

## COURSE SYLLABUS

Lecture topics, instructor, and readings are given below. Lectures and readings from the literature will be available on the eLC site (the textbook should be purchased or rented). Supplemental readings (and lecture source materials) are not required reading but provide an opportunity to familiarize yourself with the primary literature (rather than summaries from lecture and the textbook). Although these papers tend to be older, many are "classics" and they are more accessible to a beginning ecologist than some more recent (and more quantitatively sophisticated) studies. Required readings should be done prior to lecture. Lecture slides will be available after each lecture -- to supplement, but not replace, your own notes.

WEEK	LECTURE TOPIC	REQUIRED AND SUPPLEMENTAL READINGS; ASSIGNMENTS
<b>Week 1</b> Jan 10 (Osenberg)	<b>WHAT IS ECOLOGY?</b> <ul style="list-style-type: none"> <li>• Introduction to ecology</li> <li>• The scientific method and experiments in ecology</li> </ul>	Required: <ul style="list-style-type: none"> <li>• <i>Smith&amp;Smith</i>: Chapter 1</li> </ul> Assignment: <ul style="list-style-type: none"> <li>• <i>None</i></li> </ul> Supplemental: <ul style="list-style-type: none"> <li>• Mueller &amp; Oppenheimer 2014. <i>Psych Sci</i> 25:1159-1168. (hand-written vs laptop notes)</li> </ul>
<b>Week 2</b> Jan 15 & 17 (Osenberg)	<b>GEOGRAPHIC DISTRIBUTIONS</b> <ul style="list-style-type: none"> <li>• Analyzing geographic distributions</li> </ul> <b>STATISTICAL METHODS</b> <ul style="list-style-type: none"> <li>• Study design and statistics in ecology</li> </ul>	Required: <ul style="list-style-type: none"> <li>• <i>Smith&amp;Smith</i>: Chapters 2, 3, 4</li> </ul> Assignment: <ul style="list-style-type: none"> <li>• <i>Active learning #1: Testing limits of distributions (CO)</i></li> </ul>
<b>Week 3</b> Jan 22 & 24 (Murdock)	<b>GEOGRAPHIC DISTRIBUTIONS</b> <ul style="list-style-type: none"> <li>• Abiotic and biotic limitation</li> <li>• Evolution and ecology</li> </ul>	Required: <ul style="list-style-type: none"> <li>• <i>Smith&amp;Smith</i>: Chapters 5, 6, 7</li> </ul> Assignment: <ul style="list-style-type: none"> <li>• <i>Active learning #2: Animal responses to changing CO<sub>2</sub>; Decker et al (2018) (CM)</i></li> </ul>
<b>Week 4</b> Jan 29 & 31 (Osenberg; Exam)	<b>POPULATION GROWTH</b> <ul style="list-style-type: none"> <li>• Demography</li> <li>• Life tables</li> <li>• Projection matrices</li> <li>• Population growth</li> </ul> <b>EXAM 1 (JAN 31)</b>	Required <ul style="list-style-type: none"> <li>• <i>Smith&amp;Smith</i>: Chapters 8 &amp; 9</li> </ul> Assignment: <ul style="list-style-type: none"> <li>• <i>No assignment this week.</i></li> </ul> Other resources: <ul style="list-style-type: none"> <li>• <b>Populus</b> (free software that simulates population dynamics: <a href="http://cbs.umn.edu/populus/overview">http://cbs.umn.edu/populus/overview</a>).</li> </ul>
<b>Week 5</b> Feb 5 & 7 (Osenberg)	<ul style="list-style-type: none"> <li>• <i>Application</i>: sea turtles</li> </ul> <b>POPULATION REGULATION</b> <ul style="list-style-type: none"> <li>• Intraspecific competition; density-dependence; regulation; equilibria</li> </ul>	Required: <ul style="list-style-type: none"> <li>• <i>Smith&amp;Smith</i>: Chapter 11</li> </ul> Assignment: <ul style="list-style-type: none"> <li>• <i>Active learning #3: Habitat loss, genetic diversity, and resilience; Wernberg et al. 2018 (CO)</i></li> </ul>
<b>Week 6</b> Feb 12 & 14 (Osenberg)	<ul style="list-style-type: none"> <li>• <i>Application</i>: fisheries management</li> <li>• <i>Application</i>: amphibian declines</li> </ul>	Required: <ul style="list-style-type: none"> <li>• <i>Smith&amp;Smith</i>: Pages 309-311.</li> </ul> Assignment: <ul style="list-style-type: none"> <li>• <i>Active learning #4: Conservation ecology (Vonesh &amp; de la Cruz 2002) (CO)</i></li> </ul>

<b>WEEK</b>	<b>LECTURE TOPIC</b>	<b>REQUIRED AND SUPPLEMENTAL READINGS; ASSIGNMENTS</b>
Week 7 Feb 19 & 21 (Murdock)	<b>BEHAVIORAL ECOLOGY</b> <ul style="list-style-type: none"> <li>Foraging &amp; territoriality</li> <li>Life history evolution</li> </ul>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapter 10; Sections 14.7 &amp; 14.8</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>Active learning #5: Adaptation to the urban environment; Ouyang et al. 2018 (CM)</i></li> </ul>
Week 8 Feb 26 & 28 (Osenberg; Exam)	<b>SPECIES INTERACTIONS</b> <ul style="list-style-type: none"> <li>Intro to species interactions</li> <li>Predation &amp; herbivory</li> </ul> <b>EXAM 2 (FEB 28)</b>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapter 12 &amp; 14</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>No assignment this week.</i></li> </ul>
Week 9 Mar 05 & 07 (Osenberg; Murdock)	<ul style="list-style-type: none"> <li>Competition</li> <li>Coexistence</li> <li>Mutualism</li> <li>Parasitism</li> </ul>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapters 13 &amp; 15</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>Active learning #6: Competition and disease in the red/grey squirrel system; Tompkins et al 2003; and Phase-plane exercises (CO)</i></li> </ul>
<b>Spring Break!</b>  Mar 12 & 14	<i>no classes</i>	None
Week 11 Mar 19 & 21 (Murdock)	<ul style="list-style-type: none"> <li>Disease ecology</li> </ul> <b>COMMUNITY ECOLOGY</b> <ul style="list-style-type: none"> <li>Intro to communities</li> </ul>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapters 15, 16</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>Active learning #7: Environmental change and disease emergence: Tesla et al. 2018 (CM)</i></li> </ul>
Week 12 Mar 26 & 28 (Osenberg)	<ul style="list-style-type: none"> <li>Food webs</li> <li>Indirect effects and higher order interactions</li> </ul>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapter 17</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>Active learning #8: Knight et al. 2005. Nature 437:880-883 (CO)</i></li> </ul>
Week 13 Apr 02 & 04 (Osenberg; Exam)	<ul style="list-style-type: none"> <li>Measuring biodiversity</li> <li>Patterns of biodiversity</li> </ul> <b>EXAM 3 (APR 04)</b>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapter 19</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>No homework handed out</i></li> </ul>
Week 14 Apr 09 & 11 (Osenberg)	<ul style="list-style-type: none"> <li>Succession and Non-equilibrium dynamics</li> <li>Maintenance of biodiversity</li> <li>Biodiversity and ecosystem function</li> </ul>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapter 18</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>Active learning #9: Deforestation and biodiversity; Betts et al 2017 (CO)</i></li> </ul>
Week 15 Apr 16 & 18 (Murdock)	<b>ECOSYSTEM ECOLOGY</b> <ul style="list-style-type: none"> <li>Primary production</li> <li>Secondary production</li> </ul>	Required: <ul style="list-style-type: none"> <li><i>Smith&amp;Smith</i>: Chapters 20</li> </ul> Assignment: <ul style="list-style-type: none"> <li><i>Active learning #10: Yacqui Valley exercise (CM)</i></li> </ul>

<b>WEEK</b>	<b>LECTURE TOPIC</b>	<b>REQUIRED AND SUPPLEMENTAL READINGS; ASSIGNMENTS</b>
Week 16 Apr 23 & 25 (Murdock)	<ul style="list-style-type: none"><li>• Nutrient cycles</li><li>• Climate change</li></ul>	Required: <ul style="list-style-type: none"><li>• <i>Smith&amp;Smith</i>: Chapters 21 &amp; 22</li></ul> Assignment: <ul style="list-style-type: none"><li>• <i>Active learning #11: Forests and air pollution mitigation; Nowak et al. 2018] (CM)</i></li></ul>
Week 17 Apr 30 (final lecture) (Murdock)	<ul style="list-style-type: none"><li>• Ecosystem health</li><li>• Human population growth</li><li>• Human impacts</li></ul>	Required: <ul style="list-style-type: none"><li>• <i>Smith&amp;Smith</i>: Chapter 27 (&amp; Ecol. Apps from Chs. 21-24)</li></ul> Assignment: <ul style="list-style-type: none"><li>• <i>none</i></li></ul>
Week of finals May 07	<b>EXAM 4 (MAY 07)</b> <i>(during finals time slot, but will start at the regular class time: 9:30am)</i>	