

**ECOL 3900 Syllabus**  
**Directed Reading in Ecology:**  
**Just Enough Math (Mathematics for Ecologists/Biologists)**

**Time:** T, TH 3:30-4:45 PM

**Building/Room:** Ecology Rm. 29 (Computer Lab)

**Instructors:** Andrew Park and John Vinson

**Office Hours:** By appointment

**Email:** Andrew Park (awpark@uga.edu) and John Vinson (vinsonje@uga.edu)

**Term:** Fall 2017

**Credit hours:** 2-3

**Grading:** A-F

**Course Description:** The course is a survey of mathematical concepts, tools, and applications used in ecology. A purpose of the course is to prepare students for future classes and provide tools that can be applied in research. The content covered is combined from different areas of mathematics including algebra, calculus, differential equations and linear algebra.

**Objectives and Expectations:**

Following the 16 week course, the student will be able to understand, execute and apply mathematical concepts to ecological problems. The students are expected to complete the weekly reading prior to attending class, complete weekly homework assignments/problem sets, and participate in weekly in-class discussions/activities.

**Attendance:**

Attendance is essential. If you miss a class, you are responsible for contacting fellow students for lecture notes. More than 4 unexcused absences will result in a lowering of your final score by one letter grade. An excused absence is constituted by the student notifying the instructor in advance and producing proof for reason of absence immediately upon return to the class.

**Assignments:**

Weekly reading and videos will be posted to the class website and students are expected to complete before the first meeting of the week.

Homework assignments will be posted on the class website and are due Friday of each week.

**3 Credit Students:**

Students enrolled for 3 credit hours are expected to complete 8 paper summaries throughout the semester. These summaries will be posted to the class website roughly every two weeks. These summaries should be no less than 350 words and focus on the application of mathematical tools.

**Honors Students:**

Honors students are expected to complete a semester project investigating a novel ecological problem. The project must be approved by August 24, 2017. Periodically throughout the semester, the students will update the class on their project. These dates will be announced in class. A rough draft/project update will be submitted on November 9, 2017 and a final submission will be December 7, 2017. The students will submit a final manuscript in Biology Letters format ([rsbl.royalsocietypublishing.org/content/author-information](http://rsbl.royalsocietypublishing.org/content/author-information)).

**Grades:**

Assignment	Percent
Participation and Attendance	20
Homework Assignments	40
Classwork Assignments	40
Total	100

**Grading Scale:**

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	<59.5%

**Class Schedule:**

<b>Week</b>	<b>Topic</b>	<b>Assignments</b>
Aug. 14 2017 (Week 1)	Algebraic concepts <ul style="list-style-type: none"><li>- Algebraic Reasoning</li><li>- Algebraic Expressions</li><li>- Exponents, Logarithms, and Rationals</li><li>- Factoring Polynomials</li></ul>	
Aug. 21 2017 (Week 2)	Introduction to R, R Markdown and Maxima <ul style="list-style-type: none"><li>- Scientific computing</li><li>- Reproducible research</li></ul>	Paper Summary Due
Aug. 28 2017 (Week 3)	Functions <ul style="list-style-type: none"><li>- Functions of one variable</li><li>- Exponential functions</li><li>- Logarithmic functions</li><li>- Periodic functions</li><li>- Functions with two or more variables</li></ul>	
Sept. 4 2017 (Week 4)	Case Study: <ul style="list-style-type: none"><li>- Modeling populations in space and time</li></ul>	Paper Summary Due
Sept. 11 2017 (Week 5)	Matrices <ul style="list-style-type: none"><li>- Matrix operations</li><li>- Solving systems of equations</li><li>- Eigenvalues and eigenvectors</li></ul>	
Sept. 18 2017 (Week 6)	Case Study: <ul style="list-style-type: none"><li>- Spatial Spread of Populations</li></ul>	Paper Summary Due

Sept. 25 2017 (Week 7)	Derivatives <ul style="list-style-type: none"> <li>- Limits</li> <li>- Maxima and minima</li> <li>- Convexity</li> </ul>	
Oct. 2 2017 (Week 8)	Case Study <ul style="list-style-type: none"> <li>- Optimization</li> </ul>	Paper Summary Due
Oct. 9 2017 (Week 9)	System Stability <ul style="list-style-type: none"> <li>- Equilibria</li> <li>- Local stability</li> <li>- Global stability</li> </ul>	
Oct. 16 2017 (Week 10)	Case Study: <ul style="list-style-type: none"> <li>- TBD</li> </ul>	Paper Summary Due
Oct. 23 2017 (Week 11)	Differential Equations	
Oct. 30 2017 (Week 12)	Case Study: <ul style="list-style-type: none"> <li>- TBD</li> </ul>	Paper Summary Due
Nov. 6 2017 (Week 13)	Probability <ul style="list-style-type: none"> <li>- Probability Theory</li> </ul>	Project Rough Draft Due
Nov. 13 2017 (Week 14)	Case Study <ul style="list-style-type: none"> <li>- Stochastic models</li> </ul>	Paper Summary Due
Nov. 27 2017 (Week 15)	TBD	
Dec. 4 2017	Last Week of Class	Paper Summary Due

		Final Project Due
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