**Schedule & Assignments**

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**Assignment 1**

1. **Team assignment: Most host species have several types of pathogens or parasites. Some disease agents are generalists, and some specialize on infecting that host species. These include viruses, bacteria, fungi, and helminths. Your assignment is to make diagrams of disease agents from a focal host, with life cycles and including interactions with the host. (20 points total)**

1. **Pick a host species as a team**

Team 1 – a bat species

Team 2 – human

Team 3 – a reptile species

Team 4 – a wild bird species (not chicken)

Team 5 – a wild fish species

Team 6 – a plant species

1. Each person must **turn in a hand-drawn diagram of a parasite or pathogen** of their teams’ host species. (10 points)
   1. Include life-cycle stages
   2. Include labels of important features (*e.g.*, cell wall, spore, toxin produced, pinchers, flagellum, etc.)
   3. Include interactions of pathogen features with host, if possible
2. Decide as a team on an artistic form.

Examples:

* scan each person’s diagram of a parasite or pathogen and merge into a collage or powerpoint slide.
* make a poster with each diagram pointing to the body part of the host that gets infected.
* Be creative!

1. Present in class as a team on **Monday Sept. 17, 2018.** (10 points)
2. Play Disease Ecology Bingo

**Assignment 2**

1. Team presentations: Choose a wildlife disease and focus on disease causation in terms of host, pathogen, and environmental factors and mode of transmission. Do not include any discussion on treatment or management of disease, as that will be a later class topic. Present your summary to the class in **less than 10 minutes**. (20 points total)

Graded out of 20 points possible (including 4 points for evaluations).

**Place Team member names and Disease name on title slide.**

All members should speak, present a slide or answer questions.

Presentation content should include:

Host: 2

Pathogen: 2

Environment: 2

Transmission: 2

Disease causation (pathogenicity on a single host or emergence in a population): 2

Importance, impact/conservation implications: 2

Figure from primary literature: 2

Disease management/Treatment: 0 (do not include)

The class may make comments on presentation quality, including: visual aids, speaking clarity, how loud the speaker is, if the presentation went too long.

Evaluations of Other Presentations is part of grade: 4

Please respect that your classmates are putting effort into these presentations and come to class prepared to learn from each other, and to ask questions!

**Due for in-class presentations on Friday, Sept. 21, 2018**

**Please email the powerpoint (.ppt) file to me at** [**dwoodhams@gmail.com**](mailto:dwoodhams@gmail.com) **or** [**douglas.woodhams@umb.edu**](mailto:douglas.woodhams@umb.edu) **before class on Friday Sept. 21**

Websites of interest:

<http://wdin.blogspot.com/> Wildlife Disease News Digest

<http://eemb40.blogspot.com/> Ecology of Disease course, UC Santa Barbara

<http://parasiteecology.wordpress.com/> Parasite Ecology blog

<http://www.cdc.gov/ncezid/> National Center for Emerging and Zoonotic Infectious Diseases

<http://www.cdc.gov/> Center for Disease Control

<http://www.wildlifedisease.org> Wildlife Disease Association

[http://microbiology.usgs.gov/wildlife\_fish\_health.html U.S](http://microbiology.usgs.gov/wildlife_fish_health.html%20U.S). Geological Survey - Wildlife Disease

<http://www.apsnet.org/> The American Phytopathological Society

<http://bugs.bio.usyd.edu.au/learning/resources/Mycology2/UsesOf_Fungi/primaryProduction/fungiDiseases.shtml> Diseases of Fungi

**Name:**

1. **Disease:**

Strengths:

Weaknesses:

Question:

1. **Disease:**

Strengths:

Weaknesses:

Question:

1. **Disease:**

Strengths:

Weaknesses:

Question:

1. **Disease:**

Strengths:

Weaknesses:

Question:

1. **Disease:**

Strengths:

Weaknesses:

Question:

1. **Disease:**

Strengths:

Weaknesses:

Question:

**Assignment 3**

1. **Midterm exam** (20 multiple choice questions based on lecture material and background reading or discussion papers so far – major topics and themes)

**Friday, October 19, 2018**

(20 points)

**Assignment 4**

1. **Team project on immune defenses of invertebrates**

Immune complexity of vertebrate organisms appears to be correlated with diversity of the host microbiome. In other words, hosts with complex immune systems also have diverse microbial symbionts. This correlation is not yet clear for invertebrates.

As a team, you will research the immune defenses of an assigned group of invertebrates, and present your findings to the class in 10 min. If presenting with ppt slides, please email the day before to [**douglas.woodhams@umb.edu**](mailto:douglas.woodhams@umb.edu) **or** [**dwoodhams@gmail.com**](mailto:dwoodhams@gmail.com)



**Instructions:** Describe the different types of immune defenses of your invertebrate class. How many innate immune defense “categories” does your invertebrate group possess? Each person should contribute, one person can present the results in less than 10 minutes.

Reference paper in dropbox background folder: Dishaw et al. 2014 – there are many other comparative immunology studies, and literature specific to immune defenses of each of these groups. Please investigate thoroughly!

(20 points)

**Due Wed. 11/2/18**

**Assignment 5**

1. **Writing assignment: Interpreting scientific papers**

A major learning objective of this course is: “*To become skilled at interpreting and discussing primary literature*.” To this end, you will write a report that demonstrates your ability to critically analyze a scientific paper that we have already discussed as a class.

So far, we have discussed 7 published studies as a class. Please choose one of these studies for your 2 page analysis of the paper.

**Where in a paper do you find:**

Hypotheses or study objectives

Background evidence and logic of the study

Data

Experimental methods

Interpretation of findings

Unanswered questions

Future objectives

Devote 1 paragraph to how you (personally) read scientific papers in general for the best understanding.

Summarize the main findings and importance of the study (one that we have read in class) in 2-3 sentences.

Carefully describe your interpretation of each data figure or table presented in the paper. This may take several paragraphs.

Provide a critique of methods, experimental design, and conclusions made by the authors of the study in one paragraph. Describe how you know if the conclusions represent an expert opinion from the authors, or an objective finding of a rigorous study.

Graded out of 20 points possible:

10 points for final paper,

5 points for receiving reviews on two rough drafts marked up and reviewed in class by peers

5 points for peer-reviewing papers of two other students

**2 copies of first draft due in class on Friday 11/9/18**

**Turn in Final draft and 2 marked-up rough drafts signed by student reviewers in class on Wed. Nov. 16, 2018.**

**Emails NOT accepted.**

**Peer review in class on Friday 11/9/17:**

**Bring 2 printed copies of your draft to share.**

1. Make corrections and mark up the first draft of at least 2 other students.
2. Write a paragraph summarizing the strengths of the paper, and weaknesses that should be addressed in the writing. Indicate where things should be corrected.
3. Sign your name to the review and give it to the student author.
4. \*\*\*On the final paper, write the names of the 2 students whose papers you reviewed.

**Assignment 6**

1. **Epidemiological curves and disease models report**

(20 points)

**Due Monday Dec. 3, 2018**

**Email not accepted**

Based on in-class data generated on Wed. 11/28/18.

Data can be found on Blackboard.

**1. Graph the epidemic curves for games 2-7. Make histograms for the epidemic curves in excel in blocks of 5 seconds. Comment on any of the graphs that look incorrect based on how the game was played – how should the curve look?**

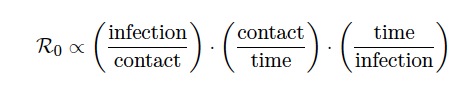
**2. Why do the curves differ? How does the different factor in each game (e.g. source, latency period, or host resistance) affect the epidemic? Discuss:**

* + Source of the outbreak
  + Magnitude
  + Disease incubation period
  + Anything else?

**3. Calculate the transmission rate (rate of encounter x transmission efficiency) for games 4 and 7.**

* + Hint: the average encounters/second can be calculated from game 1
  + Hint: the transmission efficiency assumes either all hosts can be infected (game 4, transmission efficiency =1) or only half of hosts can be infected (game 7, transmission efficiency =0.5)

**4. Calculate R0 for each scenario using the below equation. What does this mean for each scenario?**



**Assignment 7.**

1. **Take-home final exam.**

(40 points)

This exam will be short answer and you can use any notes or resources, but it must be completed in your own words, not as a team or group effort.

**The exam will be due on Monday 12/17/18.**

Please email the exam to me: [dwoodhams@gmail.com](mailto:dwoodhams@gmail.com) or [douglas.woodhams@umb.edu](mailto:douglas.woodhams@umb.edu)

1. **Extra Credit**

**(10 points possible)**

**Due Wed. 11/28/18**

Write a 2-3 page report after reading the book: I Contain Multitudes by Ed Yong.

Focus on a chapter or two that captured your interest and connect the topics from this course with what you have read. How does I Contain Multitudes contribute to your understanding of disease ecology, and the learning objectives of this course: “(1) To learn core principles in disease ecology, and (2) To gain in-depth knowledge of focal wildlife disease systems”?