

**WILDLIFE POPULATION ECOLOGY (WIS 4501)
SPRING 2020**

Instructor:

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

Teaching Assistants:

Vratika Chaudhary (chaudharyv@ufl.edu)
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Friday: 11 am – 1:00 pm (Vratika)
Monday: 2:00 – 4:00 pm (Arjun)

Lectures:

Location: Larsen Hall (LAR 0310)
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 population dynamics and species interactions;
- Become familiar with topics such as population viability analysis, life history theory and population regulation; and
- Become familiar with the application of ecological theories and models to conservation and management of wildlife populations.

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 (<http://elearning.ufl.edu/>). Please note that lecture outlines are not designed to replace lectures. You must be present in the class to take notes and participate. You are responsible for keeping up to date on all announcements and material covered during class.

To login to the Canvas e-Learning system, go to the e-Learning (<http://elearning.ufl.edu/>), 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 the 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 or contact the e-Learning Support Team (UF Helpdesk [HUB 132](#); **Phone:** (352) 392-HELP (4357) and select option 2; **Email:** learning-support@ufl.edu).

- 2. Lab manual and 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 a self-guided lab manual for each section of the course. This document is meant to serve as a **self-guided instruction manual** on the implementation of population models and other analyses relevant to ecology and management of wildlife populations. 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 implement relevant models, along with R code and the results they produce; and (3) provide data and code that complement the laboratory material. **It is important that you read the manual and try to work through the code before coming to the class.**
- 3. R resources:** Most of the homework problems will require the 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 - this is often the best and most efficient way to learn R. Fortunately, there are many online resources that can help you; 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.

Required materials: (1) Laptop computer, android phone, iPhone, iPad or flip phone and (2) Top Hat software (<https://tophat.com/>; cost to UF students: \$20/semester).

EXPECTATIONS OF STUDENTS

1. Students are expected to arrive to class on time and be ready to learn and participate, with a positive and respectful attitude towards the instructor and fellow students.
2. Students are expected to complete the homework assignments and quizzes on time.
3. Students are expected to attend all classes, and fully engage themselves in all aspects of the class. Full participation in computer exercises and discussion sessions is required and expected.
4. Because we will be using Top Hat system for taking attendance, in-class quizzes and student engagement activities (see below), students will need to bring a mobile device (cell phone, tablet or a laptop computer) to every class.

- Students are strongly encouraged to meet with instructors periodically, especially if they need assistance.

Caution:

- You are expected to complete all homework assignments and quizzes independently. Copying other students' codes or answers and submitting it as your own work is against the course policy, and will be considered a case of plagiarism.
- We will be taking attendance using the Top Hat's secured attendance feature. You must be present in the class for you to receive participation points for in-class activities.

GRADING

Grading - WIS 4501

Mid-term exam	25%
Homework problems	20%
Quizzes	15%
Participation	15%
Final exam (cumulative)	25%

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 (see below for due dates) will be based on lectures, computer exercises and/or discussion papers. Many of the homework problems will require the use of the software R. An introductory tutorial on the use of R will be provided at the beginning of the course and you will find examples of needed code in the self-guided laboratory manual. You will have **one week** to complete the homework problems. We will assign homework problems using the Canvas e-Learning system.

- Completed assignments and R code (as *.R file) that you used to complete the assignment 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.
- 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.
- If you experience any problem with the 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.

Quizzes

There will be two **lecture quizzes** (60 points total) assigned via Canvas, one before and one after the mid-term. They will be based only on lecture material (Monday and Wednesday classes).

Weekly **lab quizzes** (40 points total) will be assigned via Canvas each Friday after the class; they will be due the following Thursday at 5 pm. The lab quizzes will be based on required readings, lab exercises and other materials covered during the Friday's class.

Homework and quiz due dates

Assignment	Date assigned	Due date
Homework problems:		
Homework 1 (40 points)	10 th February, 9am	17 th February, 5pm
Homework 2 (60 points)	13 th April, 5pm	20 th April, 5pm
Quizzes:		
Lecture Quiz 1 (20 points)	20 th February, 5pm	25 th February, 5pm
Lecture Quiz 2 (40 points)	20 th April, 5pm	27 th April, 5pm
Lab Quizzes (40 points)	Assigned Fridays	Next Thursdays

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 encouraged to read the required papers, and actively participate in the discussions.

Extra credit activities

Students can earn extra credit by attending and critiquing spring 2020 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 of the seminar material) should be submitted **no later than 5pm on the 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.**

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.

There may be additional extra credit activities; they will be announced in the class.

COURSE POLICIES

1. **Attendance policy:** We will take attendance using Top Hat's secured attendance feature; you must be physically present in the class for this feature to work. Even though, attendance itself is not graded, you will NOT receive participation (or in class quiz) points for that lecture only if you were not present in the class. Also, you are responsible for any announcements and all material covered during lectures, computer exercises, and discussion sessions.
2. **Make-up exam/quiz policy:** For unexcused absences, make-up exams or in-classes quizzes will not be given.
3. **Cell phones:** You will need to bring a mobile device (a cell phone, tablet, or a laptop computer) to the class because we will be using the Top Hat response system for engagement and active learning. In class, cell phones should only be used for Top Hat activities.
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 during office hours.
6. **Announcements and notices:** All course-related announcements and notices (including homework assignments, changes in schedule, etc.) 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 TAs.
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; submissions 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 a detailed explanation, please come see us.

COURSE OUTLINE

PART I. INTRODUCTION

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

PART II. UNSTRUCTURED POPULATION GROWTH MODELS

1. Models in population ecology
2. Exponential population growth models
3. Density dependence
4. 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 spatial structure 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. Evaluating PVA quality
4. Overview of PVA modeling approaches

PART VI. SPECIES INTERACTIONS

1. Dynamics of infectious diseases
 - Why disease matter in ecology and conservation
 - SIR model and its variations
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 R, Microsoft Word and Excel. Students lacking aforementioned background should contact instructors at the beginning of the semester.

CRITICAL DATES

First day of class:	6 th January
Martin Luther King Jr. Day:	20 th January (no class)
Midterm exam:	26th February (Wednesday)
Spring break:	29 th Feb – 8 th March (no class)
Last day of class:	22 nd April
Term paper due:	24 th April, 5pm (only for graduate students)
Reading days:	23-24 th April
Final exam:	Tuesday 28th April, 7:30 – 9:30 am.

GENERAL NOTICE TO STUDENTS

UF Policies

Academic Honesty

UF students are bound by The Honor Pledge which states, “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-honorcode/>) 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.

Course Evaluations

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.aa.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.aa.ufl.edu/public-results/>

Campus Resources

Health and Wellness

- 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.
- Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc/Default.aspx>, 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
- Sexual Assault Recovery Services (SARS) Student Health Care Center, 392-1161.
- University Police Department, 392-1111 (or 9-1-1 for emergencies).
<http://www.police.ufl.edu/>

Academic Resources

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learningsupport@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.
- Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <http://www.crc.ufl.edu/>
- Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <http://teachingcenter.ufl.edu/>
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>

Student Complaints

- Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
- On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaintprocess>

Students with Disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, 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.

Top Hat

We will be using the Top Hat (<https://tophat.com/>) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message.

You can visit the Top Hat Overview (<https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide>) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system. A quick start guide for the University of Florida can be found [here](#).

An email invitation will be sent to you by email, but if don't receive this email, you can register by simply visiting our Top Hat course website: <https://app.tophat.com/e/325607> (lecture section) and <https://app.tophat.com/e/846181>.

Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of [email](#), the in app support button, or by calling 1-888-663-5491.

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?

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: