ASSESSMENT FUND

for discipline «Medical Parasitology»

The level of higher education

SPECIALTY

Direction of preparation

Specialization 31.05.01. - RF, 560001 - KR General medicine

(the Code and Direction of Preparation)

2024

№ 1: STUDENTS' COMPETENCIES, RESULTING FROM THE COURCE UNIT (MODULE)

Competencies Formation	Planned learning outcomes for the discipline, characterizing the stages of competency development	Types of Assessment Tools/ section code in this document
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:*** the main concepts of Medical Helminthology and Medical Entomology, Classification parasitic helminths (worms), and parasitic arthropods (vectors). Life cycles of major parasites groups, describe its' intermediate and definitive hosts, the infective stages, and types of transmission.	**Block A, D** - tasks of the reproductive level - Oral answers, - interview, attendance, - Formative assessment, Survey & Questioning of 1st Module. - MCQS Testing , Control work
	After study of the discipline the STUDENT MUST: **be able to:** Recognize and classify medically important metazoan parasites based on their morphology, biology, and clinical significance. Recognizing the relationships between parasites and their hosts. Applying basic techniques to examine parasites and interpret results. Safety: Demonstrating safe work practices, including proper handling of infectious materials and observing biosafety protocols. Scientific communication: Preparing written reports, presenting research findings at conferences, and teaching scientific concepts to others.	**Block *B, D* -** tasks of the reconstructive level: - Solving situational cases-Report - Cytogenetical analysis of karyotypes - Formative assessment, - - MCQS Testing, - Control work
	After study of the discipline the STUDENT MUST have : ***own skills:***	**Block D** – practice-oriented and/or research level

	To outline and discuss epidemiologic principles of parasitic diseases, to identify medically important vectors or intermediate hosts and its' roles in disease transmission 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.	assignments- Solving situational cases

№2. 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**	

№ 3: STANDARD CONTROL TASKS AND OTHER MATERIALS IMPORTANT FOR EVALUATING PLANNED LEARNING RESULTS IN THE DISCIPLINE "MEDICAL PARASITOLOGY" (ASSESSMENT TOOLS)

BLOCK A

A. Fund of tests for the discipline.

MULTIPLE CHOISE QUESTIONS (Test control)

Choose one correct answer.

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 eggs,
   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.

A.1 QUESTIONS FOR ORAL DISCUSSION:

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..*
    - Causal agent
    - Life cycle,
    - clinical manifestation,
    - 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

BLOCK B

B. SITUATIONAL CASES

Helminthology **situational cases** are clinical scenarios used to diagnose and understand infections caused by parasitic worms (helminths). These cases typically involve details about the patient's travel history, symptoms, and laboratory findings (such as stool or blood tests) to identify the specific parasite.

Situational cases:

Case 1: Intestinal Obstruction *(Ascaris lumbricoides)*

Scenario: A 4-year-old child in a rural area presents with severe abdominal pain, vomiting, and constipation.

Finding: A massive infestation of adult Ascaris worms causes bowel obstruction or volvulus.

Case 2: Neurocysticercosis (*Taenia solium*)

Scenario: A patient presents with new-onset seizures and headaches after eating undercooked pork.

Finding: Imaging reveals larval cysts (*Cysticercus cellulosae*) in the brain, caused by consuming *T. solium* eggs.

Case 3: Trichinosis (*Trichinella spiralis*)

Scenario: A hunter and friends develop muscle pain, fever, and periorbital edema after eating raw or undercooked bear/wild boar meat.

Finding: Larvae have migrated into muscle tissue.

Case 4: Schistosomiasis (Blood Flukes)

Scenario: A traveler presents with fever, diarrhea, and itchy skin (swimmer's itch) weeks after swimming in a freshwater lake in Africa or South America.

Finding: Eggs deposited in the liver/bladder cause granulomas and inflammation.

Case 5: Visceral Larva Migrans (*Toxocara canis*)

Scenario: A young child presents with chronic cough, hepatomegaly (enlarged liver), and high eosinophil counts, with a history of playing in dirt contaminated by dog feces.

Finding: Larvae are migrating through organs.

Case 6: Hookworm Anemia (*Necator americanus*)

Scenario: A patient in a tropical region with poor sanitation presents with severe iron-deficiency anemia and fatigue.

Finding: Adult worms attached to the intestinal mucosa have caused chronic blood loss.

Case 7:

Scenario: 56-year-old Korean immigrant sought medical attention for non-specific abdominal pain and mild, intermittent diarrhea. A stool specimen was collected and sent for ova and parasite (O & P) examination. Figures A and B show what was detected in low numbers on a wet-mount preparation following fecal concentration. The objects of interest average 30 micrometers in length. What is your diagnosis? Based on what criteria?

Finding:

 **figure A**  **figure B**

Case answer:

This was a case of clonorchiasis caused by Clonorchis sinensis or opisthorchiasis caused by Opisthorchis viverrini. Morphologic features shown included:

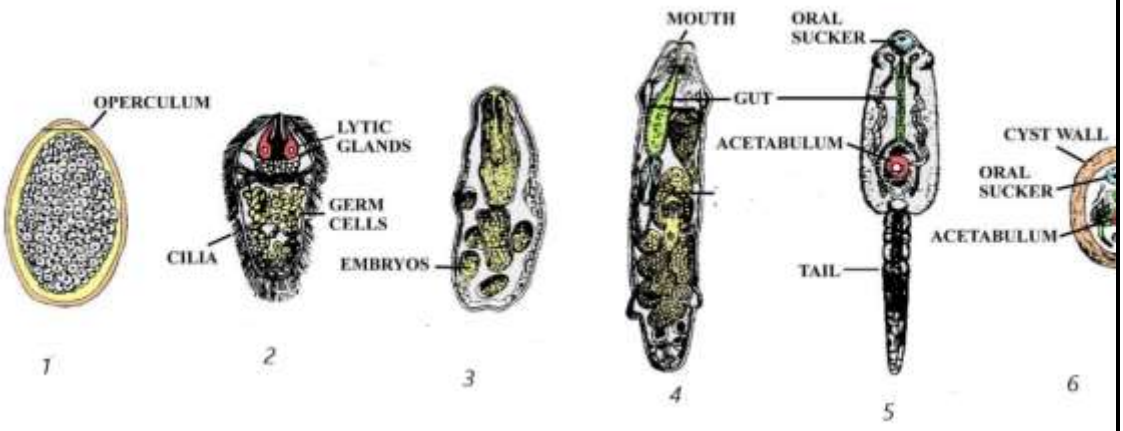
Oval shaped, embryonated operculate eggs within the size range for both C. sinensis and O. viverrini (C. sinensis 27-35 µm and 19-30 µm for O. viverrini).

Visible opercular "shoulders."

Small abopercular knob.

Presence of a differentiated miracidium.

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



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

Morphology case

Phylum _____

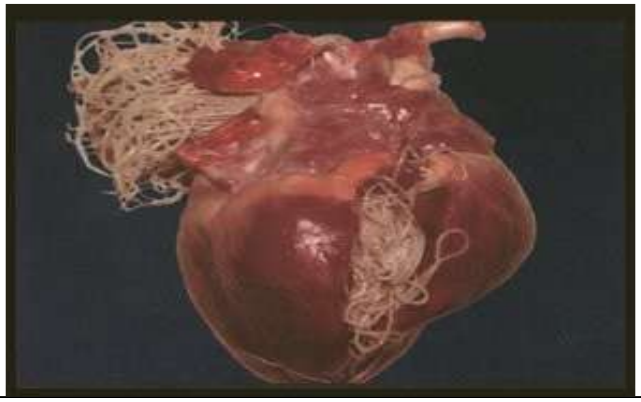
- flatworms

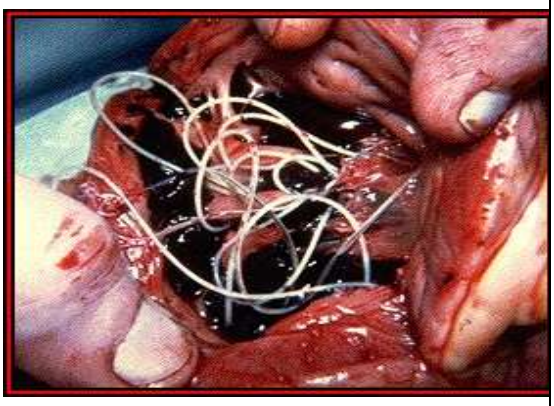
Free-living Planarian

Parasitic Tapeworm

Dirofilaria immitis

- Dog _____
- Carried by _____





71

Situation Cases

CHARACTERISTICS OF ARTHROPODS

- segmented bodies are arranged into regions, called tagmata (e.g., head, thorax, abdomen)
- _____ symmetry
- Paired_____ appendages
- Chitinous _____
  - shed during growth
- _____ circulatory system - dorsal
- _____ nerve cord
- Compound _____

CASE STUDIES IN MEDICAL PARASITOLOGY

№1. Presentation of Quiz

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.

Conclusion:

Helminth eggs **cannot be clearly viewed at only 40x total magnification**. For proper observation, use at least **400x total magnification** (40x objective lens with 10x eyepiece).

Scroll Down for Answer and Discussion

Answer and Discussion of Quiz #1

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

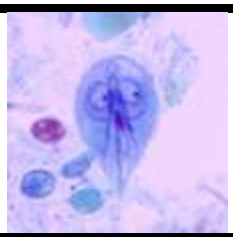
1. The three helminth eggs are those of *Taenia* spp. From the egg morphology, it is impossible to identify the cestode to the species level, either *T. saginata* (beef tapeworm) or *T. solium* (pork tapeworm).
2. This structure recovered from the patient's stool specimen is a *T. saginata* gravid proglottid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

Comment: This is a case.

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*.

BLOCK C:

LIST OF THEMES OF ABSTRACTS FOR INDIVIDUAL STUDENTS' WORK:

THEMATIC PLAN OF STUDENTS' INDEPENDENT WORKS

1st MODULE

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
MEDICAL 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.

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

BLOCK D

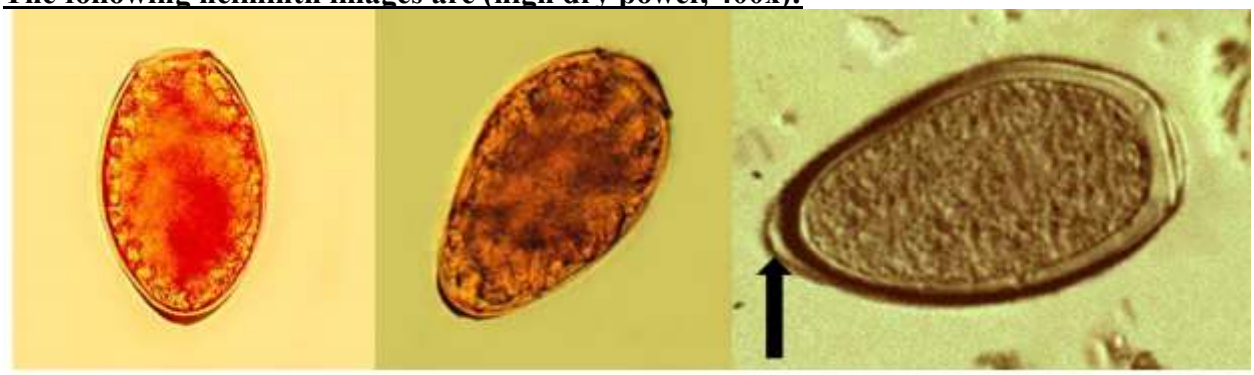
CONTROL QUESTIONS AND ASSIGNMENTS
Questions to check the Students' level of learning
TO KNOW:
Identify and classify parasites: Recognize and classify medically important metazoan parasites based on their morphology, biology, and clinical significance.
Recognizing the relationship between parasites and their hosts, including mechanisms of pathogenicity.
BE ABLE to
Describe the classification, pathogenesis, epidemiology, diagnosis and management of helminthic parasitic infections.
Applying basic techniques to examine parasites and interpret results.
Recognizing the relationship between parasites and their hosts, including mechanisms of pathogenicity.
Safety: Demonstrating safe work practices, including proper handling of infectious materials and observing biosafety protocols.
Scientific communication: Preparing written reports, presenting research findings at conferences, and teaching scientific concepts to others..
To explore the parasitology, pathogenesis, diagnosis of parasitic infections in humans. Demonstrate knowledge and a critical understanding of key aspects of basic helmithology as applied to certain global health problems. Apply theoretical, methodological and practical skills in medical parasitology to study the basic concepts of practical medicine. Apply theoretical knowledge from the field of medical parasitology for the treatment and implementation of preventive measures among the population. Demonstrate knowledge from a molecular, cellular, biologic, clinical sphere for disease prevention, Health promotion and cure.
TO OWN SKILLS:

- To integrate the results and achievements of medical parasitology, gene technologies, medical parasitology to medical clinical practice of public health. Development of oral presentation skills within a team setting.

Key Tasks to Assess Parasitology Levels:
To Be Proficient (Analysis/Evaluation/Synthesis):
Research & Analysis (Helminthology):
Planning, implementing, analyzing, and reporting on helminthological scientific studies, focusing on parasite identification, ecology, and impact.

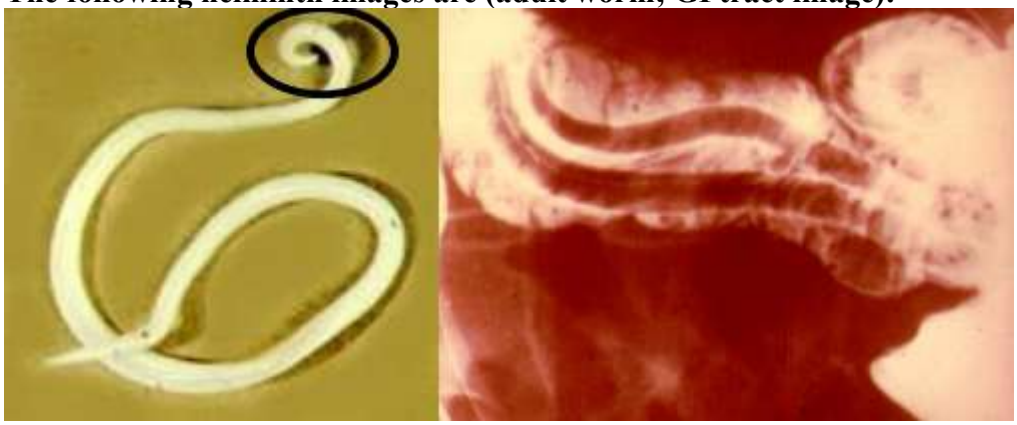
Information & Communication Technology:
Utilizing digital tools, software, and databases to enhance learning, data management, and research communication.
Collaborative Teamwork:
Functioning effectively within laboratory and field environments, emphasizing teamwork in parasite sample collection and analysis.
Assessment & Evaluation:
Often evaluated through a mix of laboratory activity, weekly tests, and detailed reporting.
Scientific Scope:
Includes studying the diversity of parasitic worms and their roles in ecosystems.

№ 1:
The following helminth images are (high dry power, 400x):



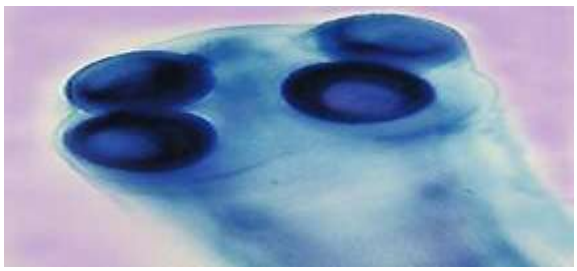
A. Fasciola hepatica
B. Paragonimus sp.
C. Fasciolopsis buski
D. Clonorchis sinensis

№ 2: ***Situation***:
The following helminth images are (adult worm; GI tract image):



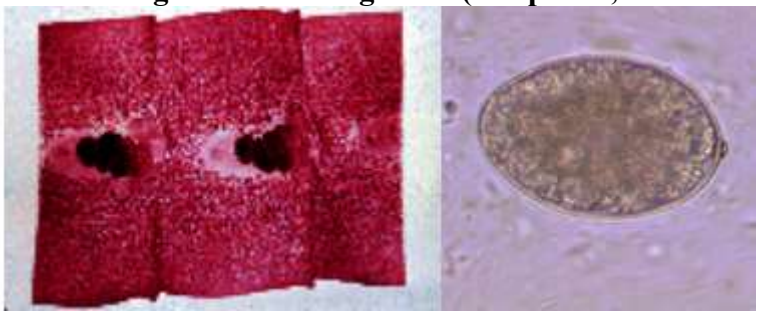
A. Enterobius vermicularis
B. Trichuris trichiura
C. Onchocerca volvulus
D. Ascaris lumbricoides

№ 3: ***Situation***:
The following helminth image is (low power, 100x):



A. Enterobius vermicularis
B. Trichuris trichiura
C. Onchocerca volvulus
D. Ascaris lumbricoides

№ 4: ***Situation***:
The following helminth images are (low power, 40x and high dry power 400x):



A. *Taenia* sp.
B. *Diphyllobothrium latum*.
C. *Hymenolepis nana*
D. None of the above

№4 : METHODOLOGICAL MATERIALS DEFINING ASSESSMENT PROCEDURES FOR KNOWLEDGE, SKILLS, AND (OR) THE EXPERIENCE OF ACTIVITIES THAT CHARACTERIZE THE STAGES COMPETENCE FORMATION DESCRIPTION OF INDICATORS AND EVALUATION CRITERIA COMPETENCIES, DESCRIPTION OF ASSESSMENT SCALES

.

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

To check medical parasitology parasitology parasitology parasitology 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.

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 parasitology 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 parasitology, which can lead to better academic performance.

Current control (CC)

Current (contemporary) control and assessment in parasitology 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.

METHODOLOGICAL INSTRUCTIONS FOR THE IMPLEMENTATION OF INDEPENDENT WORK
on course
MEDICAL 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.

List of Assessment Tools

- Abstracts
- Situational Problems (Case Study)
- Multiple choice questions (Tests)
- Interviews

Grading scales are provided of
MEDICAL PARASITOLOGY Course Outline.

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	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;

			clarifying answers	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 demonstrate d the formation of competencie s and can apply them in professional activities; exhaustively, consistently, competently and logically harmoniousl y 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 independentl y
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 understandin g 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
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 parasitology 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 parasitology, which can lead to better academic performance.

Current control (CC)

Current (contemporary) control and assessment in parasitology 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 HELMINTHOLOGY

Thorough preparation for a parasitology 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 pipettes, microscopes and others. 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 or dissections, 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 parasitology education and require careful consideration or alternative arrangements. Teaching using web technologies: ZOOM, GOOGLE Classroom Platform, TEAMS, WhatsApp chats.