year students in the discipline PARASITOLOGY

Matching: A list of parasites stages can be matched with their corresponding numbers on a diagram.



	Your answer.
1.	
2.	
3.	
4.	
5.	
6.	

Phylum _____

- flatworms



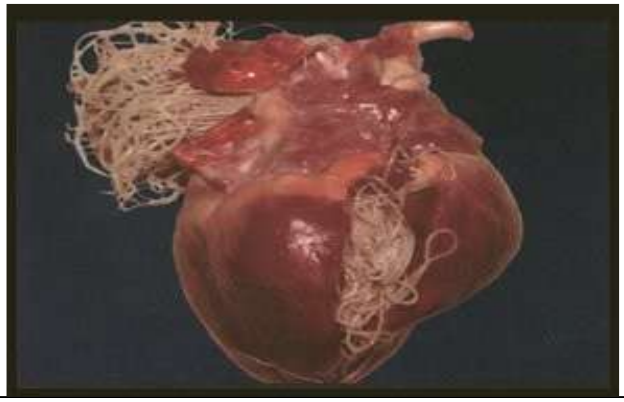
Free-living Planarian

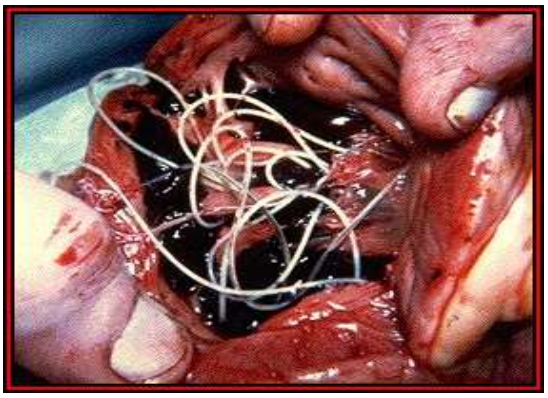


Parasitic Tapeworm

Dirofilaria immitis

- Dog _____
- Carried by _____





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CASE STUDY ON PARASITOLOGY

Presentation of Quiz #1

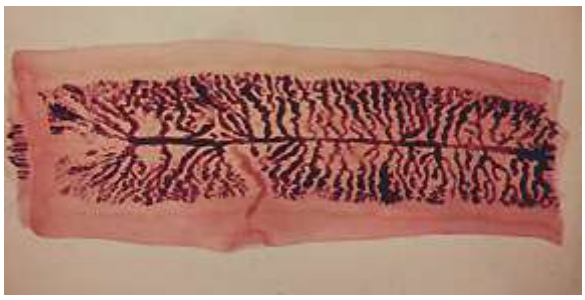
A 25-year-old woman from Peru went to the physician's office because she found some white, rectangular objects in her stool specimen. She had always been healthy, and had come to the United States 3 years earlier. She denied any gastrointestinal or other symptoms. She had lived in a rural area of Peru. She indicated she had eaten beef and pork rather regularly. During the last few days, she complained of anorexia, some nausea, and abdominal cramps; however, she had no diarrhea.

Laboratory findings were normal; however, the routine O&P examination revealed the following:



Examples of helminth eggs; photographed using the high dry (40X) objective

The structure below was brought in by the patient and measured approximately 1" by 3/8" and appeared to be a very pale tan color (almost white) - this image was obtained after staining.



Scroll Down for Answer and Discussion

Answer and Discussion of Quiz #1

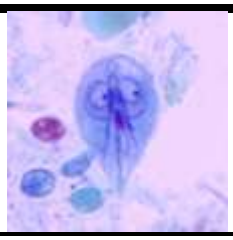
The images presented in Diagnostic Quiz #14 are the following:

1. The three helminth eggs are those of *Taenia* spp. From the egg morphology, it is impossible to identify the cestode to the species level, either *T. saginata* (beef tapeworm) or *T. solium* (pork tapeworm).
2. This structure recovered from the patient's stool specimen is a *T. saginata* gravid proglottid (after staining with a Congo red-based dye.

Comment: This is a case of a woman who was infected with the tapeworm, *Taenia saginata*.

Presentation of Quiz #2

A patient is a 52 year-old male from the United States who has traveled throughout the world as a professional architect (Europe, Asia, Central and South America, Australia, New Zealand). He was diagnosed as having diarrhea, cough, and general malaise. He has had a history of vague health problems over the past few years, but was not currently under a physician's care. He presented to the Tropical Disease Clinic and, subsequently, three stool specimens were submitted to the laboratory. After examination of the concentration sediment and permanent stained smears from all three specimens, the following objects were seen. Please comment on the identification of the structures seen.

		
1. High Dry Objective	2. High Dry Objective	3. Oil Immersion Objective (>12 microns)
		
4. High Dry Objective	5. Oil Immersion Objective	6. Oil Immersion Objective

Answer and Discussion of Quiz #2

The images presented in Diagnostic Quiz #2 are the following:

1. *Trichuris trichiura* egg
2. *Giardia lamblia* cyst
3. *Entamoeba histolytica/E. dispar* trophozoite

4. *Hymenolepis nana* egg
5. *Giardia lamblia* trophozoite
6. *Entamoeba coli* cyst

Comments on the patient: The patient may have experienced vague abdominal symptoms from several of the parasites found, including *Trichuris trichiura*, *Hymenolepis nana,* or *Giardia lamblia*. The cough may be related to other causes. *Entamoeba coli* is a nonpathogen and would merely be an indication that the patient had ingested something contaminated with fecal material. The morphology of *Entamoeba histolytica/E. dispar* does not allow differentiation between the true pathogen, *E. histolytica* and the nonpathogen, *E. dispar*.

Tests for 1st year students in the discipline of Medical Parasitology

1. ___**Reduviid bugs are also known as:**

a) laughing bugs b) hissing bugs c) kissing bugs d) tickling bugs e) hairy bugs

2. ___**How is Schistosoma haematobium transmitted?**

a) Ingestion of raw or under cooked snail, frog, or snake, b) Invasion of filariform larvae from soil, c) Handling aquatic birds, d) Standing or swimming in contaminated water e) Tsetse fly bite

3. ___**The following worms are Nematods:** a) *Taenia saginata*, b) *Fasciola hepatica, c) Echinococcus granulosus, d) Ascaris lumbricoides*

4. ___**Which of these groups of arthropods transmit the causative agents of Dengue fever** a) Fleas, b) Kissing (conenose) bugs, c) Sucking lice, d) Chewing lice, e) *Aedes aegypti.*

5. ____**Which of these groups of arthropods transmit the causative agents of Plague and murine (endemic) typhus to humans?** a) Fleas, b) Kissing (conenose) bugs, c) Sucking lice, d) Chewing lice, e) Cockroaches.

6. ____**What stage of the Trematodes swims in the water?** a) Cercariae b) Coracidium c) Metacercariae d) Sporocyst

7. ____**What is the usual manner of transmission of Schistosoma to man?** a) Arthropod vector B] Ingestion of the embryonated eg C] Skin penetration of the cercariae D] B & C

8. ____**Which of the following is the tape worm acquired from eating undercooked pork?** a) *Dipylidium* spp., b) *Echinococcus granulosus, c) Taenia saginata, d) Taenia solium, e) Trichinella spiralis.*

9. _____**Lyme disease transmitted to humans by** a) ingesting cysts in water or food, b)inhaling trophozoites, c) ticks bites, d) dirty fingers, e)handing cats.

10. ____**Trichinosis in humans results from:** a) ingestion of eggs, b) ingestion of cyst, c) ingestion of pork containing encysted larvae, d) ingestion of pork containing cysticerci , e) penetration of larvae through the skin.

11. ____**The following worms are nemathelminths:** a) *Trichinella spiralis*, b) *Echinococcus granulosus, c)Taenia saginata, d) Dirofilaria immitis* (Dog Heartworm).

12. _____**The following worms are plathelminthes:** *a) Wuchereria bancrofti, b) Taenia solium, c) Echinococcus granulosus, d) Trichinella spiralis*

13. ____**The scientific name of the sheep livert fluke is?** a) Metagonimus yokogawai, b) Paragonimus westermani, c) *Dicrocelium dendriticum , d) Fasciola hepatica*

14. ____**The following worms are Cestodes:** *a) Fasciola hepatica, b) Taenia solium, d) Ascaris lumbricoides, e) Echinococcus granulosus*

15. ___**Class Cestoda has the following characters EXCEPT** a) Flat worm b) The worms are segmented, c) Has alimentary tract d) Hermaphrodite

16. ____**In the life cycle of Liver fluke the sheep get infection when they ingest** a) encysted cerecariae, b) miracodia, c) sporocysts, d) rediae.

17. ____**Miracidium is a larval stage in the development of** *a) Taenia solium, b) Fasciola hepatica, c) Ascaris, d) Echinococcus*

18. ____**The mode of infection with pinworm is the following except:** a) through mouth, b) inhalation of air borne ova, c) retroinfection, d) infected larvae penetrate the skin.

19. _____**The location of Dirofilaria immitis (Dog Heartworm) Is** a) peripheral blood, b) lymphatic system, c) small intestine, d) large intestine, e) lung

20. _____**Cysticercous bovis is the infective stage of:** a*) Diphyllobothrium latum*
b) Taenia saginata *c) Taenia solium* *d) None of the above*