

TENTATIVE

Human Parasitology

01:146:328

Fall 2022

COURSE INSTRUCTOR Anne Keating, PhD
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PREREQUISITES General Biology 01:119:115 & 116 (or 01:119:101 & 102)

COURSE OVERVIEW

The current SARS-CoV-2 pandemic is having a worldwide catastrophic human health and economic impact. The enormity of the response and pace of research and vaccine development are unprecedented and highlight the interconnected nature of today's world and the importance of disease control. This health threat and the global reaction, however, are in stark contrast to the lack of attention to the over 1 billion people worldwide who are infected with parasitic diseases caused by a range of helminths and protozoa. Many of these diseases are described as neglected and the suffering of their victims, who are often economically disadvantaged, does not always generate world-wide concern. During this course we will consider traditional aspects of parasitology including an understanding of the morphology, life cycle, pathology, treatment, and control of many of the major parasites of humans. We will also explore molecular mechanisms in the host-parasite relationship, the modes of action of chemotherapeutic agents, and strategies for the possible elimination and eradication of these diseases. The objectives of the course are summarized in the following enduring understandings, learning outcomes, and CBN learning goals

Enduring understanding 1: Parasites cause enormous human suffering and an understanding of their basic biology is critical to our ability to control these infections

Learning outcomes:

- a. Explain the relevance of studying parasitology
- b. Describe the living conditions of the world's "bottom billion" and why they are at greatest risk for infection with parasites
- c. Use basic morphological characteristics to identify the major species of human parasites
- d. Draw generalized life cycles for the major groups of parasitic organisms (trematodes, cestodes, nematodes, and protozoa)
- e. Sequence detailed life cycles for specific parasite pathogens of humans

Enduring understanding 2: The host-parasite relationship must be considered at the ecological and molecular levels.

Learning outcomes:

- a. Evaluate a simple epidemiological model of a parasite life cycle
- b. Design appropriate transmission control and prevention programs based on life cycle information
- c. Discuss host immune responses to parasitic infections
- d. Determine and describe appropriate diagnostic techniques to identify infections
- e. Analyze patient history information and lab results to make diagnoses
- f. Explain the modes of action of commonly used anthelmintic drugs
- g. Describe the major control programs which target the eradication of parasitic diseases

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CBN learning goals

1. Master factual and conceptual knowledge in cell biology and neuroscience that will provide a solid foundation for success in advanced training and professional careers.

We will cover the species which cause the major human parasitic diseases and gain an understanding of their basic morphology, life cycle, and host relationships and also explore the molecular mechanisms of pathology, drug action, and host defenses. These competencies will lay the foundation for students to continue advanced research and to apply this knowledge in health-related fields.

2. Develop an ability to summarize, integrate and organize information.

Students will synthesize the course information and apply it to real-world problems. The importance of using life cycles as organizers to summarize the biology, pathology, control strategies, etc. associated with these organisms will be emphasized.

3. Use scientific reasoning to evaluate the potential for current research and new discoveries to improve our understanding of cell biology and neuroscience and its relevance to human health and to our society.

It is estimated that over 1 billion people are affected by one or more of the neglected tropical diseases, but because, in part, these are typically conditions associated with poverty and generally not easily transmissible from person-to-person (thereby making their global spread less likely) they are not given much attention. These diseases, however, inflict terrible social and economic costs in many developing parts of the world. Our understanding of these diseases and development of methods to control and treat them are critical to humanitarian efforts. In this course we will explore experiments, techniques, and control strategies that are used in the field of parasitology.

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COURSE RESOURCES

Lectures: Tuesdays and Thursdays
2:00 - 3:20 PM
SEC 111, Busch Campus

Text: *Parasitic Diseases*, 7th edition
Despommier, DD, Griffin, DO, Gwadz, RW, Hotez, PJ, and Knirsch, CA.
Parasites Without Borders, 2017.
<https://parasiteswithoutborders.com/wp-content/uploads/2020/02/PD7thEditionHighResVersion5-11-2019.pdf>

This online textbook has been selected for our course because it covers traditional and modern aspects of parasitology and because it is free of charge, thereby supporting the mission of a more affordable Rutgers education. The text and associated videos will be used throughout the course.

Papers: Scientific papers will be assigned during the semester. These will provide deeper understanding of material covered in the lectures and will highlight current research in the field of parasitology. There will be questions on the quizzes and exams which address these papers.

Website: <https://canvas.rutgers.edu/>
Announcements, grades, assignments, quizzes, and other material will be posted throughout the semester.

Office hours: TBD

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LECTURE & EXAM SCHEDULE

Lecture	Date	Lecture Topic	Associated material
1	Tues, 9/6	Introduction to Parasitology	
2	Thurs, 9/8	Parasite diversity and transmission	
3	Tues, 9/13	Introduction to trematodes	
4	Thurs, 9/15	Food-borne trematode infections	
5	Tues, 9/20	<i>Schistosoma</i>	
6	Thurs, 9/22	Introduction to cestodes	
7	Tues, 9/27	Cyclophyllidea	
8	Thurs, 9/29	Pseudophyllidea	
9	Tues, 10/4	Introduction to nematodes	
	Thurs, 10/6	Exam 1, Lectures 1 - 8	
10	Tues, 10/11	Soil transmitted helminths	
11	Thurs, 10/13	Tissue nematodes	
12	Tues, 10/18	Filarial nematodes	
13	Thurs, 10/20	Epidemiology	
14	Tues, 10/25	Vector biology	
15	Thurs, 10/27	Introduction to protozoa and amoebae. <i>Entamoeba histolytica</i>	
16	Tues, 11/1	Non-pathogenic and pathogenic amoebae. Flagellates	

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17	Thurs, 11/3	Pathology & Diagnostic techniques	
18	Tues, 11/8	<i>Trypanosoma brucei</i>	
	Thurs, 11/10	Exam 2, Lectures 9 - 17	
19	Tues, 11/15	<i>Trypanosoma cruzi</i>	
20	Thurs, 11/17	<i>Leishmania</i> & Ciliates	
21	Tues, 11/22	Introduction to apicomplexans and <i>Plasmodium</i>	
22	Tues, 11/29	<i>Plasmodium</i> 1	
23	Thurs, 12/1	<i>Plasmodium</i> 2	
24	Tues, 12/6	<i>Toxoplasma gondii</i> and other apicomplexans	
25	Thurs, 12/8	Immune responses to parasitic infections	
26	Tues, 12/13	The future of parasitology & course conclusion	
	TBD	Final Exam, Lectures 18 - 26	

Lecture schedule and topics are subject to change

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ASSESSMENTS

1. STUDY QUIZZES

There will be 10 study quizzes on Canvas. These questions will cover lecture material and any other associated content (videos, readings, papers, etc). These quizzes will help students stay up-to-date with the material and allow them to gauge their mastery of the content. Quizzes will be posted on Canvas on Thursday at 9:00 pm and must be submitted by 9:00 pm the following Wednesday. Once a quiz has closed, it will not be reopened and cannot made up. Any email requests for extensions will be ignored. The total points earned on the quizzes will comprise 10% of the final course grade

Quiz schedule (TBD)

Quiz	Lectures	Quiz opens at 9:00 pm on Thursday	Quiz closes at 9:00 pm on Wednesday
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

2. EXAMS

There will be three, non-cumulative exams. The exams will consist of multiple choice questions that require an understanding of the basic biology of parasitic organisms in addition to the ability to apply critical thinking to problems in parasitology. The exams will cover the lectures and any additional assigned materials (papers, videos, etc).

- Students who require special accommodations must make arrangements at least one week in advance with Dr. Keating. These accommodations will be given only if approved by the Office of Disability Services.
- Exams cannot be rescheduled or retaken. Individual exceptions for rescheduling will possibly be made only in cases of documented serious, long-term illness or family emergency. Only one makeup exam may be taken during the semester.

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3. OTHER ASSESSMENT INFORMATION

- **Extra Credit:** None. No exceptions. Any requests for extra credit will be ignored.
- **Grades**
Final course grades will be determined by points accumulated on the study quizzes and exams. Neither the individual quizzes, exams, nor final averages will be curved. Any requests for grades to be curved, “bumped up”, or altered in any other way will be ignored. Grades will be based on the following distribution.

Assessment	% of final grade
Study quizzes	10
Exam 1	30
Exam 2	30
Final Exam	30

Final grade	Final average
A	90.00 – 100.00%
B+	86.00 – 89.99%
B	80.00 – 85.99%
C+	76.00 – 79.99%
C	70.00 – 75.99%
D	60.00 – 69.99%
F	0 – 59.99%

- **Special Accommodations**
Students who require special accommodations and support services should contact the Office of Disability Services and Dr. Keating during the first week of class.
- **Academic Integrity Policy**
Dishonesty will not be tolerated in this course. Please see the Rutgers policy at <http://nbacademicintegrity.rutgers.edu/home-2/academic-integrity-policy/>

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STUDENT-WELLNESS SERVICES

Just In Case Web App

Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services (CAPS)

(848) 932-7884

rhscaps.rutgers.edu/

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance (VPVA)

(848) 932-1181

vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services

(848) 445-6800

<https://ods.rutgers.edu/>

The Office of Disability Services works with students with a documented disability to determine the eligibility of reasonable accommodations, facilitates and coordinates those accommodations when applicable, and lastly engages with the Rutgers community at large to provide and connect students to appropriate resources.

Scarlet Listeners

(732) 247-5555

<http://www.scarletlisteners.com/>

Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.