

SYLLABUS Biological Sciences 385 II-08-09 1030MWF 129MHLS

Instructor: John Janovy, Jr., 424 Manter Hall; jjanovy1@unl.edu; <http://bsweb.unl.edu/labs/janovy>

Text: Roberts and Janovy, FOUNDATIONS OF PARASITOLOGY, 7th or 8th Ed.

Lab Manual: Online exercises from Blackboard and handouts in lab

Materials you need to supply for lab: A good drawing pencil with 4H lead (0.5mm mechanical recommended), drawing paper (white, unlined, laser printer paper recommended), a 12" ruler (plastic, perhaps with letter/number templates and metric scale on one side), a good eraser (art gum recommended), a 3-ring binder for your notebook (a few binders are available free if you want to borrow one).

Teaching Assistants: Alaine Knipes and Gabe Langford, both doctoral candidates in parasitology.

UNL Institutional Objectives and Learning Outcomes: BIOS 385 is proposed to be an Outcome 10 course that reinforces Outcomes 3 and 4. See <http://ace.unl.edu>

Welcome to the complex and highly diverse world of parasites and parasitologists. I hope your time in our realm is well spent and that the experience turns out to be a positive one. BIOS 385 is designed to provide students with both a broad perspective on the most common way of life, namely parasitism, and a reasonably detailed knowledge of organisms that have a major economic and social impact. Because of the subject matter, the course also deals quite a bit with global health and global socio-economic issues. BIOS 385 is an IS (Integrative Studies) course under the old UNL Comprehensive Educational Program (CEP). I believe very strongly in the ideals of the IS designation and will try to fulfill the responsibilities of instructors assigned to such courses. Thus you will be asked to write papers, provided with opportunities for in-class discussion and presentation, presented with controversies typical of parasitology, and introduced to cultural and gender diversity material appropriate for an upper division university science course, especially one that focuses on disease and infectious organisms. UNL also is replacing the IS/ES system with one called ACE (Achievement Centered Education) in the fall of 2009 (see the web site listed above); BIOS 385 will likely satisfy Outcome 10 (Integrative Experience) of ACE when that program is started.

What to expect in this class:

- (1) Usually there will be three lectures a week, mostly explaining material in the book and expanding on that material when appropriate. Facts, vocabulary, and diagrams will all come from the book, but the meaning, significance, and interpretations sometimes will come from material presented in class.
- (2) We have a schedule of topics, and we will follow that schedule at least in the order it is presented below. Depending on how the class responds to lecture and quizzes, we may not be able to go quite as fast as the schedule indicates. We will stay either ahead of lab or even with it, however, so that you will not go to lab without having been introduced to that week's material in lecture.
- (3) I am substituting take home exam papers (the IS option) and weekly lecture quizzes for large exams.
- (4) I will learn your names as soon as I can and am likely to call on you in class for responses to particular pieces of information or diagrams.
- (5) Most of the material will address parasites of humans and domestic animals, although at times I will talk about topics that have little or no impact on human health. We are also likely to have a guest lecturer a few times, and such lectures are most likely to concern parasites of wildlife.

- (6) You will be assigned some homework in addition to the papers, mainly as a means of introducing you to statistical analysis of parasite populations. Such quantitative handling of parasite data is basic to understanding epidemiology and the quantitative aspects of public health.
- (7) I intend to try class presentations by students on some socio-economic issues and topics related to parasitism.
- (8) If you are now registered for BIOS 315 (Seminar), you can satisfy some of those seminars by attending BIOS 915P (Parasitology Seminar) on Thursdays at noon in 529W Nebraska Hall. If you have nothing else to do and want to attend that seminar, you are always welcome.

Attendance:

I will take attendance and make it part of the grade. My major means of taking attendance on Wednesday and Friday is likely to be a short extemporaneous daily writing exercise or sign-up sheet.

Questions:

Questions are expected. Although I have a lecture schedule, it is not so rigid that we can't spend an entire period on class discussion or in answering questions. Someone please raise his or her hand and tell me to slow down, spell words, or repeat if I am going too rapidly.

Grading:

Lecture: There will be 14 short lecture quizzes, three take-home exams, and three homework assignments in lecture. The quizzes will be given at the start of the period each Friday beginning with the second week. You may drop two of these quiz grades, so that you will end up being graded on 12. These quizzes are worth a total of 120 points. Attendance will be calculated as the percentage of days you are present, based on the number of days I take attendance (including quiz days). The take-home exams will be given on Fridays (according to schedule) and be due on the following Friday; these exams will be worth 50 points each. The homework assignments will be given out at the beginning of the semester; each assignment is worth 50 points. Beginning with the second week of class, we will have two short student presentations of papers from the original (primary) parasitological literature. I will try to convince your TAs to demonstrate these presentations the first week of class. Point summary for lecture is as follows:

Quizzes	120
Exams	150
Homework	150
Attendance	100
Portfolio	30
<u>Presentation(s)</u>	<u>50</u>
Lecture total	600

Presentation(s): Each Friday, after the quiz, we will have two student presentations of original papers from the primary literature in parasitology. Students will choose their own papers, but I encourage ones that have some socio-economic importance or significance, even if that significance is slight. You will be given some advice on journals to choose papers from and the format of these presentations. Each student is expected to give at least one such presentation.

Portfolio: Portfolio contents and specifications will be posted on Blackboard, but as a minimum a portfolio will contain all your quizzes, homework, take home exams, original papers used for take home exams, and a self-assessment.

Homework and Take-home Exams: These items are done on a contract basis; i.e., if you do the work requested, and to the extent requested, then you will get the full credit. You will also have an opportunity to do these items over again with no loss of credit.

Take home exam 1: What has molecular biology contributed to our understanding of the epidemiology, pathology, and control of Chagas' Disease?

Follow the editorial policies provided. The paper must be three pages of double spaced typing, 12-point font, 1 inch margins. Illustrate your answer with at least five but no more than 10 original paper citations from the past two years. See editorial policies in the Blackboard Course Documents folder for format rules.

Lab: Laboratory work includes weekly quizzes beginning with the second week, a mid-term and a final practical, a rather extensive notebook, and your TA's subjective evaluation of your overall approach to laboratory. The point distribution for lab is as follows:

Weekly quizzes	100
Practical exams	100
Notebook	200 (150 if not picked up by the end of finals week)
TA evaluation	<u>50</u>
Lab total	450

Seventy five percent of your final letter grade will be based on lecture, and twenty five percent on lab (proportions calculated in the spreadsheet). Missed labs can be made up by attending any of the other labs in which there is room during that particular week. The class average is middle C. I reserve the right to scale grades up if the class average falls below 75%. If the class average is 75% or higher, then an approximate standard scale applies (90% = A, 80% = B, etc.). I give no makeup exams. If you miss a quiz or lab because of illness or personal emergency, we will not count that quiz or lab if you have either a physician's note indicating you were ill, or have some other documentation of a real emergency. If you miss class because of athletic competition, I need to have the letter from your coach and I need to be reminded of that letter as the semester nears its end; I'll be happy to arrange with your coach to send along a quiz if possible.

NOTE: You have complete control over 80% of your lecture grade and 55% of your lab grade, namely through attendance, homework, take-home exams, notebook, portfolio, and TA evaluation. The weekly lecture quizzes also are taken from a list of questions you are given in advance.

Office hours:

My office hours are early Monday, Wednesday, and Thursday afternoons. I'm also relatively available a lot of other times except Friday afternoons. You can call me at 472-2754 (office), or leave a message at 472-2720 (BioSci office) or 489-4369 (home). If you leave a message on my home phone, please speak slowly and clearly, and leave your name and phone number. I also have a mailbox in 348 Manter Hall (BioSci office, campus mail zip = 0118). My e-mail is jjanovy1@unl.edu. I am available by appointment about any day, including late in the afternoons (except on Friday).

Study hints:

- (1) Make a vocabulary list. Someone ask me about how to make and use such a list.
- (2) Find a study partner, or several, and use the vocabulary in your daily conversation.
- (3) Answer the questions on Blackboard from which the quizzes will be taken, using a complete sentence with two “facts” and a concept or idea.
- (4) Draw the life cycles and use the scientific names.
- (5) Read and write a lot! Practice your writing, practice making arguments from evidence, practice passing judgment on information from the primary literature.**
- (6) Seek individual help early if you feel completely lost, especially on the homework.
- (7) DON'T feel embarrassed if you are not doing as well as you think you should be; seek help and don't be afraid of me or your TAs.

About your instructor:

John Janovy, Jr.

Paula and D. B. Varner Distinguished Professor of Biological Sciences

BS in Math (1959), MS in Zoology (1962), and PhD in Zoology (1965); University of Oklahoma; post-doctoral research, Rutgers (1965-66).

Research interests: parasitology, especially ecology of parasitism and evolution of parasite life cycles, with focus on the protistan parasites of insects and the helminth parasites of small fish. There are usually 2-3 graduate students and 1-3 undergraduates doing research in my lab.

Other courses taught: General Biology (BIOS 101), Invertebrate Zoology (BIOS 381, fall semesters), Field Parasitology (BIOS 487/887, Cedar Point Biological Station, Lake McConaughy, NE).

Web site: <http://bsweb.unl.edu/labs/janovy>

Lecture schedule:

The lecture schedule more or less follows the sequence of chapters in the text, although when we actually start talking about some of these parasitic infections, I will incorporate material from the arthropod vector chapters when appropriate. The schedule also is posted as a spreadsheet on Blackboard.

BIOS 385 PARASITOLOGY - II-07-08

Inst

r John Janovy, Jr., jjanovy1@unl.edu

TA Alaine Knipes, lainey244@yahoo.com

TA Gabriel Langford, glangfo1@bigred.unl.edu

Da **Dat**

y # **e**

1

Jan M **Lecture**

Introduction

Pges

Chapt 1

	12			
2	14	W	Parasitism - The Big Picture	Chapters 2 & 3
3	16	F	Parasitic protists - an overview; Lec Quiz 1	Chapt 4
4	19	M	Kinetoplastida - basic biology	Chapt 5
5	21	W	Trypanosomes - life cycles, pathology	Chapt 5
6	23	F	Chagas' disease	Chapt 5
6	23	F	First homework assignment due; Lec Quiz 2	Data set
7	26	M	Leishmaniasis - course of infection, clinical types	Chapt 5
8	28	W	Overview of trypanosomatids	
9	30	F	Take home exam - I due; Lec Quiz 3	
	Feb			
10	2	M	Intestinal infections in general - an overview	Chapt 6
11	4	W	Diplomonads and trichomonads	Chapt 6
12	6	F	Diplomonads and trichomonads; Lec Quiz 4	Chapt 6
13	9	M	Parasitic amebas - structure and life cycles	Chapt 7
14	11	W	Amebiasis - pathology, diagnosis, epidemiology Molecular parasitology - flagellates and amebas; Lec	Chapt 7
15	13	F	Quiz 5	Chapt 7
16	16	M	Apicomplexa - an overview	Chapt 8
17	18	W	Toxoplasmosis - epidemiology and course of infection	Chapt 8
18	20	F	Coccidiosis - life cycles of parasites, economic impact	Chapt 8
18	20	F	Second homework assignment due; Lec Quiz 6	Data set
19	23	M	Malaria - history, sociology, economics	Chapt 9
20	25	W	Malarial parasites - life cycles, vectors	Chapt 9
21	27	F	Malarial parasites - life cycles, vectors	Chapt 9
22	27	F	Take home exam - II due; Lec Quiz 7	
	Mar			
22	2	M	Trematodes - A general introduction, with examples	Chapters 13 and 15
23	4	W	Paragonimiasis - A case study	Chapt 18
24	6	F	Liver flukes and echinostomes; Lec Quiz 8	Chapt 17
25	9	M	Schistosomiasis - parasite life cycles and epidemiology	Chapt 16
26	11	W	Schistosomes - immunology, metabolism, etc. Trematode parasites of wildlife - an overview and	Chapt 16
27	13	F	survey	
27	13	F	Third homework assignment due; Lec Quiz 9	Data set
	16	M	Spring Break (Whew!)	
	18	W	Spring Break	
	20	F	Spring Break	
28	23	M	Tapeworms - Form and function	Chapters 20 and 21
29	25	W	Cestodes of humans	Chapters 20 and 21

30	27	F	Cestodes of wildlife - an overview and survey; Lec Quiz 10	Chapts 20 and 21
31	30	M	Nematodes - form and function	Chapt 22
	Apr			
32	1	W	<i>Trichuris, Capillaria, and Trichinella</i>	Chapt 23
33	3	F	Hookworms - life cycles, epidemiology; Lec Quiz 11	Chapt 25
34	6	M	<i>Ascaris</i> and pinworms	Chapt 26
35	8	W	Filarial worms	Chapt 29
36	10	F	Filarial worms	Chapt 29
36	10	F	Take home exam - Ill due; Lec Quiz 12	
37	13	M	Miscellaneous nematodes - parasites of wildlife	Parts of several chaps
38	15	W	Acanthocephalans	Chapts 31 and 32
39	17	F	SWAP - no class	
40	20	M	Nematomorpha and other parasites of arthropods	Chapts 36 and 38
41	22	W	Arthropods - Fleas and Lice	Chapt 39
	24	F	Arthropods - Mosquitoes; Lec Quiz 13	
42	27	M	Arthropods - Ticks and mites	Chapt 41
43	39	W	Parasitism - socioeconomic issues	Parts of several chaps
	May			Parts of several chaps
44	1	F	Parasitism - socioeconomic issues; Lec Quiz 14	Chapts
	May			
	4	M	Final Exam Week	

Learning outcomes for BIOS 385:

- (1) Demonstrate the ability to retrieve and use, in a written document, primary literature and online reference materials from index and journal databases such as Biological Abstracts.
- (2) Demonstrate the ability to follow editorial guidelines exactly.
- (3) Demonstrate the ability to develop and retain a portfolio of coursework as evidence of your achievement of institutional and course objectives.
- (4) Draw and explain the life cycles of the major parasites of humans (trypanosomes, intestinal amebas and flagellates, *Plasmodium* spp., schistosomes, tapeworms, *Ascaris*, hookworms, filarial worms.)
- (5) Explain the significance of parasite population structures, especially in terms of economic impact, epidemiology, and health care delivery.
- (6) Explain the role of vectors in the transmission and maintenance of parasitic infections and give at least one example.

- (7) State the major evolutionary problems and questions associated with parasitism and explain how those questions are addressed.
- (8) 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.
- (9) Demonstrate the ability to use spreadsheets and statistical software for analysis of epidemiological data, including health statistical data available online at www.cdc.gov.
- (10) 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.

Homework assignments:

Note: before starting on these assignments, you will want to learn how to:

- (1) Rank-sort spreadsheet data according to any criterion you specify;
- (2) Insert, delete, and format cells, rows, and columns;
- (3) Save, back up, and copy data to backup files and additional worksheets within the workbook;
- (4) Introduce mathematical and statistical functions into cells and columns;
- (5) Make your spreadsheet look nice and be useful to others by labeling cells, introducing notes, etc.;
- (6) Generate *.csv (comma separated values) files from spreadsheets;
- (7) Use spreadsheet data in the construction of PowerPoint graphs;
- (8) Acquire basic PowerPoint skills;
- (9) Install and use the statistical software provided (FieldStat and StatView); and
- (10) Practice verbally describing some of the data provided in a way that a non-parasitologist can understand what you are working on.

You will get a substantial amount of help accomplishing the above if you're not familiar with all the spreadsheet operations.

Assignment #1:

Using the data set and software provided, answer the following questions:

- (1) What are the prevalences, mean intensities, and mean abundances of three species of parasites in all the years?
- (2) In what ways do the distributions of these three species of parasite among host populations differ between years of the study (i.e., explain the population distribution graphs)?
- (3) Is there evidence that any of the parasite species are changing in their impact on hosts of different ages over the years of the study?
- (4) Are there significant differences in the prevalence of various parasite species between sexes in any of the years of the study?

Assignment #2:

Using the data set and software provided, answer the following questions:

- (1) What are the population distribution parameters that best describe parasite populations in this data set? (NOTE: You will have to "fit" the curves for this question)

- (2) Is there a relationship between parasite infrapopulation and host age with any of the parasites, and if so, do these relationships change over time?
- (3) Is there any evidence that females encounter any of the parasite species in a manner different from the way males encounter the same parasite species, and if so, does this demographic phenomenon change over time?
- (4) What is the most effective way to communicate all of the data contained in the data set, including the basic epidemiological situation, to an audience of non-parasitologists?

Assignment #3:

Using the data set and software provided, answer the following questions:

- (1) What are the major conceptual problems that are suggested by a study of this data set?
- (2) What are some testable hypotheses that can be derived from a study of this data set, hypotheses that might address some of the conceptual issues mentioned in (1)?
- (3) What kind of parasitological principles are revealed by this data set?
- (4) If this data set was actually derived from humans, what might it reveal about socio-economic conditions in the study area?

General advice on how to maximize the value of the education you receive at the University of Nebraska (these suggestions will cost you absolutely nothing except a little time):

- (1) Make sure every instructor you have knows your name, and make sure that instructor knows you and your work well enough so that he/she can write a letter of recommendation for you if necessary.
- (2) Simply decide today that you are not afraid of, or intimidated by, faculty members, no matter how obnoxious or wacko they seem, and regardless of whether their “values” are consistent with yours.
- (3) Pay attention to world events, especially those with a cultural component. Try to understand why these events take place, even though your courses may not deal with anything other than specific subject matter having nothing to do with global politics or economics.
- (4) Visit the museums on campus about once a week (free with student ID). Talk to your friends about what you see in those buildings. When the Sheldon Gallery opens in March, be sure to visit it regularly and be able to talk intelligently about the works there, as well as the sculptures on campus.
- (5) Pay attention to the campus landscaping; read the labels on the trees and plants. Talk about campus landscaping and vegetation with your friends.

- (6) Read some high quality magazine fairly regularly. I suggest *The New Yorker*, *Harpers*, or *Atlantic Monthly*. Ask your instructors for a reading list of non-fiction books and read some of the items on such lists.
- (7) Talk to your parents or guardians about the ideas you are encountering at UNL.
- (8) Do *something* original and creative (poetry, music, sketches, etc.) on a fairly regular basis.
- (9) Go to free lectures and recitals when you have the opportunity. Once you get there, stay through the whole thing and be a quiet and attentive audience member.
- (10) Talk to your fellow students. Find out who are the most challenging faculty members in the arts, humanities and social sciences, and enroll in those teachers' courses.

BIOS 385 II-06-07 Information sheet (please print legibly, thanks!):

Name _____ Choose a 6-digit PIN _____

Home town _____ High school attended _____

What year are you? (sophomore, junior, etc.) _____ Major _____

e-mail address _____

(Please print this address very carefully, exactly as you would send a message to yourself.)

Other UNL activities you are involved in _____

Do you read any magazines? If so, what are they? _____

What are the last two books you read that were not required as part of a course? _____

What museum did you last visit, and when was that visit? _____

Have you taken at least six semesters of a foreign language, or do you speak and read a language other than English, and if so, what is it? _____

Foreign countries you have visited _____

Reason you are taking this course _____

Might you be at all interested, ever, in undergraduate research? _____

Do you have a scholarship? _____ If so, what kind? _____