**Disease Biology**

*Spring 2017*

**BSC 4933/6932**

**Professor:** Dr. Lynn B. Martin **Time:** 9:30-10:45

**Email:** [lbmartin@usf.edu](mailto:lbmartin@usf.edu) **Days:** Mon and Wed

**Office:** SCA 130 **Room:** NES 108

**Office hours:** Mondays 10:45-11:30 or by appointment

**Course objectives:**

The majority of our understanding of the way hosts interact with parasites comes from molecular and cellular research on vertebrates and a few invertebrates in unnatural laboratory conditions. The goal of this class is to highlight discoveries in the fields of ecological immunology and disease ecology. These disciplines merge evolutionary ecology, parasitology, epidemiology and classic immunology to understand how organisms resist or endure infections in their natural environments.

**Texts, readings, and other materials:**

Required:

1. Schmid-Hempel, P. *Evolutionary Parasitology,* Oxford.

2. Sompyrac, Lauren. *How the Immune System Works*, 3rd Edition. Blackwell.

All other materials will be posted on Canvas. See the schedule below for details.

**Grading:**

Discussion participation 100 points

Grant proposal 100 points

Exam 1 100 points

Exam 2 100 points

Exam 3 100 points

Grad discussion leading 50 points

***Undergrad points available 500 points***

***Grad points available (50 points for leading a lecture) 550 points***

Grading scale (percentages; no plusses/minuses)

A – 90 and above; B – 89-80; C – 80-79; D – 69-60; F – 59 and below

No extra credit will be given and grades will not be curved.

**Attendance:** USF policy mandates that you attend the first class or be dropped from the roster. Other class attendance is at your discretion; however, tardiness will not be accepted. You will not be allowed to attend a class if you arrive >5 minutes late. Also, weather alerts are not a justified reason to miss class or be late; if the university is open, you should be present.

**March 25 is last day to drop with ‘W’**

**Tentative schedule**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Topic** | **Readings** | **Sompyrac** | **Assignments** |
| Jan 9 | Syllabus |  |  | attendance |
| Jan 11 | Intro to Disease Biology | Schmid-Hempel c1&2 |  |  |
| Jan 16 | No class |  |  |  |
| Jan 18 | Natural history of defenses | Schmid-Hempel c4 |  |  |
| Jan 23 | Immune organization | Joyner 2012; Schmid-Hempel and Ebert 2003 | 1 | *Discussion* |
| Jan 25 | Innate immunity | Medzhitov 2008 | 2 |  |
| Jan 30 | B cells | Hedrick 2004 | 3 |  |
| Feb 1 | T cells |  | 4-5 | Proposal topic due |
| Feb 6 | **Exam 1** |  |  |  |
| Feb 8 | Ecological immunology | Schmid-Hempel c5 |  | *Discussion* |
| Feb 13 | Sexual selection | Schmid-Hempel c6 |  |  |
| Feb 15 | Optimal immunity | Viney et al., 2005; Graham et al., 2010 |  | *Discussion* |
| Feb 20 | Origins of variation | Jackson et al., 2014; Galic et al., 2009 |  | *Discussion* |
| Feb 22 | Species variation | Stutz et al., 2015; Ostfeld et al., 2014 |  | *Discussion* |
| Feb 27 | Individual variation 1 | Ardia et al., 2011 |  | *Discussion* |
| Mar 1 | Specificity | Schmid-Hempel c7 |  |  |
| Mar 6 | Parasite evasion | Schmid-Hempel c8 |  | Proposal outlines due |
| Mar 8 | **Exam 2** |  |  |  |
| ***Mar 13*** | ***Spring break*** |  |  |  |
| ***Mar 15*** | ***Spring break*** |  |  |  |
| Mar 20 | Proposal outline round table |  |  | *Discussion* |
| Mar 22 | Grad students 1&2 | Papers on tolerance |  | *Discussion* |
| Mar 27 | Pathogenesis | Schmid-Hempel  c9 |  | **Cancelled! Extra credit only** |
| Mar 29 | Epidemiology | Schmid-Hempel c11 |  | *Discussion* |
| Apr 3 | Virulence | Schmid-Hempel c12 |  | Proposal drafts due |
| Apr 5 | Co-evolution | Schmid-Hempel c13 |  | *Discussion* |
| Apr 10 | Proposal draft round table |  |  | *Discussion* |
| Apr 12 | Individual variation 2 | Martin et al., 2016; Gervasi et al. 2015 |  | *Discussion* |
| Apr 17 | Ecology | Schmid-Hempel c14; |  | *Discussion* |
| Apr 19 | Dilution debate Grad students 3&4 | Keesing et al., 2010; Wood et al., 2014; Civitello et al., 2015 |  | *Discussion;*  Final proposals due |
| Apr 24 | Grant proposal panel |  |  | *Discussion* |
| Apr 26 | **Exam 3** |  |  |  |

**Grant proposal**

One of the most important activities you will conduct as a scientist will be grant writing. For this reason, you will conceive and write a proposal to test a hypothesis based on class topics. Your proposal should follow the guidelines of the AOU Student Research Awards (but it need NOT be on birds). Pay particular attention to the “Application Format” section, but do not submit budget or a CV. The class schedule on the previous page lists due dates for each component of this assignment. This means that you should start reading and thinking about the project now. You must turn in both an outline and draft to your peers, and although these exercises will not be graded, failing to submit these documents to your peers will be considered when grading the final draft. Likewise, the effort you invest in critiquing your colleagues’ work will be considered when grading your final assignment. Participation in class discussions, which include the proposal round tables, is a large proportion of your grade. Peer groups will be assigned early in class, and historically, peers that interact extensively (i.e., meeting to discuss drafts and outlines) tend to earn the best grades.

**Research and references**: You can come to me in office hours or work with one of the librarians if you have concerns with topics or approaches or even if you’re not comfortable with literature searches, which will be integral to writing a good proposal. You **must use references from primary literature to support your ideas and methods**, not Wikipedia or the like. If you need help here, please seek it well in advance of deadlines!

When you cite a reference, use the formats below. The final paper should include at least 10 references. The bibliography is NOT included in the page limit.

*Journal example:*Kitaysky, A. S., E. V. Kitaiskaia, J. C. Wingfield, and J. F. Piatt. 2001. Dietary restriction causes chronic elevation of corticosterone and enhances stress response in red-legged kittiwake chicks. Journal of Comparative Physiology B-Biochemical Systemic and Environmental Physiology 171:701-709.

*Book example (include relevant page numbers!):*Sapolsky, R. M. 2002. Endocrinology of the Stress-Response. Pp. 409-450 (in J. B. Becker, S. M. Breedlove, D. Crews, and M. M. McCarthy, editors). Behavioral Endocrinology. M.I.T. Press, Cambridge.

**Grant proposal panel (Nov 24):**

Towards the end of class, we will spend a class period reviewing grant proposals, just as is done for real proposals. You and your classmates will rank all proposals and ranks will be incorporated into the final grades. Details will be provided as the panel date nears.

**Grad Student Led events:**

Late in the semester, graduate students will lead discussion on two topics: i) parasite tolerance and ii) the Dilution Effect. All students will be evaluated for participation, just as with any other discussion day. Grad students, however, will be eligible to earn 50 points for this activity. I will work with grad students in advance to develop the discussion and answer questions. Grad students will be evaluated on the quality of the presentation (2/3) and the discussion led thereafter (1/3). All grad students in the group will receive the same grade, so it will be your responsibility to ensure that your peers carry their share of the workload (please consult with me well in advance if this becomes an issue). Under no circumstances will an absence on the day of your presentation be excused; you will receive a ‘0’ if you miss it.

**Student participation**

Participation in discussions is integral to learning in the class (~1/5 of your grade!). For this reason, you will be awarded points based on your involvement in discussions. Points will be earned as you ask questions about the presented material, make suggestions about future directions, and critique ideas in the literature or those of your peers or me. Scores will be posted on Canvas soon after each discussion, but points will not be negotiable. Note that you will be evaluated on the quality and quantity of your contributions. If you have concerns about your points, discuss this with me early. This activity has the potential to help your grade tremendously if you invest the effort; think of these points as near-free, as they are intended as a way to keep you engaged.

**Exams**

Class exams will include multiple-multiple choice, fill-in-the-blank, short answer, essay and other question types. Interpretation of figures and tables from the primary literature will be key, including some figures you will not have seen previously. Material covered in discussions as well as all class readings may be the basis of some exam questions.

**Other important notes**

1. Students who anticipate missing class due to a religious observance must submit notification in writing by the third class. Other absences are not excusable and NO LATE ASSIGNMENTS WILL BE ACCEPTED.

2. The content of the course is the sole property of the instructor and may not be reproduced or distributed in any form for sale.

3. Assignment due dates and class content are subject to change, so your attendance is critical.

4. S-U grades must be negotiated in writing within the first three weeks of the term.

5. An “I” grade indicates incomplete course work and may only be awarded when only a small portion of coursework is incomplete and when the student otherwise has a passing grade. A Biology department “Incomplete Grade Contract” must be completed before the “I” grade is given.

6. No cell phones, PDAs, or other electronic devices except laptop computers are to be used in the classroom, unless approved by me on particular days. Any use of these devices or abuse of computers is grounds for dismissal from the class that day; second offenses will result in permanent dismissal. Also, do not use social media websites during class, as it distracts your classmates and is grounds for dismissal that day.

7. Disruption of academic process is an act by a student in a classroom or teaching environment, which in the reasonable estimation of a faculty member: i) distracts attention from the academic material (e.g., persistent, disrespectful or abusive disruptions), or ii) presents danger to the health, safety or well-being of class participants. These acts will not be tolerated.

8. Uncollected assignments will not be retained longer than 90 days from the due date. Grades cannot be disputed beyond 90 days from their assignment.

9. Academic dishonesty will not be tolerated and you will be held to all academic policies and standards of the USF. Any form of cheating is academic dishonesty. ‘Cheating’ is defined by the University as (1) unauthorized granting or receiving of aid during the prescribed period of a course-graded exercise (students may not consult written materials such as notes or books, may not look at the paper of another student, nor consult orally with any other student taking the same test); (2) a student’s asking another person to take an examination for or in place of him/her; (3) taking an examination for or in place of another student; (4) stealing visual concepts, such as drawings, sketches, diagrams, musical programs and scores, graphs, maps, etc., and presenting them as one’s own; (5) stealing, borrowing, buying, or disseminating tests, answer keys, other examination materials, research papers, creative papers, speeches, other graded assignments, text or phrases from websites, etc., except as officially authorized; (6) stealing or copying of computer programs and presenting them as one’s own. Engaging in plagiarism is academic dishonesty, even though a student may plagiarize without any intent to be dishonest. ‘Plagiarism’ is defined by the University as literary theft, consisting of the unattributed quotation of the exact words of a published text, or the unattributed borrowing of original ideas by paraphrase from a published text. Plagiarism detection software (e.g., SafeAssign) may be used on your assignments.

10. No make-ups or extensions will be made without a valid excuse. If you believe you are entitled to a makeup or an extension, you must make your case within 2 days of the assignment due date. Otherwise, you will earn a “0” for that assignment. Valid excuses include medical emergencies (individual or immediate family only), legal (accident or court case; individual only), or funerary (immediate family only). Reasons for requesting a make-up must relate specifically to the time period of the missed coursework. Reasons for requesting a make-up must be documented in writing by an involved professional. The instructor retains the right to make additional inquiries concerning the documentation. The instructor retains the right to give a make-up that is different in exact content and/or style than the missed coursework. A staff member is not permitted to administer a make-up.Chronic attendance problems for reasons beyond a student’s control may warrant withdrawal from the course. You should see the Undergraduate Program Assistant for information concerning late withdrawals and refund of fees.

11. In the event of an emergency, it may be necessary for USF to suspend normal operations.  During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Canvas, Elluminate, Skype, and email messaging and/or an alternate schedule. It’s the responsibility of the student to monitor Canvas site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

12. You are held to all of the guidelines of USF Integrative Biology, which can be found here: http://biology.usf.edu/ib/admin/.