

## General Parasitology (BIOL 4104)

Spring Semester 2020

This course will cover the biology of some important parasitic organisms (protozoa, helminths, and arthropods) of medical and veterinary importance. In the course we will be covering the basic biology, identification, pathology and treatment of these parasites.

**Texts:** Roberts, Janovy and Nadler, *Foundations of Parasitology*, 8th or 9th ed.; Desowitz, *New Guinea Tapeworms and Jewish Grandmothers*.

**Instructor:** Dr. Matthew G. Bolek, 415 Life Sciences West, 744-9675  
E-mail: bolekm@okstate.edu  
Office hours: MF 2:30-3:30, or by appointment  
Mailbox: 501 Life Sciences West

**Teaching Assistant:** Mr. Ryan Koch (T; W)  
E-mail: ryan.koch@okstate.edu  
Mailbox: 430 Life Sciences West

**Lecture:** 203 North Classroom Building, MWF, 1:30-2:20

**Laboratory:** 316 Life Sciences West, T 1:30-4:20; W 2:30-5:20

**Website:** www.matthewbolek.com; go under teaching, and general parasitology.

**Attendance:** You are expected to attend class and laboratory and you are responsible for all assigned readings and all material presented in lecture and in the laboratory.

**Academic Dishonesty:** I assume that you have read and understand the O.S.U. policies on academic dishonesty. The penalty for **ANY** act of dishonesty in this class is a grade of **ZERO** on the assignment, see (<http://academicintegrity.okstate.edu>).

**Special Needs:** If you have a disability and need special accommodations of any nature, I will work with you and the Office of Disabled Student Services to provide reasonable accommodations to ensure that you have a fair opportunity to perform successfully in this class. Please let me know about your disability and the accommodations you desire by the end of the second week of class. To receive services, you must submit appropriate documentation and complete an intake process during which the existence of a qualified disability is verified and reasonable accommodations are identified. Call 744-7116 v/t for more information.

**Drop Policy:** I assume you are aware of the drop and withdrawal dates and policies listed in the OSU class schedule. See syllabus attachment on website.

**a. Course Objectives**--At the conclusion of this course, students should be able to:

(1) Draw and explain the life cycles of the major parasites of humans (trypanosomes, intestinal amoebas and flagellates, *Plasmodium* spp., schistosomes, tapeworms, *Ascaris*, hookworms, and filarial worms.)

(2) Explain the significance of parasite population structures, especially in terms of economic impact, epidemiology, and health care delivery.

- (3) Explain the role of vectors in the transmission and maintenance of parasitic infections.
- (4) State the major evolutionary problems and questions associated with parasitism and explain how those questions are addressed.
- (5) Be able to explain the geographical distribution, disease caused, the pathological effect on the host, diagnostic stages, and treatment for a select number of human and veterinary important parasites.
- (6) Demonstrate skill in use of the microscope by finding parasites in various kinds of preparations and explaining what those parasites are, including life cycle stages.
- (7) Exhibit ability to solve a parasitological problem by demonstrating an understanding of the problem, obtaining background knowledge about that problem, generating possible solutions for that problem, identifying and evaluating constraints of those solutions, and selecting a solution.

The course grade for Biology 4104 will be determined by student percentage of a possible 450 points for undergraduates and 500 possible points for graduate students.

**b. Methods/activities used to measure student outcomes:** The grades in this class will be determined based on short quizzes, 3 hr long exams, participation, and the laboratory. Final grade will be based on the following items:

<u>Undergraduate Student Grade Calculations</u>	<u>Points</u>
Lecture Examinations (Hr. exam), 3 @ 75.....	225 points
Lecture Quizzes (10 min.), 10 @ 10.....	100
<u>Laboratory, 1 @ 125.....</u>	<u>125</u>
	Total 450

The laboratory grade will be calculated as a percentage of 400 points. This percentage will be multiplied by 1.25 to determine the number of points for the laboratory portion of the course grade (above). The 400 points upon which the laboratory percentage will be calculated are distributed as follows:

Quizzes, 10 @ 10.....	100
Practical Examination(s), 1 @ 200 or 2 @ 100.....	200
Laboratory Notebook.....	50
Laboratory Experiment.....	25
<u>Laboratory Technique.....</u>	<u>25</u>
	Total 400

### **c. Course Schedule**

#### **I. Lecture tentative schedule**

1. Introduction, grading, significance of parasitism in world affairs
2. Outline of “areas of responsibility for a selected group of parasites”
3. Structure of amoebae by ontogenetic stage; life history
4. Amoebiasis: course of infection, gross and histopathology, treatment and prognosis
5. Epidemiology of intestinal protozoans
6. Differential diagnosis of amoebae; serodiagnosis and fluorescent antibody techniques
7. Flagellate structure and ontogeny
8. Intestinal flagellates of people
9. Hemoflagellates of people: diagnostic characteristics, ontogeny, and phylogenetic origins
10. Kala-azar: course of infection, gross and histopathology, treatment and prognosis
11. Cutaneous and mucocutaneous leishmaniasis: clinical manifestations and treatment
12. Trypanosomiasis and human affairs
13. African trypanosomiasis: course of infection, pathology, and treatment
14. Antigenic variation and immunization strategies; current research on trypanosome control
15. American trypanosomiasis: Chagas’ disease
16. *Plasmodium* life history and course of infection
17. Malaria: pathology, symptoms, treatment, and prognosis
18. Malaria and human affairs including role in evolution of humans
19. Malaria control: monoclonal antibody production and recombinant DNA techniques
20. **Exam I (usually during 7<sup>th</sup> or 8<sup>th</sup> week of the semester; most likely week of March 2<sup>nd</sup>)**
21. Coccidiosis: economic impact in animals and role as human pathogens
22. Toxoplasmosis: epidemiology and course of infection
23. Epidemiological models: mathematical models and malaria, ecological models and control
24. Paragonimiasis: example of detail required in “areas of responsibility”
25. Liver flukes: life history, epidemiology, and pathology
26. Schistosomiasis: course of infection, gross and histopathology, treatment and prognosis

27. Schistosomiasis and human affairs
28. Psuedophyllidea of humans: *Dibothriocephalus* (formally *Diphyllobothrium*) and sparganosis
29. Cyclophyllidea of humans: taeniasis and echinococcosis
30. Larval tapeworms and human disease
31. **Exam II (usually during 12<sup>th</sup> or 13<sup>th</sup> week of the semester; most likely week of April 6<sup>th</sup>)**
32. Ascariasis: the diseases and Trichuriasis
33. Trichinosis: course of infection, treatment, biopsies in diagnosis
34. Humans and epidemiology of *Trichinella spiralis*; moral implications of control
35. Enterobiasis: clinical manifestations, treatment, prognosis, parasitism and human institutions
36. Intestinal nematodes and human nutrition
37. Hookworm disease
38. Filariasis: course of infection, gross pathology, treatment and control
39. Oncocerciasis
40. **Final Exam (week of May 4<sup>th</sup>)**

## **II. Laboratory tentative schedule**

Week 1 The Orientation, how to use the microscope, calibration, notebooks and how to draw specimens; Amoeba Scan Week I

Week 2 Amoeba Demo week

Week 3 Amoeba Scan Week II

Week 4 Intestinal and Reproductive Track Flagellates and MIF

Week 5 Hemoflagellates

Week 6 Malaria

**Week 7 Midterm Practical (week of February 24<sup>th</sup>)**

Week 8 Trematode Anatomy

Week 9 Trematodes

Week 10 Spring Break

Week 11 Schistosomes and Cricket Infections

Week 12 Cestodes

Week 13 Larval Cestodes and Intro to Nematodes

Week 14 Intro to Nematodes

Week 15 Nematodes and Nematomorphs

**Week 16 Laboratory Practical II (week of April 27<sup>th</sup>)**

**d. Grading policy/scale: Grades will be determined based on the following percentages based on overall point accumulated in the lecture (72%) and laboratory (28%) portions of the course.**

Letter Grade	Percentage Needed
A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	below 60%

**e. Distinction between graduate and undergraduate requirements including grading.**

**Graduate Students:** Graduate students will be responsible for writing a term paper on a parasitological topic of their choice. The paper will be worth 10% of the final grade. The paper will be graded on length (10 typed pages of double spaced text), and completeness of reviewing the literature on the topic chosen.

<u>Graduate Student Grade Calculations</u>	<u>Points</u>
Lecture Examinations (Hr. exam), 3 @ 75.....	225 points
Lecture Quizzes (10 min.), 10 @ 10.....	100
Research Paper (10 page minimum).....	50
<u>Laboratory, 1 @ 125.....</u>	<u>125</u>
	Total 500