

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:** PCB 3063 OR WIS 3553C OR ARGR 3303, & FOR 3153C OR PCB 3601C OR PCB 4043C OR WIS 3404, & 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 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
Section I	
Week 1 (Aug 21–25)	<ul style="list-style-type: none"> • Lecture W: Class introduction/Why study population ecology? • Lab F: Remembering R and loops (R-lab 1) • <i>Assignment:</i> Prep: Remembering R and loops
Section II	
Week 2 (Aug 28 - Sep 1)	<ul style="list-style-type: none"> • Lecture M: Density independent models (exponential growth) I • Lecture W: Density independent models (exponential growth) II • Lab F: Density independent models • Assignment 1-Monday, Lab: Remembering R and loops • Assignment 2-Thursday, Prep: Density independent models • Read: Gotelli (Ch 1), Rockwood (Ch 1)
Week 3 (Sep 4–8)	<ul style="list-style-type: none"> • Lecture W: Density dependent models • Lab F: Density dependent models • Assignment 1-Tuesday, Lab: Density independent models • Assignment 2-Thursday, Prep: Density dependent models • Read: Gotelli (Ch 2), Rockwood (Ch 2)
Section III	
Week 4 (Sep 11–15)	<ul style="list-style-type: none"> • Lecture M: Life table analysis • Lecture W: Life table analysis II • Lab F: Life table analysis (R-lab 3) • Assignment 1-Monday, Lab: Density dependent models • Assignment 2-Thursday, Prep: Life table analysis. • Read: Gotelli (Ch 3), Rockwood (Ch 4)
Week 5 (Sep 18–22)	<ul style="list-style-type: none"> • Lecture M: Matrix algebra • Lecture W: Structured population models I • Lab F: Structured population models I • Assignment 1-Monday, Lab: Life table analysis • Assignment 2-Thursday, Prep: Structured population models I • Read: Gotelli (Ch 3), Rockwood (Ch 4)

Week 6 (Sep 25–29)	<ul style="list-style-type: none"> • Lecture M: Structured population models II • Lecture W: Structured population models III • Lab F: Structure Population models II • Assignment 1-Monday, Lab: Structured population models I • Assignment 2-Thursday, Prep: Structured population models II • Read: Gotelli (Ch3), Rockwood (Ch4)
Section III, IV	
Week 7 (Oct 2–6)	<ul style="list-style-type: none"> • Lecture M: Exam review • Lecture W: Work on exam • Lecture F: Metapopulation models I • Assignment 1-Monday, Lab: Structured population models II • Read: Gotelli (Ch4), Rockwood (Ch5)
Week 8 (Oct 9–13)	<ul style="list-style-type: none"> • Lecture M: Metapopulation models II • Lecture W: Metapopulation models III • Lab F: Metapopulation models • Assignment 1-Thursday, Prep: Metapopulations • Read: Hanski 1999 (Ch 4, 5)
Section V	
Week 9 (Oct 16–20)	<ul style="list-style-type: none"> • Lecture M: Population viability analysis I • Lecture W: Population viability analysis II • Lab F: PVA • Assignment 1-Monday, Lab: Metapopulations • Assignment 2-Thursday, Prep: Population viability analysis • Read: Rockwood (Ch1)
Section VI	
Week 10 (Oct 23–27)	<ul style="list-style-type: none"> • Lecture M: Competition • Lecture W: Predator-prey • Lab F: Lotka-Volterra • Assignment 1-Monday, Lab: PVA • Assignment 2-Thursday, Prep: Lotka-Volterra • Read: Gotelli (Ch 5,6), Rockwood (Ch 7, 10)
Week 11 (Oct 30 – Nov 3)	<ul style="list-style-type: none"> • Lecture M: Disease models I • Lecture W: Disease models II • Lab F: Disease models • Assignment 1-Monday, Lab: Lotka-Volterra • Assignment 2-Thursday, Prep: Disease models • Read: Keeling and Rohani 2011 (Ch 2)
Section VII	

Week 12 (Nov 6–10)	<ul style="list-style-type: none"> • Lecture M: Exam review • Lecture W: Work on exam 2 • Lab F: No Class • Assignment 1-Monday, Lab: Disease models • Read: Leopold (Ch 9)
Section VIII	
Week 13 (Nov 13–17)	<ul style="list-style-type: none"> • Lecture M: Wildlife Harvest • Lecture W: Population cycles • Lab F: Population cycles (Paper discussion: Krebs et al. 1996) • Assignment 1-Thursday, Quiz on Krebs et al. 1996 • Read: Kendall et al. 1999
Week 14 (Nov 20–24)	<ul style="list-style-type: none"> • Lecture M: Online lecture
Section IX	
Week 15 (Nov 27–Dec 1)	<ul style="list-style-type: none"> • Lecture M: Paper presentations • Lecture W: Paper presentations • LAB F: Paper presentations • Assignment 1-Monday, Podcast reflection • Assignment 2-All days, Quiz papers • Assignment 3-Paper presentations • Read: Papers
Week 16	<ul style="list-style-type: none"> • Lecture M: Miguel's Research • Lecture W: Class review

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.

9. Evaluation strategies:	Quizzes	10%
	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 Oct 4

Exam 2 is scheduled for Nov 8

Final exam is schedule for Dec 14

10. Grading:	>= 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.

You can find complementary content on these sources:

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 required 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 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.
<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.
19. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.