

# Introduction to Wildlife Population Ecology (WIS 4501)

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This syllabus is a broad description of course objectives and plan of work; it is subject to change.

1. **Codification:** WIS 4501
2. **Credits:** 3 crds
3. **Pre-requirements:** WIS 3401, General Ecology choices (PCB3601, FOR 3153, PCB 4043 or WIS 3404), and WIS 4601 suggested
4. **Course Description:** How does the human population size changes over time? What are the temporal patterns of influenza in the USA? What are the drivers of boom and bust pest cycles? What will be the predicted outcome of various management strategies? How much can we fish without compromising future fish stocks? The answers to these questions belong to the field of *population ecology*—the study of how population size varies in space and time. Once we understand the patterns and mechanisms behind this temporal variation in abundance we can ultimately explain and predict species distributions. In this course, you will get introduced to the fundamental concepts of population ecology. Because populations are complex and difficult to quantify we will use an array of models to fulfill our goal.
5. **Course Objectives:** At the completion of this course, students will be able to:
  - (a) Recognize, compare and contrast concepts and vocabulary related to population ecology applied to wildlife ecology and conservation.
  - (b) Describe the key definitions in population ecology
  - (c) Interpret models that describe population size change through time
  - (d) Apply population ecology models to answer questions in wildlife ecology, conservation and management

## 6. Tentative Course Outline:

The weekly coverage might change as it depends on the progress of the class. The class is divided into nine sections. I: introduction, II: unstructured population growth models, III: structured population growth models, IV: metapopulation dynamics, V: population viability analysis, VI: species interactions, VII: wildlife harvest, VIII: population cycles and regulation, and IX: life history. Readings are optional but highly recommended.

Week	Content
<b>Section I</b>	
Week 1 (Aug 20-23)	<ul style="list-style-type: none"> <li>• <b>Lecture W:</b> Class Introduction</li> <li>• <b>Lab F:</b> Remembering R and loops (R-lab 1)</li> <li>• <i>Due:</i> Prep</li> </ul>
<b>Section I, II</b>	
Week 2 (Aug 26–31)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Why study population ecology?</li> <li>• <b>Lecture W:</b> Density independent models (exponential growth)</li> <li>• <b>Lab F:</b> Density independent models</li> <li>• Read: Gotelli (Ch 1), Rockwood (Ch 1)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
Week 3 (Sept 3–6)	<ul style="list-style-type: none"> <li>• <b>Lecture W:</b> Density dependent models</li> <li>• <b>Lab F:</b> Density dependent models</li> <li>• Read: Gotelli (Ch 2), Rockwood (Ch 2)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
<b>Section III</b>	
Week 4 (Sept 9–13)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Life table analysis</li> <li>• <b>Lecture W:</b> Life table analysis II</li> <li>• <b>Lab F:</b> Life table analysis (R-lab 3)</li> <li>• Read: Gotelli (Ch 3), Rockwood (Ch 4)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
Week 5 (Sept 16–20)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Matrix algebra</li> <li>• <b>Lecture W:</b> Structured population models I</li> <li>• <b>Lab F:</b> Structured population models (R-lab 4)</li> <li>• Read: Gotelli (Ch 3), Rockwood (Ch 4)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
Week 6 (Sept 23–27)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Structured population models II</li> <li>• <b>Lecture W:</b> Structured population models III</li> <li>• <b>Lab F:</b> Structured population models</li> <li>• Read: Gotelli (Ch3), Rockwood (Ch4)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
<b>Section III, IV</b>	

Week 7 (Sept 30–Oct 3)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Work on exam</li> <li>• <b>Lecture W:</b> Metapopulation models I</li> <li>• <b>Lab F:</b> No lab</li> <li>• Read: Gotelli (Ch4), Rockwood (Ch5)</li> <li>• <i>Due:</i> Group project, Exam 1 (Sept 30)</li> </ul>
Week 8 (Oct 7–11)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Metapopulation models II</li> <li>• <b>Lecture W:</b> Metapopulation models III</li> <li>• <b>Lab F:</b> Metapopulation models</li> <li>• Read: Hanski 1999 (Ch 4, 5)</li> <li>• <i>Due:</i> Quiz, Prep</li> </ul>
<b>Section V</b>	
Week 9 (Oct 14–18)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Population viability analysis I</li> <li>• <b>Lecture W:</b> Population viability analysis II</li> <li>• <b>Lab F:</b> PVA</li> <li>• Read: Rockwood (Ch1)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
<b>Section VI</b>	
Week 10 (Oct 21–25)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Competition</li> <li>• <b>Lecture W:</b> Predator-prey</li> <li>• <b>Lab F:</b> Lotka-Volterra</li> <li>• Read: Gotelli (Ch 5,6), Rockwood (Ch 7, 10)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
Week 11 (Oct 28 – Nov 1)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Disease models I</li> <li>• <b>Lecture W:</b> Disease models II</li> <li>• <b>Lab F:</b> Disease models</li> <li>• Read: Keeling and Rohani 2011 (Ch 2)</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
<b>Section VII</b>	
Week 12 (Nov 4–8)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Work on exam</li> <li>• <b>Lecture W:</b> Wildlife Harvest</li> <li>• <b>Lab F:</b> Wildlife Harvest</li> <li>• Read: Leopold (Ch 9)</li> <li>• <i>Assignments due:</i> Group project, Exam II (Nov 4), Quiz, Prep</li> </ul>
<b>Section VIII</b>	
Week 13 (Nov 12–15)	<ul style="list-style-type: none"> <li>• <b>Lecture W:</b> Population cycles</li> <li>• <b>Lab F:</b> Population cycles (Paper discussion: Krebs et al. 1996)</li> <li>• Read: Kendall et al. 1999</li> <li>• <i>Due:</i> Group project, Quiz, Prep</li> </ul>
<b>Section IX</b>	

Week 14 (Nov 18–23)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Life history I</li> <li>• <b>Lecture W:</b> Life history II</li> <li>• <b>Lab F:</b> Life history (Paper discussion: Beckerman et al. 2002)</li> <li>• Read: Rockwood (Ch 6)</li> <li>• <i>Due:</i> Quiz, Prep</li> </ul>
Week 15 (Nov 25–26)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Online lecture</li> </ul>
Week 16 (Dec 2–4)	<ul style="list-style-type: none"> <li>• <b>Lecture M:</b> Miguel's research</li> <li>• <b>Lecture W:</b> Final exam review</li> </ul>

7. **Educational Strategies:** We follow an active learning framework that include inquire-based lectures, analysis of the primary literature, computer exercises, group projects and group discussions

8. **Minimum resources available:** Lecture room, Computer lab, audio-visual equipment.

	Quizzes	10%
9. <b>Evaluation strategies:</b>	Lab prep	30%
	Group exercises	20%
	Exams	40%

Every week there will be a quiz (formative assessment) due on Fridays before 11pm. Labs will have two evaluations: a *prep* and a *group project*. A prep consists of an R worksheet or a paper designed to give you the necessary skills to conduct the group project in the lab. Each prep will have a quiz that is due Thursdays before 11pm. Group project reports are due on the Monday following the lab before noon.

Exam 1 is scheduled for September 30, 2019

Exam 2 is scheduled for November 4, 2019

Final exam is schedule for December 11, 2019 (12:30–2:30pm)

10. <b>Grading:</b>	>= 93.00 %	A	90.00–92.99	A-
	87.00–89.99	B+	83.00–86.99	B
	80.00–82.99	B-	77.00–79.99	C+
	73.00–76.99	C	70.00–72.99	C-
	67.00–69.99	D+	63.00–66.99	D
	60.00–62.99	D-	< 59.99	E

Information on current UF grading policies is available at <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>.

11. **Textbook:** There are no book requirements for this course. However, Gotelli's "A primer of Ecology" is highly recommended for students that want to complement lecture materials. A course packet will be available electronically via CANVAS that contains required weekly readings, lecture, and lab information.

Lectures will be based on the following resources:

Gotelli, N. J. (2001). A primer of ecology. Sunderland, MA: Sinauer Associates.

Hanski, I. (1999). *Metapopulation ecology*. Oxford University Press.

Kendall, B. E., Briggs, C. J., Murdoch, W. W., Turchin, P., Ellner, S. P., McCauley, E., ... & Wood, S. N. (1999). Why do populations cycle? A synthesis of statistical and mechanistic modeling approaches. *Ecology*, 80(6), 1789-1805.

Kingsland, S. E., & Kingsland, S. E. (1995). *Modeling nature*. University of Chicago Press.

Leopold, B. (2019). *Theory of Wildlife Population Ecology*. Waveland Press.

Rockwood, L. L. (2015). *Introduction to population ecology*. John Wiley & Sons.

12. **Class attendance and demeanor policy:** All students are expected to attend every class and lab sessions. Students are responsible for the materials and information presented. Students who miss class for a UF approved reason (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) will be able to make-up exams and quizzes from that day. Unexcused late assignments will have 10% of the point total for that assignment deducted for each day late. Late assignments will not be accepted beyond 3 days post-due date. A professional attitude is expected in all lectures and labs. Please do not disturb your fellow students by talking during class. Please minimize electronic distractions by silencing cell phones. While we will actively use computer resources in class and lab, it is strongly recommended that students focus on course material and minimize distractions from e-mail and social networking sites. Make-up exams or assignment/homework/quiz problems will not be given for unexcused absences. An acceptable excuse (meeting guidelines from the UF handbook) must be submitted to be eligible for a make-up exam.
13. **Rights of students with special needs:** The University of Florida meets all federal and state laws regarding discrimination including the American Disabilities Act (ADA Law). Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <http://www.dso.ufl.edu/drc/>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.
14. **Student evaluations:** Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.
15. **Academic honesty:** As a result of completing the registration form at the University of Florida, every student has signed the following statement: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either re-

quired or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.”

16. **UF counseling services:** The University of Florida provides excellent resources on campus for students having personal problems or seeking additional career and academic assistance to help them realize their full potential. The University cares about you and your well-being. These resources include:
  - (a) U Matter, We care:  
If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) or 352 392- 1575 so that a team member can reach out to the student.
  - (b) Counseling and Wellness Center:  
<https://counseling.ufl.edu/>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
  - (c) Sexual Assault Recovery Services (SARS)  
Student Health Care Center, 392-1161.
  - (d) University Police Department, 392-1111 (or 9-1-1 for emergencies).  
<http://www.police.ufl.edu/>
17. **Academic Resources**
  - (a) E-learning technical support, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu).  
<https://lss.at.ufl.edu/help.shtml>.
  - (b) Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling.  
<http://www.crc.ufl.edu/>
  - (c) Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
  - (d) Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.  
<http://teachingcenter.ufl.edu/>
  - (e) Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>
  - (f) Student Complaints On-Campus:  
<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>
  - (g) On-Line Students Complaints: <http://distance.ufl.edu/student-complaint-process/>
18. **Software use:** All faculty, staff and students of the University are required to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.