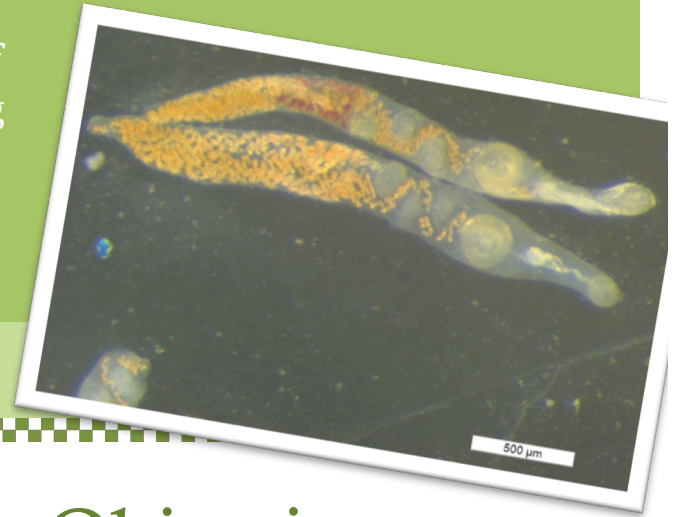


# Animal Parasitology

“The medical tapestry of the world is full of organisms too small to see, carried by flying and creeping creatures too numerous to eradicate.” Robert Desowitz, *New Guinea Tapeworms and Jewish Grandmothers*



Instructor: Dr. Sarah A. Orlofske

## Important Information

Office: M&T 1-3PM,  
Hours: Th 11AM-12PM  
Office: TNR 446  
Phone: 715-346-4249

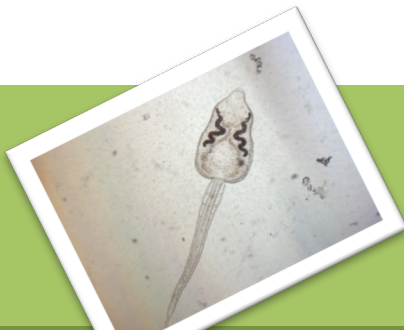
Email: Sarah.Orlofske@uwsp.edu

Text: *Foundations of Parasitology (FOP)*, 9<sup>th</sup> Ed. Roberts & Janovy (Bookstore rental)

Lab Manual: *Animal Parasitology Lecture-Laboratory Manual (APLLM)* by Taft & Huspeni (Available from the Bookstore)

## Course Objectives

- To help students gain a fundamental understanding and basic level of familiarity with the diversity of animal parasites, interactions with hosts, life history, physiology, and evolution.
- To assist students with incorporating knowledge of parasites into other branches of biology including community ecology, behavioral ecology, and conservation.
- To help students distinguish between parasites and disease and recognize the conditions that result in disease as well as appropriate and efficient preventative measures and management responses.
- To provide students realistic preparation for field and laboratory disease investigations through hands on experiences.



## PARASITOLOGIST:

Quaint person who seeks truth in strange places; a person who sits on one stool, staring at another.

*Roberts and Janovy 9<sup>th</sup> Edition.*



## Assignments

### Hands on projects – Doing the work of a Parasitologist.

#### Parasite Specimen Collection:

Throughout the semester students will necropsy hosts for parasite specimens from hosts provided for research projects or those they choose to donate for class projects. The purpose will be to obtain a collection of molecular and morphological specimens that will become a permanent part of the UWSP Parasitology Museum Collection for future research.

**Research Project:** Students will write *an individual paper* based on the data and analysis from a group research project. The papers will be 6-8 double spaced pages and will include at least 4 sources from the scientific literature. The paper will consist of the standard components of a scientific paper

#### Parasite Public Outreach:

Scientists frequently communicate their research to non-scientist audiences. Students will

choose a parasite taxa and write a brief profile intended for a public audience to be hosted on the website for the UWSP Parasitology Museum Collection.

**Case Study:** Students will work as groups to solve real-life parasitology problems. Students participate in class discussions, give oral presentations or write position statements about their proposed solutions.

## Assessments of your learning

**Lecture Exams:** Lecture exams will include an in-class portion emphasizing key concepts, principles, taxonomic groups and characteristics of organisms and diseases they cause. Part of the exams will consist of longer take home essay questions requiring

synthesis of primary scientific literature.

**Practicals:** Practical exams will be given in lab and will require students to identify organisms, life stages, host use, anatomical structures as well as conduct diagnoses of infections



based on host use, pathology, and geography. Microscopes will be used to present the specimens for identification.

Lecture	Points	Lab	Points
Exams 3X75	225	Practicals 3X60	180
Case Study	25	Specimen Collection	70
Parasite Public Outreach	50	Research Project Paper	15 pt Draft 35 pt Final
TOTAL	300		300

## Grading scale and Point distribution

Final grades will be assigned based on the following **minimum** cutoff percentages:

A = $\geq 93\%$	A- = 89.9%	
B+ = 87%	B = 83%	B- = 79.9%
C+ = 77%	C = 73%	C- = 69.9%
D+ = 67%	D = 63%	F $\leq 59.9\%$

## Course policies

### Attendance.

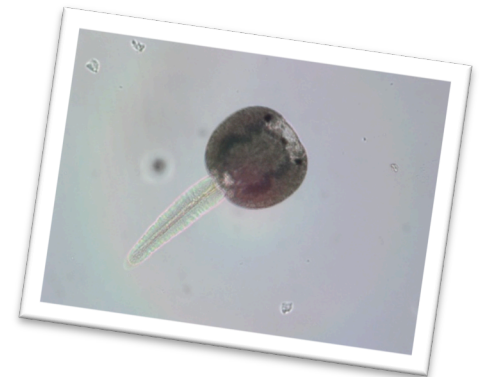
Attendance for lecture and lab is mandatory, and past experience indicates there is a strong positive correlation between the amount of time a student spends in class and her/his final grade. We will frequently use living material, and scheduling make-up opportunities for missed classes is exceedingly difficult. Make-up exams will be provided only in the case of serious illness (requiring a physician's note), or the death of a

relative. However, absences relating to a student's religious beliefs will be accommodated according to [UWS 22.03](#), providing the student notifies the instructor within the first three weeks of the beginning of class regarding the specific dates she/he will be absent.

### Academic Integrity.

UW-Stevens Point values a safe, honest, respectful, and inviting learning environment. In order to ensure that

each student has the opportunity to succeed, we have developed a set of expectations for all students and



You don't want to miss exciting parasite action!

instructors. This set of expectations is known as the *Community Rights and Responsibilities*

## Continued

document, and it is intended to help establish a positive living and learning environment at UWSP. Click here for more information:

[http://www.uwsp.edu/docs/Documents/CommunityRights.pdf - page=11](http://www.uwsp.edu/docs/Documents/CommunityRights.pdf?page=11).

Academic integrity is central to the mission of higher education in general and UWSP in particular. Academic dishonesty (cheating, plagiarism, etc.) is taken very seriously. Don't do it! The minimum penalty for a violation of academic integrity is a failure (zero) for the assignment. For more

information, see the UWSP "Student Academic Standards and Disciplinary Procedures" section of the *Community Rights and Responsibilities* document, Chapter 14, which can be accessed through the link above.

### Disabilities.

The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. For more information about UWSP's policies, check here:

<http://www.uwsp.edu/disability/Pages/faculty/>

[awAndPolicy.aspx](#).

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technology Center and then contact me at the beginning of the course. I am happy to help in any way that I can. For more information, please visit the Disability and Assistive Technology Center, located on the 6th floor of the Learning Resource Center (the Library). You can also find more information here:

<http://www.uwsp.edu/disability/Pages/default.aspx>.

## Learning Objectives - After completing the course students should be able to:

- Distinguish parasitism as a life history strategy
- Identify the major groups of animal parasites: Trematoda, Cestoda, Nematoda, Acanthocephala, Protista, Insecta, etc.
- Describe general parasite life cycles, geographic distribution, and patterns of host use.
- Apply knowledge of parasite biology to fundamental questions in ecology and evolution.
- Design treatment or management strategies based on parasite biology in the context of wild and domestic animal and human health.
- Synthesize scientific resources to evaluate real-world problems including the role of parasites in host conservation, invasive species establishment and persistence, food web stability, and spillover between domestic and wild animals.

Tentative Course Schedule (Subject to Change)



Course  
 Location: TNR 460  
 Meeting times:  
 TUES & THURS  
 8-10:50 AM

Coming late to class is  
 disruptive. Please  
 arrive to class on time!



Important notes  
 about grading!

I will return graded material no later than 1 week after the assignment is due (2 weeks on rare occasions). If you believe I've made a mistake in grading your work, you must bring your concern to my attention within one week of receiving the graded assignment and I will reevaluate it outside of class time. I will not reconsider the assigned grade after one week.

Date	Topic	Reading
Sep 5	Introduction, general principles, definitions	Chaps. 1 & 2
	<b>Lecture Continued:</b> Parasite adaptations, host specificity, Begin Platyhelminthes	
Sep 7	Turbellaria, Monogenea, Aspidoboth.	Chaps. 13-14, 19 (FOP)
	<b>Lab 1:</b> Turbellaria, Monogenea & Aspidobothrea	Pp. 1-17 (APPLM)
Sep 12	Digenea: schistosome pathology, immunology, distribution, & life cycle	Chap. 3, 15-16 (FOP)
	<b>Lab 2:</b> Digenea Intro., Digenea II & <i>Schistosoma</i> (Adult worms) + <b>Case Study</b>	Pp. 18-26 (APPLM)
Sep 14	Other medically important trematodes; trematode community ecology	Chaps. 17 & 18 (FOP)
	<b>Lab 5:</b> Larval Digenea & Life Cycles	Pp. 53-63 (APPLM)
Sep 19	<b>Case Study</b>	
	<b>Lab 4:</b> Digenea IV (Adult worms)	Pp. 37-52
Sep 21	* <b>Lab 3:</b> Digenea III (Adult worms) + Waterfowl Endoparasite Dissection.	Pp. 27-36 + Protocol
	* <b>Lab 3:</b> Continued.	
Sep 26	Cestoda intro: Cestodaria, Pseudophyllidea	Chap. 20 & 21 (FOP)
	<b>Lab 6:</b> Cestodaria, major eucestode orders	Pp. 79-105
Sep 28	Medically important Cestodes, Parasite-host energetics, <i>Hymenolepis</i> competition	Chap. 21 (FOP)
	<b>Lab 7:</b> Cyclophyllideans I	Pp. 106-116
Oct 3	* <b>Lab 8:</b> Cyclophyllideans II & Caryophyllidea; Passerine Dissection	Pp. 117-124 + Protocol
	* <b>Lab 8:</b> Continued.	
Oct 5	Nematodes: General features and Major Groups; Geohelminths	Chap. 22-28 (FOP)
	<b>Lab 9:</b> Nematodes I; Arthropod Dissection	Pp. 125-153
Oct 10	Nematodes: Guinea worm, filarial worms	Chap. 29-30 (FOP)
	<b>Lab Practical 1</b>	
Oct 12	<b>Guest Lecture Dr. Todd Huspeni Parasitic Crustacea &amp; parasitic castration</b>	<b>Chaps. 33-34 (FOP)</b>
	<b>Lab 14: Parasitic Crustacea</b>	<b>Pp. 183-189</b>
Oct 17	* <b>Lab 10:</b> Nematodes II; Continue Dissections for research project	Pp. 154-166
	* <b>Lab 10:</b> Continued.	
Oct 19	<b>Lecture Exam 1 + Take Home Assigned</b>	
	<b>Lab 12:</b> Fecal analysis & Egg ID	Pp.175 & 309-328 (APPLM)
Oct 24	Insect nematodes, Nematomorpha & Acanthocephala	Chaps. 24, 31-32 (FOP)
	<b>Lab 11:</b> Nematodes III; Photomicroscopy for Outreach Projects	Pp. 167-174+ Protocols

## Tentative Course Schedule Continued

Date	Topic	Reading
Oct 26	<b>*Lab 13:</b> Acanthocephala, Mollusca, Annelida & Pentastomida; Continue Dissections for Research Project + <b>Take Home DUE</b>	Pp. 176-182 (APPLM)
	<b>*Lab 13:</b> Continued.	
Oct 31	Parasitic crustacea & chelicerates (mites & ticks)	Chaps. 34-35, 41 (FOP)
	<b>Lab 15:</b> Mites, Ticks & Siphonaptera; Overview of Staining and Slide Mounting	Pp. 190-206 + Protocols
Nov 2	Insecta: Siphonaptera, Phthiraptera (Mallophaga & Anoplura)	Chaps. 36-38 (FOP)
	<b>Lab Practical 2</b>	
Nov 7	Insecta: Diptera, biological control and Hymenoptera	Chaps. 39 & 40 (FOP)
	<b>Lab 16:</b> Insecta: Phthiraptera (Mallophaga & Anoplura)	Pp. 207-213 (APPLM)
Nov 9	Cnidaria (Myxozoa), Protista: Microspora & Amebae + <b>Parasite Outreach Project Due</b>	Chaps. 11, 4 & 7 (FOP)
	<b>Lab 17:</b> Insecta: Diptera I: sand flies, mosquitoes, black flies, etc...	Pp. 214-238 (APPLM)
Nov 14	<b>Lecture Exam II + Take Home Assigned</b>	
	<b>Lab 18:</b> Insecta: Diptera II, Hemiptera, Hymenoptera, & Coleoptera	Pp. 239-250 (APPLM)
Nov 16	Hemoflagellates II: New World Sleeping Sickness, Leishmaniasis	Chap. 5 (FOP)
	<b>Lab 19:</b> Myxozoa, Microsporidia & Amoebae (Demonstrations) + <b>Data Analysis for Papers</b>	Pp. 251-260 + Stats Review
Nov 21	Ciliates & Apicomplexa I: Gregarines & Coccidia+ <b>Take Home Due</b>	Chaps. 10 & 8 (FOP)
	<b>Lab 20:</b> Gut Flagellates & Opalinida	Pp. 261-266
Nov 23	THANKSGIVING BREAK!	
Nov 28	Apicomplexa II: <i>Toxoplasma</i> life cycle & epidemiology	Chap. 8 (FOP)
	<b>Lab 21:</b> Hemoflagellates + <b>Draft Paper Due; In class Peer Review</b>	Pp. 267-274
Nov 30	Malaria: History & life cycle	Chap. 9
	<b>Lab 22:</b> Ciliates & Apicomplexa I (Gregarines)	Pp. 275-282 (APPLM)
Dec 5	Malaria life cycle & pathology I	Chap. 9
	<b>Lab 23:</b> Apicomplexa II (Coccidians)	Pp. 283-287
Dec 7	Malaria pathology II	Chap. 9
	<b>Lab 24 and 25:</b> Malaria I & II	Pp. 288-298
Dec 12	Malaria diagnosis, treatment, history, & genetic adaptations to malaria	Chap. 9 (FOP)
	<b>Lab:</b> Open lab for work on parasite collection	
Dec 14	Overview Lecture	
	<b>Lab Practical III + Collection Due</b>	
Dec 18	<b>8-10AM Final Exam + Final Paper Due</b>	



## Open Lab Time:

I will attempt to leave the lab door open (or unlocked) during all other available hours. Students should plan dissections and slide preparation activities accordingly during open blocks of room time. Generally, prepared slides will be available for student review during all open lab times.



## Dissection Specimens:

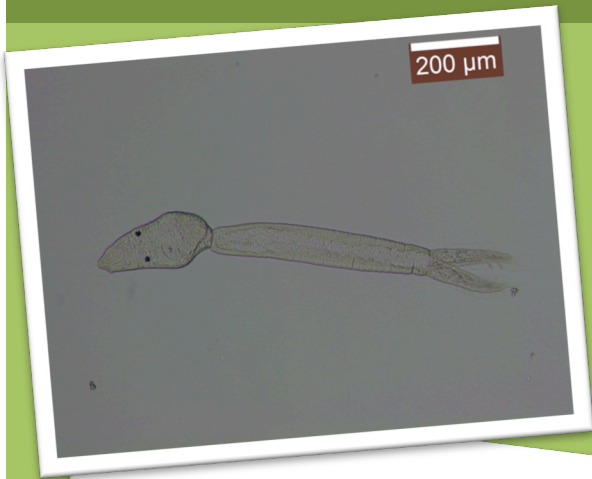
Assorted carcasses (e.g., passerines, raptors, assorted mammals, etc...) are available for student dissection and research projects. Donations of legally obtained hosts (from hunting/fishing) are also welcome. Please discuss specimens or questions about hosts for use in the class with the instructor prior to dissection.

## Course Expectations:

The lecture and laboratory portions of the course are intended to complement and reinforce one another and are given equal weight. The lecture will cover the diverse taxonomic groups of animal parasites and the concepts related to the study of parasitology and of its interdisciplinary components, ecology, evolution, behavior, molecular biology, conservation and medicine. The laboratory will consist of demonstrations, dissections, and examples of the groups of parasites covered, their lifecycles, host use, pathology, physiology, and development. The laboratory will also serve as a realistic research experience as students will collect, preserve, and identify parasite specimens as well as analyze data and prepare a scientific research paper.

*Welcome to the World of Parasites!*

**Have a fun and productive semester.**



Notes: