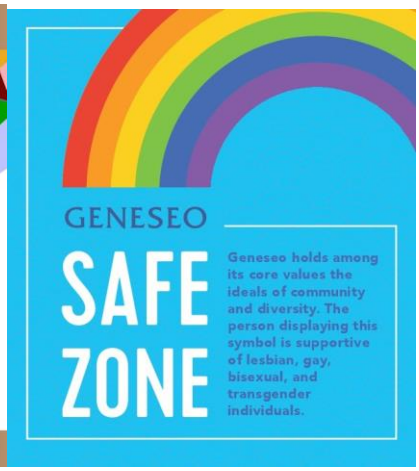
Biology 342: Parasitology

SYLLABUS – Spring, 2023

Instructor information

Dr. Susan Bandoni Muench
bandoni@geneseo.edu
Office: ISC 332A
Phone: 585-245-5309
Office hours: Mondays, 1230-120 (ISC 304); Tuesdays and Thursdays, 2:00-3:00 (ISC 332A) and by appointment.



Course description

In this course, we will examine parasites and parasitism, emphasizing the influence of parasites on the ecology and evolution of free-living species, and the role of parasites in global public health. Prerequisites: Cell Biology or Biochemistry. Offered every spring Credits: 4 (3-3)

Course Format

For the Spring of 2023, the lecture and lab are fully in person. Asynchronous forms of participation will be provided for those who cannot participate. Please note that missing lectures or labs frequently has a negative impact on success in this course. Contact me for more information if you are unable to come to class.

Accommodations

Disabilities and pregnancy or parenting:

SUNY Geneseo will make reasonable accommodations for persons with documented physical, emotional, or cognitive disabilities. Accommodations will also be made for medical conditions related to pregnancy or parenting. Students should consult with the Office of Disability Services and see me regarding any needed accommodations as early as possible in the semester.

Accommodations for English language learners*:*

Individuals who have been using English as a primary language of instruction for 6 years or fewer and are actively working to improve English fluency may receive extra time on in-class tests and online quizzes. Please see me for assistance early in the semester if this applies.

Diversity and inclusion

Parasitology is about people as well as about fascinating organisms and the diseases that they cause. I intend for this course to serve students from all backgrounds and with different perspectives. Student diversity is an asset and a resource, and benefits everyone here. It is my intent for course activities to be respectful of diversity including gender, sexual orientation, ability, age, socioeconomic status, ethnicity, race, culture, religion and other background characteristics. I have designed instruction in this course to support the needs of diverse learners. I welcome feedback about how the instructional approach works for you, and let me know if you have suggestions for increasing learning or inclusivity in this course.

Texts, other readings and other course materials

Required text: Despommier DD, Griffin DO, Gwadz RW, Hotez PJ, and Knirsch CA. Parasitic Diseases, 7th edition. Parasites Without Borders, 2019. Available as a book from the publisher or from the Geneseo Bookstore. Also available on Amazon as a Kindle book (ISBN-10 : 1097115909), and available on the Parasites Without Borders website as a downloadable PDF file. Note that the authors of this text have produced a series of lecture videos as well, so if you prefer video lectures to reading, this is an option.

Laboratory resource: We will make extensive use of a free online resource from the Centers for Disease Control, DPDx: Laboratory Identification of Parasites of Public Health Concern. This site also has information useful to the lecture portion of the course.

Brightspace: Additional articles, case studies, links to videos and additional laboratory resources, and lecture presentations will be available on Brightspace. A weekly announcement provides specific information about readings required each week.

THEMATIC OVERVIEW:

1. *Protozoan parasites: basic knowledge and current challenges (learning outcomes 3, 4)*
2. *Helminth parasites: basic knowledge and current challenges (learning outcomes 3, 4)*
3. *Nature of symbiosis, parasitism and parasites (learning outcomes 1, 2)*
4. *Ecological and evolutionary roles of parasites (learning outcome 5)*

Learning Outomes

Students who are active participants and complete all course requirements will be able to:

1. *Demonstrate through tests and on writing assignments an understanding of parasitism, including the diversity of symbiotic associations and their populational, dynamic and contextual nature.*
2. *Demonstrate through tests and on writing assignments an understanding of views of parasites and parasitism, including social and cultural perceptions of parasitism, and varying views of parasitism among scientists from different disciplines.*
3. *Demonstrate through quizzes, class activities and tests an understanding of the taxonomic diversity of parasites, and the universality and variety of symbiotic associations.*
4. *Demonstrate familiarity with common protozoan and helminth parasites of humans as well as some related parasites of livestock and companion animals on quizzes, class activities and tests.*
5. *Analyze case studies and scenarios, interpret data and use evidence to address problems in parasitology, including clinical, public health and biological issues.*
6. *Analyze research challenges in diagnosis, treatment and control of parasitic infections in humans and in veterinary contexts through examination of evidence.*
7. *Demonstrate an understanding of the roles of parasites and of infectious diseases on the ecology and evolution of their hosts, and of the role of symbiosis in the evolution of life on earth.*

Students who are active participants and complete all course requirements will be able to:

1. *Critical Thinking and Problem Solving: Students will have the knowledge base and intellectual (conceptual) framework to use reasoning and problem-solving skills to: (1) read critically; (2) evaluate support for competing hypotheses; and (3) critique experimental design.*
2. *Laboratory Inquiry and Technique: Students will have the laboratory and inquiry skills and technical ability to formulate hypotheses, design and run experiments using instruments to test*
3. *their hypotheses, and analyze and interpret the results. They will be able to build on earlier work to design further experiments.*
4. *Communication: Students will be able to communicate biological ideas from literature or their own laboratory investigations to audiences of biologists and non-biologists in a variety of formats including written reports, poster and oral presentations.*
5. *Attitudes and Personal and Professional Development: Students will recognize the importance of scientific integrity and ethical research and applications of biology to science policy. They will be able to work independently and in teams for life-long learning.*
6. *Students will be able to demonstrate a broad and diverse background in biology and related sciences and a strong foundation for graduate and professional programs of study or employment.*
7. *Students will recognize evolution as the central tenet of biology which explains the unity and diversity of life and interrelatedness of levels of biological organization.*

All of the Biology learning outcomes are addressed in this course to varying degrees, but those emphasized in this course are critical thinking and problem solving, attitudes and personal and professional development, and diverse biological content.

Evaluation – Summary

Day-to-day activities (Reading quizzes, participation, homework)	*15%*
Quizzes (5 at 5% each, drop lowest	*20%*
Tests (3, 15% each, take all but drop lowest)	*30%*
Laboratory (quizzes, class activities, participation checks)	*20%*
Poster on Parasitism or Parasite Ecology/Evolution	*15%*

Additional Information About Evaluation

Overview:

Below is a brief description of the quizzes, homework, exams, lab and writing assignment that contribute to your grade.

Day-to-Day:

Every week, there are multiple choice quizzes on the parasites we are discussing. These ensure that you have a foundation of essential vocabulary and an understanding of the life cycle that will enable us to have substantial discussions in class. To help you in understanding difficult topics, especially those not addressed in the reading for our Thursday classes, there are short homework assignments, mostly on topics for which we do not have textbook reading assignments. Most class periods, there will be either a Google Doc from small group discussion or a brief reflective assignment. Except for the quizzes, these assignments are generally graded pass-fail with feedback, rather than being graded.

Each type of assignment in this course is designed intentionally to contribute to your learning. Keeping up with the reading provides an essential foundation for success on both the test and major writing assignment. You will typically have a reading quiz, an online homework, and participation assignments each week unless we are having a test. These are not listed in the syllabus, but weekly announcements provide updates and reminders. The day-to-day activities are intended to deepen your understanding of topics from the reading and class discussion.

Mini-tests

Mini-tests are larger quizzes, and include short answer and short essay questions, and provide practice for the skills needed for the tests. Many questions will test your ability to apply the information in the context of a scenario. Some questions will require you to analyze or evaluate information. Some or all of these may have a required group component.

Tests

There are three larger tests, spread roughly equally through the semester. Some questions may be available ahead of time or drawn from the summative quizzes. The tests will take place during the laboratory time to reduce time pressure. The format will be similar to the other quizzes but longer.

Project & Presentation:

There will be a larger written assignment requiring that you read primary literature addressing an interesting host-parasite relationship or the ecological or evolutionary impact of parasites. You will put together a poster presentation to share during the final exam period. Instructions will be provided separately.

Laboratory

In the laboratory, you will have quizzes and participation assignments each week, and periodic larger tests. Quizzes may vary in size and may be practical or based on photographs. Some may be completed in groups.

Explanation of final grades:

Grades are determined using the scale presented below almost always without any adjustment or curve. There are no limits on numbers of high grades, and helping others can only help you and cannot hurt your grade in any way. Scores will be rounded up or down to the nearest whole number. The point distribution is the standard Geneseo distribution; Canvas is set to display this. The distribution is as follows: A: (>93%), A- (90-92%), B+ (87-89%), B (83-86%), B- (80-82), C+ (77-79), C (73-76), C- (70-72), D (60-69), E (<60%).

Tentative schedule

Date	***Lab***	***Tuesday***	***Thursday***
Week 1	*No lab*	*1/24* *Introductions: first day of class*	*1/26* *Definitions of parasite, parasitism.* *Read: A vein is a river* *Janovy & Roberts Definitions classification of parasitic protists prepare for Tuesday*
Week 2	*1/30* *Introduction to lab;* *Amebas & flagellates*	*1/31* Entamoeba histolytica, Giardia lamblia. *Diagnostic techniques and treatments* *Read: Parasitic Diseases (PD) PD 11-20, 147-160*	*2/2* *Who studies parasites*? *Read:* A Pig from Jersey, Worm Hunt, The Power of Parasites *Defining harm*
Week 3:	*2/6* ***Mini-test**** *Amebas & flagellates*	*2/7* *African trypanosomiasis* *Read PD 71-84* *Drug development (Loker & Hofkin, optional)*	*2/9* *American trypanosomiasis* *Symbiosis* *Read PD 71-84; Pros and Cons of being parasitized*

Date	Lab	Tuesday	Thursday
Week 4:	*2/13* *Leishmanias & trypanosomes* *Lab test*	*2/14* *Visceral leishmaniasis* *Immune response* *Read: PD 21-38, and 47-56*	*2/16* *Cutaneous and mucocutaneous leishmaniases* *Read: PD 29-46 + Parasites or Cohabitants*
Week 5:	*2/20* ***Mini-test*** *Malarias*	*2/21* *Malarias* *Read: 93-122* *Parasite control (vectors & vaccines)* *Loker & Hofkin (optional)*	*2/23* *3/2 Misc. Protozoa:* Babesia, Cryptosporidium, Toxoplasma *Read PD 93-122, 123-132, 133-146* *Behavior change*
Week 6	*2/27*	*2/28 Diversity summit, no classes*	*3/2* ***TEST 1 (protozoa)***
Week 7	***3/6*** ***Lab test**** 	*3/7* Enterobius, Trichuris, *Introduction to nematodes* *Parasite control: MDA* *Read: PD 189-204*	*3/9* Ascaris *Read: PD 205-214* *Parasites & sexual selection*
		3/13-3/19 SPRING BREAK – NO CLASSES	
Week 8:	*3/20* *Nematodes*	*3/21 hookworms* *Hygiene hypothesis* *Read: PD 215-228, 229-240*	*3/23* Strongyloides *Parasites & tolerance*
Week 9:	*3/27* ***Mini-test*** *Nematodes*	*3/28* Trichinella *and guinea worm* *PD 241-252*	*3/30 Zoonotic nematodes: cutaneous larva migrans and visceral larva migrans* *Evolution of virulence* *PD 299-314*
Week 10	*4/3* *Nematodes*	*4/4 Lymphatic filariasis*	*4/6 Onchocerciasis & Loaiasis* *Read PD: 265-284*
Week 11	*4/10* *Cestodes* ***Lab test**** 	*4/11* *Cestodes* Diphyllobothrium, Taenia*)* *PD 317-348*	*4/13* ***TEST 2* (nematodes)***
Week 12	*4/17* *Cestodes*	*4/18* *Cestodes (minor tapeworms)* *PD 349-358*	*4/20* *larval tapeworms (sparganosis, cysticercosis, hydatid disease)* *Read PD: 359-376*
Week 13	*4/24* *Trematodes*	*4/25* Clonorchis, Opisthorchis *Read PD: 405-412, 421-428*	*4/27 Trematodes* Fasciola, Paragonimus *Read PD: 413-420, 429-438*
Week 14	*5/1* ***Mini-test***	*5/2 Schistosomes* *Read PD: 394-404*	*5/4* Fasciolopsis *and other miscellaneous trematodes* *Review and catch-up*
Week 15	*5/8* ***Lab test**** 	*5/9* ***TEST 3* (platyhelminths)***	*No class*
Week 16	*No class*	*No class*	***5/18 8:00-11:20*** ***Final exam (poster session)***

Important notes regarding the schedule

This schedule is tentative and subject to change, particularly given the ongoing pandemic. The direction of change is likely to be dropping topics, not adding. it is possible that changes to the schedule, assignments and content delivery mode will be necessary after the semester has started. If this is the case, be assured that I will prioritize student success, course continuity and open lines of communication. Check the weekly announcements to see what is required. Generally, test dates will not change but content covered on a test may change.

If you find that a test orMini-testis scheduled on a day of religious observance for you, I am happy to work with you to identify an acceptable alternative time.

IMPORTANT POLICIES

Communication:

Set up Brightspace to provide daily updates via email or text message to ensure that you receive updates or changes to the schedule. Check Brightspace announcements regularly. Besides office hours, the fastest way to get in touch with me is via e-mail. To preserve my work-life balance, I reserve the option to delay answering emails sent after 5 pm or on the weekends until the start of the next business day.

Attendance and expectations for class:

The lecture and laboratory sessions are in person unless I am sick or quarantined or the College closes. Attendance is strongly linked to student success, and active participation in class is not only vital to your success, but also makes an important contributor to other students' learning. If you are unable to participate in person, daily participation assignments can be completed by working with the course materials on your own. Because of the structure of the classroom and the design of classroom activities, simultaneous in-person and remote participation is not possible. Participation assignments help you stay engaged with the content, and will generally not be excused if you miss class. The exception to this is if you are missing all of your classes for a week or more and working with the Dean of Students, Dr. Leonard Sancilio.

Missing Summative quizzes and Tests:

For the mini-tests and tests, it will be possible to make these up within a week. However, if you are unable to make up a test in that time frame, you will either need to take a different test or agree to an alternative strategy for calculating your grade. Communication throughout your absence will be essential to finding a solution that is mutually agreeable.

Missing Day-to-Day assignments:

The benefits to learning from completing the online assignments are greatest if you use these to stay caught up on the reading and class activities. Most of the due dates are flexible; permission is needed to complete assignments after the next test. As noted above, the participation assignments can be completed outside of class. Please contact me as soon as possible when you are having trouble completing day-to-day assignments, and be prepared to propose and discuss solutions. If you will be unable to complete course work for a week or more, please contact me along with the Dean of Students, Dr. Sancilio (sancilio@geneseo.edu). Similarly, if you are working with Accessibility Services and have accommodations related to due dates or class attendance, please meet with me early in the semester to discuss the supports that you need.

Missing laboratory quizzes and tests

Setting up laboratory quizzes or tests can be very time-consuming. Missing these will usually mean substituting identifying photographs rather than microscope slides; some students may find this task more difficult. Without jeopardizing your health or the health of others in our class, make every effort to attend lab, especially on days when practical tests are scheduled. For lab quizzes, accommodations for disabilities are more limited. Please consult with me early and we can work with the Office of Accessibility Services to determine how best to meet your needs within the constraints of the course and materials.

Extensions on the Project:

Because the final project is due at the end of the semester, extensions on the project will be limited and may require accepting an incomplete grade initially. Please contact me as soon as you know there is a problem so we can work out a solution together.

Appealing grades:

Any graded work may be submitted for re-evaluation along with a written appeal. Appeals must be submitted promptly, within two weeks of when the work is returned to you. The appeal should contain a brief written explanation of your concerns, including your understanding of the test question or assignment directions and why you believe your work meets the requirements. At the time that you turn in the work for appeal, we will schedule a conference to discuss my response.

Academic integrity:

Breaches of academic integrity devalue the work of other people. Cheating on exams is a serious breach of trust and will be treated accordingly. Examples of cheating on tests include collaboration or communication with others in any form, as well as using resources beyond those allowable under the instructions for the test. Plagiarism is the misrepresentation of the originality of your work. This can taking multiple forms including copying or minimally modifying text created by others, turning in an assignment created by another student or created by you for another course, or using a large language model such as OpenAI's ChatGPT because it is not

guaranteed to be free from using the intellectual products of others. Please review the College Policy on academic dishonesty. Either cheating or plagiarism will result in a failing grade for the test or assignment, and may result in a failing grade for the course. Ignorance of the policy or of the nature of cheating or plagiarism will not serve to excuse the behavior.

Copyrighted materials:

Many of the materials that are provided to students in this course have been created by your instructor or by authors of published sources excerpted under educational fair use. You should assume that all course materials are protected by legal copyright. Copyright protection means that reproduction of this material is prohibited without the author's consent. Thus, you are prohibited from sharing or posting copyrighted material to any websites outside of our course Brightspace site. Also prohibited is sharing materials with more limited groups (e.g., sorority/fraternity test bank). Be aware that UUP (Union of University Professionals, the union representing faculty on this campus) is seeking to take legal action against sites that provide instructor materials, and that posting or selling copies of materials to such sites may put you in legal jeopardy.

FOR YOUR CONSIDERATION

Important disclaimer:

Even though we will discuss diagnosis throughout the course, you will not be qualified to diagnose parasitic diseases on completion of this course. It is especially important not to use the class as an opportunity to self-diagnose.

Class format:

The lecture portion of this class will be in person this semester. Transfer of information through lecture will make up only a portion of class time, and small group discussion or discussion with the full class will make up the rest. Obtaining your first exposure to new information outside of class through independent reading and video segments and through other assignments will make meaningful class discussion possible. Every assignment and activity is designed with a goal of assisting you to learn. If you are not seeing the purpose or benefit of what we are doing, ask me! Because lecture time is spent mostly in small group discussion, these sessions cannot be recorded for asynchronous participation.

Inclusive language:

Parasitology is about people as well as about biodiversity or disease, and the use of inclusive language contributes to creating an environment conducive to learning for everyone. This will include use of individuals' preferred names and pronouns, use of group descriptors preferred by members of that group, and using language that is people-centered and non-discriminatory. Especially critical in the context of Parasitology is using non-judgmental descriptions of human behavior. Inclusive language is dynamic and

socially constructed, and requires living with tension as we learn from each other in community. Please let me know (and let other students know) if you are uncomfortable with language used, and help us all to learn from your perspective and experiences.

Topics included:

Parasitism is the predominant trophic mode on earth, and the range of organisms we could examine is enormous. In this course, we will focus primarily on protozoa, helminths and arthropods that parasitize animal hosts including humans. Viruses, prokaryotes, fungi and plants are largely excluded.

Difficult discussion topics and graphic images

In this class, you will see graphic and disturbing images that are accurate depictions of the impact of these neglected diseases. These images generally come from Understanding disease transmission requires discussing bodily functions and behaviors that you may not normally discuss in public. Treating others with respect, both those present in the room, and those portrayed in images, videos and case studies, is essential for learning.

Evolution:

The Theory of Evolution provides the central explanatory framework in biology, and will be an important theme running throughout the Parasitology course. I welcome the opportunity to discuss any questions or concerns you may have about evolution, including those related to religious belief.