BIOE 149 Disease Ecology

Instructor: Luz A. de Wit, PhD Candidate, Ecology and Evolutionary Biology

Office: COH 150A

Email: ldewit@ucsc.edu

Office Hours: Th 1pm-2pm and by appt.

TA: Carle Sette

Office: CBB 158

Email: cmsette@ucsc.edu

Office Hours: Weds 12:30-1:30

Lecture: CBB 110 Tue, Thurs 9:00-11:30pm

Discussions:

Tue 11:30-12:30pm CBB 110

Thurs 11:30-12:30pm CBB 110

Course Description: This is a class on problem solving and critical thinking focusing on problems related to the ecological and evolutionary processes that drive the transmission of pathogens between hosts and the impact of disease on host populations. The course content includes a theoretical framework and a discussion of wildlife and human diseases including Ebola, Zika, influenza (swine flu, bird flu), malaria, West Nile virus, Lyme disease, HIV, Chikungunya, tuberculosis, toxoplasmosis, and many others.

Course Readings: There is no book. See schedule of readings below. PDFs of readings will be posted under Files.

Attendance: Attendance at lectures and discussion is mandatory and attendance will be taken. If you miss a class, you need to find a fellow student who will share their notes.

Daily Assignments: There are short quizzes on the reading for each day. There will be questions on the papers in column labeled “Readings for quizzes” (see below). Papers in column
“Readings (list below)” are additional papers for those of you interested in the topic. Make-up quizzes will be taken 15% off.

**Grades:** Daily assignments 15%; Poster Project 15%; Midterm 25%; Discussion Activities: 15% Final take home exam: 30%.

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
<th>Readings (list below)</th>
<th>Readings for quizzes</th>
<th>Assignments</th>
<th>Assignment due</th>
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<tbody>
<tr>
<td>1</td>
<td>Tue</td>
<td>June 25</td>
<td>Foundations of disease ecology: SIR models, R0. Frequency and density dependent transmission, Nth</td>
<td>1 - 4</td>
<td>2 &amp; 3</td>
<td>Quiz 1</td>
<td>July 2</td>
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<tr>
<td>1</td>
<td>Thurs</td>
<td>June 27</td>
<td>Epidemiological terminology; Directly transmitted human pathogens</td>
<td>5 - 8</td>
<td>5 &amp; 6</td>
<td>Graph-building exercise</td>
<td>July 9</td>
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<td>2</td>
<td>Tue</td>
<td>July 2</td>
<td>Macroparasites and Microparasites; Disease impacts on populations and ecosystems;</td>
<td>9 - 11</td>
<td>9</td>
<td>Lab 1 Model Structures</td>
<td>July 9</td>
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<td>2</td>
<td>Thurs</td>
<td>July 4</td>
<td>Holiday</td>
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<td>3</td>
<td>Tue</td>
<td>July 9</td>
<td>Livestock, wildlife, zoonotic pathogens; Evolution of virulence In class problem solving</td>
<td>12 - 15</td>
<td>13 &amp; 14</td>
<td>Problem solving: Evolution of virulence and myxoma exercise</td>
<td>July 16</td>
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<td>3</td>
<td>Thurs</td>
<td>July 11</td>
<td>Midterm; Disease control: Vaccination, Behavioral changes, culling</td>
<td>16-18</td>
<td>16</td>
<td>Lab 2</td>
<td>July 18</td>
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<td>4</td>
<td>Tue</td>
<td>July 16</td>
<td>Vector borne disease ecology;</td>
<td>19-21</td>
<td>20</td>
<td>Vaccination assignment</td>
<td>July 23</td>
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<td>Day</td>
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<td>Lab 3</td>
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<td>Seasonality, climate change and transmission dynamics</td>
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<td>5</td>
<td>Tue</td>
<td>July 23</td>
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<td>Lab 4</td>
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<td>Multi-host pathogens, biodiversity and disease: the “dilution effect”</td>
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<td>Disease and conservation; Disease and Poverty</td>
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<td>Thurs</td>
<td>July 25</td>
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<td>Final Exam and Poster Presentations</td>
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**Readings**


23. Young, H., Parker, I., Gilbert, G., Introduced Species, Disease Ecology and Biodiversity-Disease Relationships Trends in Ecology and Evolution
