Course Title: Biology of Disease Vectors (IB 481)
Instructor: Dr. Brian Allan (ballan@illinois.edu)
Teaching Assistant: Jo-anne Holley (jholley@life.illinois.edu)
Lecture/Discussion: MWF 12:00-12:50; Lab: Tues. 2:00-4:50
Lecture: Engineering Hall 106B3; Discussion: Morrill Hall 284 & 487; Lab: Natural History Building 315
Office Hours: Online via course website and by appointment
Website: https://moodle.life.illinois.edu/course/view.php?id=260

Grading:	
Exam 1	25%
Exam 2	25%
Discussion Participation	15%
Paper Critiques & Questions	10%
Final Paper	15%
Final Presentation	10%

Lectures: Lectures will be 12:00-12:50 on Mondays and Wednesdays in Engineering Hall 106B3.

Discussions: Group discussion of a paper from the primary literature will occur once per week, 12:00-12:50 on Fridays. All students must turn in a short (1-2 paragraph) critique and three discussion questions (all typed on one sheet) that arose from reading of the weekly paper and be prepared to discuss any aspect of the assigned reading. Graduate discussion will be held in Morrill 407, undergraduate discussion will be held in Morrill 284.

Readings: Readings for Friday discussions will be assigned from the primary literature and should be read in their entirety. There will also be reading assignments for the lab section (Tuesdays 2:00-4:50 in Natural History Building 315) from "Medical Entomology for Students" and other resources (see lab syllabus for details).

Final Paper: All students will be expected to prepare a final paper resulting from an analysis and synthesis of the peer-reviewed literature on any topic in vector biology addressed during the course of the semester, and should provide considerably more than a "book report" of known facts. The goal should be to read a number of papers on the chosen topic (~10 citations would be appropriate), summarize their findings, and offer a fresh perspective on the topic based on this effort to synthesize the primary literature. Minimum length is three single-spaced or six double-spaced pages of text, not including citations (use 1 inch margins, 12 point font, etc.). Prior to the turning in the final paper on 5/2, students are expected to turn in a final paper outline in class on 4/11, and participate in a peer review process for another student's paper. Students will meet with a partner during class on 4/25 and exchange paper drafts. Peer review teams will meet again during class on 4/30 to exchange peer reviews and offer additional comments. Students should also turn in to the class instructors a copy of their paper draft on 4/25 and a copy of their peer review on 4/30. The final paper outline, final paper draft, and final paper peer review will all count towards the final paper grade.

Final Presentation: All students are expected to deliver a final presentation (10-15 minutes in length) during one of the two final lab sessions, on the same topic for which they prepared their final paper (although it may also be on a different topic with instructor permission). The goals will be to share the new information gleaned from the analysis of the primary literature with the rest of the class and further develop oral presentation skills.

Class Website: A simple class website has been built using the Moodle course management system. All important materials associated with the class can be found on this website, including an up-to-date syllabus and pdfs of all assigned readings other than the assigned textbook. There is also an online discussion forum, where students can post questions related to class materials or events and expect a quick response from the instructor, TA, or fellow students. Grades and class announcements will also be posted/accessible via the course website. Students are required to create a personal profile on the course website in the first week of class, including a clear "headshot" picture to help their instructors learn their names.

Differentiation: Because this course is designed to accommodate both undergraduate Integrative Biology majors and Entomology graduate students, we will seek opportunities to adjust the level of difficulty to the diverse audience. Lectures on Monday/Wednesday will be delivered to the entire class, but Friday discussions will be divided into two groups. The group consisting of graduate students (and a few undergraduates with especially strong interests in the subject material) will be expected to delve further into the subject matter and attain a more sophisticated understanding of the assigned topics. Similarly, during laboratory exercises there will be additional questions and challenges posed to the graduate student group.

Skills: One of the primary educational objectives of this course is to provide students with new or improved skills that may be broadly applicable in a variety of career fields (we are under no illusions that the majority of you will become medical entomologists). Thus many class and lab exercises are designed to not only enhance cognitive skills (e.g., critical thinking) but also to introduce you to tools that will have value in many other disciplines. Thus several lab exercises will revolve around utilizing tools with broad applications to a variety of career choices in the sciences (e.g., molecular assays, spatial analysis, mathematical modeling, etc.).

Re-grades: Students who wish to dispute an exam grade may submit their exam for a re-grade. However, the entire exam will be re-graded, with the potential outcome that the grade may go up, down, or stay the same. Re-grades must be submitted in class within one week of the return of the exam, and include both the original, unmodified exam and a concise, typed letter explaining the reason for the re-grade request.

Make-up Exams: Students with a legitimate excuse for missing an exam will be offered an opportunity to take a make-up exam at a time convenient for the instructors of the class. Make-up exams pose a considerable inconvenience to your instructors, so please make every reasonable effort not to miss a scheduled exam time. Students with a legitimate excuse for missing a discussion will be allowed to turn in their critique and discussion questions for the missed discussion points with instructor approval.

Grade Range: A+ = 100, A/A- = 99-90; B+/B/B- = 89-80; C+/C/C- = 79-70; D+/D/D- = 69-60, F = 59 or below.

Week	Date	Class	Topic	Assigned Reading
1	1/17	Lab	Vector Biology Introduction and Overview on the Classification & Structure of Arthropods	Medical Entomology for Students: Chapter 1
	1/18	Lecture	Physiology of Disease Vectors	
	1/20	Lecture	Mosquitoes (Anophelinae)	
2	1/23	Lecture	Mosquitoes (Culicinae)	
	1/24	Lab	Mosquitoes (Anophelinae and Culicinae)	Medical Entomology for Students: Chapters 2 & 3
	1/25	Lecture	Black-flies (Simuliidae)	
	1/27	Discussion	"Beer Consumption Increases Human Attractiveness to Malaria Mosquitoes"	Lefevre et al. 2010
3	1/30	Lecture	Mathematics of Vector Biology	
	1/31	Lab	Computer Lab 1: Mathematical modeling of vector-borne disease dynamics	Biology of Disease Vectors: Chapter 15
	2/1	Lecture	Phlebotomine sand-flies (Phlebotominae)	
	2/3	Discussion	"Leishmaniasis and Poverty"	Alvar et al. 2006
4	2/6	Lecture	Biting midges (Ceratopogonidae)	
	2/7	Lab	Black-flies (Simuliidae), Phlebotomine sand-flies (Phlebotominae), and Biting midges (Ceratopogonidae)	Medical Entomology for Students: Chapters 4-6
	2/8	Lecture	Horse-flies (Tabanidae) and Tsetse-flies (Glossinidae)	
	2/10	Discussion	"Climate Change and the Recent Emergence of Bluetongue in Europe"	Purse et al. 2006
5	2/13	Lecture	House-flies and Stable-flies (Muscidae) and Latrine-flies (Fanniidae)	
	2/14	Lab	Horse-flies (Tabanidae), Tsetse-flies (Glossinidae), House-flies and Stable-flies (Muscidae), Latrine-flies (Fanniidae), and Myiasis-producing flies	Medical Entomology for Students: Chapters 7-10
	2/15	Lecture	Myiasis-producing flies	
	2/17	Discussion	"Insects in Confined Swine Operations Carry a Large Antibiotic Resistant and Potentially Virulent Enterococcal Community"	Ahmad et al. 2011
6	2/20	Lecture	Introduction to Laboratory Methods	
	2/21	Lab	Molecular Lab: Introduction to laboratory assays in vector biology	Medical and Veterinary Entomology: Chapter 27
	2/22	Lecture	Dr. Sanogo: Advances in Molecular Assays for Pathogens, Vectors and Hosts	
	2/24	Discussion	"Disentangling Vector-Borne Transmission Networks"	Alcaide et al. 2009
7	2/27	Lecture	Ancient Plagues: The Impacts of Vector-Borne Diseases on Human History	
	2/28	Lab	**Lab Practical 1**	
	2/29	Lecture	Lice (Phthiraptera)	
	3/2	Discussion	"Genetic Analysis of Lice Supports Direct Contact between Modern and Archaic Humans"	Reed et al. 2004
8	3/5	Lecture	Fleas (Siphonaptera)	
	3/6	Lab	Fleas (Siphonaptera) and Lice (Phthiraptera)	Medical Entomology for Students: Chapters 11 & 12

	3/7	Lecture	Review Session for Exam 1	
	3/9		**Exam 1**	
9	3/12	Lecture	Triatomine bugs (Triatominae)	
	3/13	Lab	Bedbugs (Cimicidae), Triatomine bugs (Triatominae), and Cockroaches (Blattaria)	Medical Entomology for Students: Chapters 13-15
	3/14	Lecture	Bedbugs (Cimicidae) and Cockroaches (Blattaria)	
	3/16	Discussion	"Bedbugs and Infectious Diseases"	Delaunay et al. 2011
			SPRING BREAK MARCH 17-25	
10	3/26	Lecture	Spatial Epidemiology	
	3/27	Lab	Computer Lab 2: Spatial analysis of vector-borne disease dynamics	Ostfeld et al. 2005
	3/28	Lecture	Soft ticks (Argasidae) and Hard ticks (lxodidae)	
	3/30	Discussion	"A Climate-Based Model Predicts the Spatial Distribution of the Lyme Disease Vector *Ixodes scapularis* in the United States"	Brownstein et al. 2003
11	4/2	Lecture	Scabies mites (Sarcoptidae), Scrub typhus mites (Trombiculidae), and Miscellaneous mites	
	4/3	Lab	Soft ticks (Argasidae), Hard ticks (lxodidae), Scabies mites (Sarcoptidae), Scrub typhus mites (Trombiculidae), and Miscellaneous mites	Medical Entomology for Students: Chapters 16-20
	4/4	Lecture	Community Ecology of Vector-Borne Diseases	
	4/6	Discussion	"Biodiversity Loss Affects Global Disease Ecology"	Pongsiri et al. 2009
12	4/9	Lecture	Dr. Mackay: Experimental design of novel vector collection methods	
	4/10	Lab	Field Lab: Introduction to techniques for the collection and surveillance of disease vectors	Biology of Disease Vectors: Chapter 19
	4/11	Lecture	Chemical Control of Vectors and Mechanisms of Resistance *Final Paper Outline Due*	
	4/13	Discussion	"Controlling Ticks and Tick-Borne Zoonoses with Biological and Chemical Agents"	Ostfeld et al. 2006
13	4/16	Lecture	Integrated Vector Management 1: Environmental and Biological Control	
	4/17	Lab	**Lab Practical 2**	
	4/18	Lecture	Dr. Sanogo: Integrated Vector Management 2: Genetic and Immunological Control	
	4/20	Discussion	"Arthropod-Borne Diseases: Vector Control in the Genomics Era"	Hill et al. 2005
14	4/23	Lecture	The Future of and Career Opportunities in Vector Biology	
	4/24	Lab	**Final Presentations**	
	4/25	Lecture	*Meet With Peer Reviewer and Exchange Final Paper Drafts*	
	4/27		**Exam 2**	
15	4/30	Lecture	*Final Paper Peer Reviews Due*	
	5/1	Lab	**Final Presentations**	
	5/2		**Final Papers Due**	