

# SYLLABUS – Fall 2008

## Parasites and Vectors of Disease

### BIOL-40500 / 50500; 4 credit hours

**Instructor:** Bruce P. Smith (Office 166 CNS, Lab 171 CNS, 274-3971, SMITHB@ITHACA.EDU)

**Instructor's Website:** [http://www.ithaca.edu/hs/biology/smith\\_b.htm](http://www.ithaca.edu/hs/biology/smith_b.htm)

**Course Website:** [http://www.ithaca.edu/biology/303\\_405.html](http://www.ithaca.edu/biology/303_405.html)

**Office Hours:** Tues. 1:00 pm - 3:00 pm, or by appointment

**Text:** Bush, A.O., Fernández, J.C., Esch, G.W., and Seed, J.R. 2001. [T] Parasitism: the diversity and ecology of animal parasites. 1st Edition. Cambridge Univ. Press.

**Recommended Lab book:** Sullivan, J.T. 2006 A Color Atlas of Parasitology, 7<sup>th</sup> edition (includes CD version 3.0)

**Required reading:** Desowitz, R.S., 1987 (paperback edition) [D]. New Guinea Tapeworms and Jewish Grandmothers - Tales of Parasites and People. There will also be required readings put on WebCT.

The field of Parasitology cuts across the widely accepted classification of Biology into a progression through molecular, cellular, within organism, and among organisms. This course covers the general biological principles of host/parasite interactions from the cellular level (e.g., immunology) through to the ecological (i.e., population and community) level. While intended as a general survey of parasitism throughout the animal kingdom, emphasis will be given to parasites important in human and veterinary medicine. Classical aspects of Parasitology will be covered during this course, namely systematics, morphology, and life-cycles, but non-traditional topics would include coevolution of hosts and their parasites, the use of parasites and parasitoids as biological control agents of pest species, and the influence of parasites on hosts in regards to population biology and community structure.

### GOALS AND ASSESSMENT:

The mission statement of our Department makes specific reference to *providing fundamental knowledge in biology spanning from molecular biology to ecology*, and also, to foster the ability to *draw connections between different areas of biology and between biology and the liberal arts*. Both this course and the field of Parasitology cuts across various levels of biological organization, promoting *integration and synthesis across various subdisciplines*, through a focus on a single biological relationship - the one between hosts and parasites. Many human parasites and vectored diseases continue as major sources of illness, disfigurement, and death on a worldwide level, but primarily centered in Third World and underdeveloped nations - largely because of economics, politics, and social conditions. Hence, Parasitology has obvious *links to the Humanities*, including Economics, Politics, Anthropology, and Sociology, and requires a *global perspective*. Historically, parasitic and vectored diseases regularly had profound effects on the outcome of wars, and various plagues have had dramatic impact on *human societies*.

GRADING SCHEME	Undergraduate (Biol-40500)	Graduate (Biol-50500)
Lecture Test 1	13%	11%
Lecture Test 2	13%	11%
Lecture Test 3	13%	11%
Lab Test 1	13%	12%
Lab Test 2	8%	7%
Final Exam	20%	20%
Internet Project	13%	12%
Oral Presentation	7%	6%
Teaching Assignment	n/a	10%

*There is no extra credit.*

**Grade scale:** Letter grades correspond to the following percentages:

A = 93.3 – 100%	A- = 90 – 93.2%	B+ = 86.6 – 89.5%	B = 83.3 – 86.5%	B- = 80 – 83.2%
C+ = 76.6 – 79.5%	C = 73.3 – 76.5%	C- = 70 – 73.2%	D+ = 66.6 – 69.5%	D = 63.3 – 66.5%
D- = 60 – 63.2%	F = below 60%			

## LECTURE

Lectures are traditional in format, with a strong emphasis on audiovisual presentation. The main goal is to establish *fundamental knowledge* in the field, and to develop the ‘big picture’, *integrating across subdisciplines of biology and forming connections with other fields within the liberal arts*. Assigned readings from Desowitz (1987) are intended to help students extend their view beyond the science. Tests and the final exam are in traditional format and will be based on lectures and assigned readings. The three term tests are not cumulative, while the final exam includes all material in the course. Questions include short answer (typically 8 at 3 points each), fill in the blank (typically 7 at 1 point per blank), and an essay question designed to be answered in 1-2 pages (typically 1 essay at 8 points). I give a choice of questions on each section of all lecture tests and the final exam.

## LABORATORY

In the laboratory, the focus is on *developing diagnostic skills*. This includes *learning technique* (e.g., proper use of stereoscopic [“dissecting”] and compound [bright-field and phase contrast] microscopes, *critical observation skills* for finding organisms on diagnostic slides and in infected hosts), as well as fundamental knowledge in Parasitology (how to recognize and identify various stages of parasitic organisms, important internal and external anatomy of parasitic organisms). Inherent to these labs is to learn basic histology of animal tissues, including both healthy and infected material, and to be able to visualize orientation of structures and parasites in the 3-dimensional host based upon 2-dimensional microscopic sections. Laboratory tests are in two parts: 1) a traditional section testing *fundamental knowledge*; 2) a *problem-solving* application section, in which students need to find and identify unknown parasites and pathologies on slides of biological samples. I will frequently provide background information from the host’s case history in questions from the latter section, to assist students in forming a diagnosis. The application section of laboratory tests is open book, in which you are allowed to use the textbook and hand-outs from your laboratories. The Color Atlas of Parasitology and various image libraries on the internet should be very useful for practicing your diagnostic skills and preparing for the laboratory tests. Any information presented in the laboratory handouts, or presented in demonstrations, will be testable material.

## COMMUNICATION SKILLS (Written, Oral, Electronic)

The *written* and *oral* assignments are intended to be independent, self-directed scientific inquiry. Students must locate sources of information, both in the *traditional scientific literature* (journals, books) as well as *electronic media* - webpages maintained by the World Health Organization [WHO], Center for Disease Control [CDC], various organizations and governmental agencies, academic institutions, and faculty. Students evaluate information, interpreting relevance and reliability, hence *practicing critical thinking skills*.

### 1) Written Project

This project involves *writing skills*, as a student must summarize and organize information into a cohesive synthesis. The written project will be a status report on an important parasite or parasite / micropredator-vectored disease, based primarily on *electronic media* (i.e., web-based resources). Students can choose their topic from either human or veterinary medicine. The project will include an expanded literature cited section in which you will reference the websites on which you based your report, including a brief description of each website. The first regular laboratory period is scheduled as an introduction to the internet and searching for parasitological information, to get you started.

**DEADLINE FOR HAND-IN: Oct. 6<sup>th</sup>, 1:00 p.m. - NO EXTENSIONS!**

### 2) Oral Presentation

This assignment emphasizes organization and clarity, and *practice in oral communication*. Each student will summarize a recent *primary research article*, through preparing and delivering a *powerpoint* presentation. You can choose a paper that interests you, and I will check whether it is suitable (i.e., not a review article, and neither too simple nor too complex), from current research articles found in relevant scientific journals (e.g., *Parasitology*, *Journal of Parasitology*, *International Journal for Parasitology*, *Medical Entomology*, or the Parasitology Section of *Canadian Journal of Zoology*, etc.). The presentation is to be 12-15 min. in length, and will be presented during the Nov. 13th laboratory period. **NOTE: DEADLINE FOR APPROVAL OF PAPER: NOV. 3<sup>rd</sup>, 4:00 p.m.**

## GRADUATE STUDIES (MA-Teaching – Biol-50500)

For MAT students there is an additional assignment, distinguishing it from the undergraduate course. MAT students will research a topic that we provide, produce and deliver a powerpoint presentation, teaching this topic to the class. This presentation should be approximately 30 min. in length.

# **POLICY:**

## **1. Attendance:**

The Undergraduate Announcements state the general policy that students are expected to attend classes and that they are responsible for all material even when absent. Conspicuous unexplained absence (i.e., more than 10% of the classes) may result in **lower grade, or dismissal from class**. Acceptable reasons for absence include 1) student illness, requiring the student to be bed-ridden; 2) death or serious illness in the immediate family; 3) appearance in court; 4) religious holidays. Note that you **MUST** have written documentation for your reason for absence (e.g., note from doctor, religious leader, etc.).

An exam missed during an unexcused absence (i.e. oversleeping or not being prepared) will result in a **zero grade for that exam**. If you miss an exam, you **MUST** inform me **before** the test if at all possible, but if not physically capable, then notify me as soon as possible afterwards. You can send me e-mail, phone my number (above) or the Biology Department (607-274-3161) to leave a message, and if you do not have the number with you, phone directory assistance and get the number for the main switchboard of the College (they will either transfer your call, or provide the correct number). Such notification **does not guarantee** my accepting your reason for absence, but failing to notify me guarantees that you will not be excused.

## **2. Readings:**

You are expected to read the assigned readings **BEFORE** coming to class, as a background to that day's lecture. If you have any questions regarding material in the reading, please ask during class.

## **3. Questions:**

Please feel free to ask questions in class. Chances are that if there is something that you don't understand, then others in the class are also confused - don't hesitate to ask your question.

## **4. Accommodation for Students with Disabilities:**

In compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, reasonable accommodation will be provided to students with documented disabilities on a case by case basis. Students must register with the Office of Academic Support Services (607-274-1005, TDD 607-274-7319, [acssd@ithaca.edu](mailto:acssd@ithaca.edu)) and schedule an appointment with their instructors as soon as possible to discuss their needs. If tests or exams are to be written under supervision of Academic Support Services, appointments have to be made with their office at least 1 week prior to the test, and I also need to be notified at that time.

## **5. Personal Conduct:**

"A student's behavior must not interfere with the activities of the College or with other student's pursuit of educational objectives" (see General Information, Undergraduate Announcements). Talking during lecture (except for questions or participating in class discussions) is disruptive and is disrespectful to other students and the instructor. Cell phones, pagers, etc. **must** be kept turned off during classes. Disruptions may result in the student being asked to leave the class and the student will be considered absent without excuse. If asked to leave class on more than one occasion, the student will be withdrawn from the course.

## **6. Plagiarism:**

Please be aware of plagiarism: if you take a sentence from someone else's work and only change one or a couple of words, it is still plagiarism even if you cite the source. You must rewrite it in your own words. Plagiarism is a serious case of academic misconduct: check the student handbook and the library website for details, but it can lead to judicial proceedings and even expulsion from the college. I check carefully for plagiarism and will take appropriate action in any cases I encounter. I will give you further guidance on how to properly reference sources when written work is assigned.

# LECTURE SCHEDULE

Tues./Thurs. 10:50 am - 12:05 pm, CNS 115

Date	Topic	Readings T(pgs), D(chapters)
Aug. 27	Introduction [ <i>lab period</i> - first Wed. is on Monday schedule]	T(1-9)
Aug. 28	The Parasite's Environment; start Physiology & Biochemistry	D(1, 2)
Sept. 2	Physiology and Biochemistry; start Immunology	T(27-35)
Sept. 4	Immunology; start Parasitic Protozoa	T(13-27, 42-49) D(10)
Sept. 9	Parasitic Protozoa: flagellates	T(49-58)
Sept. 11	Parasitic Protozoa: amoebae, apicomplexans	T(58-69), D(6, 13)
Sept. 16	Parasitic Protozoa: apicomplexans, ciliates, myxozoans	T(69-100, 288-292), D(4, 5)
Sept. 18	Parasitic Flatworms: turbellarians, monogeneans, aspidobothrians	T(103-105, 128-134) D(11)
Sept. 23	Parasitic Flatworms: digeneans	T(105-117)
Sept. 25	<b>TEST #1</b>	
Sept. 30	Parasitic Flatworms: digeneans; start Tapeworms	T(117-128, 134-139)
Oct. 2	Tapeworms	T (139-153), D(8)
Oct. 7	Parasitic Nematodes	T(160-173)
Oct. 9	Parasitic Nematodes	T(173-184), D(3)
Oct. 14	Parasitic Nematodes	T(184-192), D(12)
Oct. 16	<b>FALL BREAK</b>	
Oct. 21	Nematomorpha, Spiny-Headed Worms, Tongueworms	T(197-223, 296-298)
Oct. 23	Parasitic Crustacea; Micropredators and Vectors	T(225-242, 257-263), D(7)
Oct. 28	Micropredators and Vectors	T(268-270)
Oct. 30	Ectoparasitic Insects	T(263-268)
Nov. 4	<b>TEST #2</b>	
Nov. 6	Ectoparasitic Insects; start Protelean Parasites	T(271-272)
Nov. 11	Protelean Parasites and Insects as Parasitoids	T(274-276)
Nov. 13	Parasitic Mites (incl. Ticks)	T(242-250)
Nov. 18	Parasitic Mites; Miscellaneous Parasites	T(251-257, 299-308)
Nov. 20	Population Biology and Ecology of Parasites	T (312-326, 357-359)

<b>Date</b>	<b>Topic (continued)</b>	<b>Readings T(pgs), D(chapters)</b>
Nov. 25	<b>THANKSGIVING BREAK, NO CLASS</b>	
Nov. 27	<b>THANKSGIVING BREAK, NO CLASS</b>	
Dec. 2	Ecology of Parasites	T(331-348, 363-368) D(9, 14)
Dec. 4	<b>TEST #3</b>	
Dec. 9	Ecology of Parasites; Evolutionary Biology of Parasites	T(405-416, 459-463, 494-501)
Dec. 11	Evolutionary Biology of Parasites	T(397-399, 501-509)
	<b>FINAL EXAM: Wed., Dec. 17th, 1:30 pm -4:00 pm</b>	

## LABORATORY SCHEDULE

Mon. 1:00 - 3:50 pm, room CNS 212

<b>Date</b>	<b>Activity</b>
Aug. 27	Introduction [first Wed. is on Monday schedule - also see lecture schedule, above]
Sept. 1	<b>Labor Day – no class</b>
Sept. 8	Parasites on the Internet
Sept. 15	Parasitic Protozoa I: flagellates and amoebae
Sept. 22	Parasitic Protozoa II: sporozoans and ciliates
Oct. 29	collection techniques
Oct. 6	Parasitic Flatworms; <b>INTERNET PROJECT DUE!</b>
Oct. 13	Tapeworms
Oct. 20	Spiny-Headed Worms and Parasitic Nematodes
Oct. 27	<b>LABORATORY TEST I</b>
Nov. 3	Parasitic Crustacea and Micropredatory Insects; <b>DEADLINE FOR APPROVAL OF PAPER!</b>
Nov. 10	<b>ORAL PRESENTATIONS</b>
Nov. 17	Ectoparasitic Insects and Parasitoids
Nov. 24	<b>THANKSGIVING: NO CLASSES</b>
Dec. 1	Parasitic Mites (including Ticks)
Dec. 8	<b>LABORATORY TEST II</b>