

WIS 4501, Spring 2016

**WILDLIFE POPULATION ECOLOGY (WIS 4501)
SPRING 2016**

Instructor:

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Office location: 324 Newins-Ziegler Hall
Office hours: Tuesday: 9:00-11:00am;
Wednesday: 11:00am – 12:00pm

Teaching Assistants:

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Office location and hours: TBA

Lectures:

Location: 105 Keene-Flint (AKA: Flint).
Time: Monday, Wednesday, and Friday, period 3 (9:35-10:25am)

COURSE OBJECTIVES

This course is designed to expose students to concepts and models in population ecology, and their application to conservation and management of wildlife populations. By the end of the semester, students will:

- Have a thorough understanding of concepts and models of single species population dynamics;
- Become familiar with the application of ecological theories and models to conservation and management of wildlife populations; and
- Become familiar with concepts and models of species interaction, life history evolution and population regulation.

COURSE MATERIALS

1. **Lecture outlines and discussion papers:** Lecture outlines, discussion papers, and other reading materials will be available through the Canvas e-Learning site (<https://login.ufl.edu/idp/Authn/UserPassword>). Please note that lecture outlines are not designed to replace lectures. You must be present in the class to take notes. You are responsible for keeping up to date on all announcements and material covered during the class.

To login to the Canvas e-Learning system, go to the e-Learning Support Services homepage <https://lss.at.ufl.edu/>, select “e-Learning in Canvas”, and use your GatorLink username and password. You must have an active GatorLink ID to access e-Learning. Should you encounter problems with your GatorLink account or need assistance, contact GatorLink website (<http://gatorlink.ufl.edu>) or UF Computing Help Desk: The Hub, 392-HELP. If you need assistance with the e-Learning system, please visit e-Learning Support Services home page (<https://lss.at.ufl.edu/home/mission/>) or contact e-Learning

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Support Team (UF Helpdesk [HUB 132](#); **Phone:** (352) 392-HELP (4357) and select option 2; **Email:** learning-support@ufl.edu).

2. **Lab (computer exercises) write-ups:** Fridays' classes will primarily (but not exclusively) focus on implementing population models using the freely available computer program, R (<https://cran.r-project.org/>). To facilitate learning, we have developed write-ups for each section. These documents are meant to serve as a **self-guided instruction manual** on the implementation of population models. For each modeling section of the course, we will: (1) briefly review the relevant concepts and models; (2) provide step-by-step instructions on how to proceed, along with relevant R code and results they produce; and (3) provide data and code that go along with the write-up. **It is important that you read the write-up and try work through the code before coming to the class.**
3. **R resources:** Most of the homework problems will require use of R (you will have to submit the completed homework along with your R code), so it is critical that you are comfortable with the program. We will provide a basic introduction to R early in the semester. However, we strongly encourage you to explore it on your own as well. Fortunately, there are many online resources; a quick google search provides links to many documents – use what you like (<https://www.google.com/search?q=R+manuals&ie=utf-8&oe=utf-8>).
4. **Required textbook:** There is **no required textbook** for this course.

EXPECTATIONS OF STUDENTS

1. Students are expected to attend all classes, and fully engage themselves in all aspects of the class.
2. Full participation in computer exercises and discussion sessions is required and expected.
3. Students are expected to arrive at class on time, ready to learn and participate, and with a positive and respectful attitude toward the instructor and fellow students. Students are expected to complete the homework assignments on time.
4. **Use of cell phones during the class is strictly prohibited.** If a student must use a cell phone during the class, s/he should step outside.
5. Students are strongly encouraged to meet with instructors periodically, especially if they need assistance.

GRADING

Grading will be based on:

Mid-term exam	25%
Homework problems	25%
Quizzes	10%
Attendance and participation	10%
Final exam (cumulative)	30%

Final course grades will be assigned as follows: >92 = A, 90-92% = A-, 85-90% = B+, 83-85% = B, 80-83% = B-, 75-80% = C+, 73-75% = C, 70-73% = C-, 65-70% = D+, 63-65% = D, 60-63% = D-, and <60% = E.

Homework problems

Homework problems will be based on lectures, computer exercises and/or discussion papers. Many of the homework problems will require the use of computer software packages (e.g., MS Excel, R). A tutorial on the use of relevant software packages will be provided prior to assigning problems that require the use of software packages. You will have **one week** to complete the homework problems. We will assign homework problems using the Canvas e-Learning system.

1. Completed assignments must be submitted using Canvas's **Assignment** tools. Hard copy or e-mail submissions will not be accepted. You will be allowed to revise and resubmit your assignments until the deadline, but not after that. You are responsible for ensuring that completed assignments are correctly uploaded to Canvas.
2. Submissions after the deadline will be treated as late submissions, and 10% of the total assignment points will be deducted for each day after the deadline for 5 days; submissions will not be accepted after that.
3. If you experience any problem with e-Learning system or while uploading assignments, contact the helpdesk immediately (352) 392-4357 (select option 2) or e-mail: learning-support@ufl.edu. Retain your e-mail or helpdesk ticket number as documentation of your problem.

Discussion papers

Discussion of primary research or review papers will be an important part of the course. Papers will be available online prior to the discussion date. All students are expected to read the required papers, and actively participate in the discussions. Quizzes and exams will include questions based on required readings/discussion papers.

Extra credit activities

Students can earn extra credit by attending and critiquing spring 2016 Wildlife Ecology and Conservation seminars. A complete list of seminars can be found at: <http://www.wec.ufl.edu/seminars>. Some relevant details follow:

1. Students should submit the completed (typed) seminar critique form (attached at the end of the syllabus, and also available for download from the Canvas course page) using the e-Learning Assignment tool (hard copy or e-mail submissions will not be accepted). The critiques (which should include a brief summary) should be submitted **no later than 5pm Friday following the seminar. Late submissions will NOT be accepted.**
2. For each seminar attended and critiqued, students will receive a maximum of 5 extra credit points. You may submit up to 4 seminar critiques, **for a maximum of 20 points total.**

Extra credit points will be added to your homework points and used for calculation of final grades. **Thus, a student can potentially earn 120 points (out of 100 points) from homework problems and extra credit activities.**

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Important notes: (1) You are responsible for making sure that the completed seminar critique forms are correctly uploaded in Canvas. (2) You will be able to submit **only one extra credit seminar critique for the months of January, February, March and April**. If you submit more than one critique in any given month, you will receive credit for only one of them.

COURSE POLICIES

1. **Attendance policy: Attendance is required.** You are responsible for any announcement and all material covered during lectures, computer exercises, and discussion sessions. We will randomly take attendance in the class, and your attendance will also be monitored via in-classes quizzes. Remember that attendance and participation will contribute to 10% of the course grade.
2. **Make-up exam/quiz policy:** For unexcused absences, make-up exams or in-classes quizzes will not be given.
3. **Cell phones:** Cell phones must be turned off during the class. Use of cell phones is NOT permitted.
4. **Final exam:** The final exam will be comprehensive.
5. **Questions regarding grades:** We do not discuss grades over the telephone or e-mail. If you have concerns regarding your grades you must come and see us.
6. **Announcements and notices:** All course-related announcements and notices (including homework assignments, changes in schedule) will be posted on the e-Learning course homepage. Please be sure to visit the e-Learning homepage regularly.
7. **Discussion section and homework assignments:** All questions related to discussion/computer exercises and homework problems should be directed to your TA.
8. **Late submission of homework assignments:** Homework assignments submitted after the deadline will be treated as late submissions, and 10% of the total assignment points will be deducted for each day after the deadline for 5 days; submission will not be accepted after that.
9. **Discussion of course-related issues, assignments or long questions:** Please avoid sending e-mails or phone messages that cannot be answered with a few words. If you have questions or issues that require discussion or detailed explanation, please come see us.

COURSE OUTLINE

PART I. INTRODUCTION

1. Population ecology: what and why?
2. Population ecology as science

PART II. UNSTRUCTURED POPULATION GROWTH MODELS

1. Models in population ecology
2. BIDE model
3. Exponential population growth models
4. Density dependence
5. Logistic population growth models

PART III. STRUCTURED POPULATION GROWTH MODELS

1. Life tables: construction and analysis
 - Age structure: why it matters
 - Methods of compiling life tables/fecundity tables
 - Life table analysis (generation times, net reproductive rates, population growth rates etc.)
2. Age- and stage-structured matrix population models
 - Age-structured (Leslie) matrix models
 - Matrix algebra review
 - Population projection, population growth rate, stable age distribution and reproductive values
 - Sensitivity/elasticity analysis
 - Life-cycle graphs and stage-structured models
 - Analysis of stage-structured models
 - Model modification and limitations

PART IV. METAPOPULATION DYNAMICS

1. Spatial structure of populations; why space matters
2. Metapopulations and extinction risk
3. Models of metapopulation dynamics
 - Classic metapopulation (Levin's) model
 - Spatially realistic metapopulation theory
 - Overview of incidence function model (IFM) and stochastic patch occupancy model (SPOM)

PART V. POPULATION VIABILITY ANALYSIS (PVA)

1. Introduction to PVA: what, why and how?
2. Components of PVA
3. Viability of PVA: evaluating PVA results
4. Overview of PVA models

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PART VI. SPECIES INTERACTIONS

1. Dynamics of infectious diseases
SIR model
2. Competition
Nature of competition
Lotka-Volterra competition model
3. Predation
Nature of predation
Lotka-Volterra predation model

PART VII. WILDLIFE HARVEST

1. Maximum sustained yield
2. Introduction to harvest models

PART VIII. POPULATION CYCLES AND POPULATION REGULATION

1. What are population cycles?
2. Hypotheses of population cycles; empirical evidence
3. Hypotheses of population regulation
4. Population regulation vs. population limitation

PART IX. LIFE-HISTORY

1. Life-history and life-history traits
2. Life history trade-offs, and evolution of life-history traits
3. Cole's dilemma: semelparity or iteroparity?

PREREQUISITES

- WIS3401, PCB 3034C or equivalent
- Familiarity with personal computers and software packages such as Microsoft Word and Excel. Students lacking aforementioned background should contact instructors at the beginning of the semester.

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CRITICAL DATES

First day of class:	6 January
Martin Luther King Jr. Day:	18 January (no class)
Midterm exam:	February 24
Spring break:	February 27 – March 5 (no class)
Last day of class:	April 20
Reading days:	April 21-22
Final exam:	April 27, 7:30-9:30 pm, 105 Flint

GENERAL NOTICE TO STUDENTS

Academic Honesty

As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

UF Counseling Services

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. Both the Counseling Center and Student Mental Health Services provide confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance. These resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling;
- Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
- Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling; and
- Career Resources Center, Reitz Union, 392-1601, career development assistance and counseling.

Technology requirements

Access to and on-going use of a computer is required for all students to successfully complete their UF degree programs. Competency in the basic use of a computer is expected for students in this course. The complete official UF policy on the student computer requirement is found at: <http://training.helpdesk.ufl.edu/computing.shtml>.

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.

Classroom and Exam Accommodations

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If you require specific accommodations to complete this course, please contact the UF Disability Resource Center (located at Room 0001 Reid Hall) by phone: (325) 392-8565 or online at: www.dso.ufl.edu/drc/.

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WEC Seminar Critique Form

Date: _____

Speaker: _____

Seminar title: _____

Your name: _____

Introduction

Is the background information sufficient to understand the topic? [Yes/No, brief comments]

Have the questions/hypotheses been outlined clearly? What were they?

Is the topic, as covered in the introduction, framed into a larger perspective? Are we told why we should care about the topic?

Methods

Are the methods appropriate for testing the hypotheses or answering questions? Were the statistical (or other) analyses appropriate and adequate? Were they clearly presented?

Results

Have the results been presented clearly? Have the results been adequately interpreted for the audience?

What were the main findings?

Discussion/Conclusion

Did the speaker answer his/her research questions? Were the results discussed in the context of hypotheses or questions?

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Is there a clear message? Is the message put into the larger context of the talk?

Style

Good transitions/flow (for example, between background info and research question or hypothesis).

Time management (e.g., too long, too short, unbalanced)

Was the speaker easy to follow? Presented information in a logical and organized manner? Graphics adequate?

List three concerns/weaknesses:

List three strengths: