

QUANTITATIVE WILDLIFE WIS 4601 - Fall 2018
(Graduate section WIS 6934/Section 2E61)

Instructors:

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Office Hours: Wednesdays, 10:30-11:15 or by appointment

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Lectures: Monday and Wednesday, (Period 3, 9:35-10:25 AM), TUR L005

Labs: Friday, (Periods 2-3, 8:30-10:25 AM or Periods 4-5, 10:40 AM-12:35 PM)
MCCB 3086 *note attend the lab you signed up for

Tutorials: Lab help sessions, reserved lab time in the WEC NZ 368 lab for WIS 4601, during TA office hours

Course Website: via UF CANVAS <https://lss.at.ufl.edu/>

Course description:

Many ecological, management, and conservation needs for animal populations are related to assessing questions related to "how many, how much, where, and when". The goal of this course is to provide students with the motivation and training to assess these questions as commonly encountered by natural resource professionals. Upon completing this course, students will be able to formulate hypotheses related to individuals, populations or communities of animals, design studies to test these hypotheses, and analyze actual data sets from different field settings, and present scientific findings following the guidelines for scientific report writing.

Prerequisite:

STA 2023 and WIS 3401.

Required Text:

None, course packet will be available electronically via CANVAS that contains required weekly readings, lecture, and lab information.

GRADING

Grading will be based on:

36 points total, Quizzes based on readings, labs, and lecture material throughout the semester (12 quizzes, 3 points each)
220 points total, Weekly lab reports - 20 points each,
30 points total, Group project 1
30 points total, Group project 2
25 points total Exam 1
25 points total Exam 2
25 points total Exam 3

*Graduate students will have an additional assignment that will be discussed.

A note on quizzes and lab reports: No make-up quizzes will be offered. Quizzes are based on the readings, lecture material/topics, and discussions in lecture and lab. Quizzes will generally be due on Friday unless there is a holiday and they are shifted to later in the week. Quizzes may also be given in lecture on Monday or Wednesday. Exams are cumulative and may include material from lab discussions. Everyone in each group is expected to contribute to the group project. It is highly recommended that you do not miss any labs as lab information is used in completing group projects. It is also recommended that you not “divide and conquer” a lab or group project by splitting the assignment questions between group members.

Final course grades will be assigned based on the following percentages:

Percent of total points	Letter Grade
93-100%	A
90-92%	A-
87-89%	B+
83-86%	B
80-82%	B-
77-79%	C+
73-76%	C
70-72%	C-
67-69%	D+
63-66%	D
60-63%	D-
<60%	F

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 (documented illness, trip, emergency, etc.) 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 and eliminating electronic distractions during class and lab. 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 EXAM POLICY

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.

IMPORTANT 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:

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 and being a successful student requires mental and physical health. We want you to be successful. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling; <http://www.counseling.ufl.edu/cwc/> The Counseling Center also provides extensive help with anxiety stress management through a variety of innovative and free programs. Take advantage of these resources sooner rather than later! <http://www.counseling.ufl.edu/cwc/tao>
2. Student Mental Health, Student Health Care Center, 392-1575, personal counseling;
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling;
4. Career Resources Center, Reitz Union, 392-1601, career development assistance and counseling; <http://www.crc.ufl.edu/>
5. Students working with the Office of Disability Resources should provide their accommodation letters within the first 10 days of class. If you are unsure what resources Office of Disability Resources can provide then visit their web page to find out more. <http://www.dso.ufl.edu>. Accommodations include extended test taking time, alternate format exams, and other types of accommodations developed cooperatively with the Office of Disability Resources, the student, and faculty.

Unsure where to turn for help? Come see Bill or Miguel. We want you to do well in this course and want to see you succeed as a student, a professional, and in life.

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.

General computer guidelines

If you are using the IFAS computer labs you already have access to all of the software you will need. If you wish to use your personal computer, then you will need to install the same software we will be using for the course. Fortunately, it is all free or inexpensive.

We will use the free program R extensively. There are R builds for PC, Mac, Linux, etc. R can be downloaded here

<http://www.r-project.org/>

We will also use “R studio” another free program that makes R a little easier to use. It is available for Mac, PC, or Linux here

<http://www.rstudio.com/>

or

<https://www.rstudio.com/products/rstudio/download/>

Just download the free desktop version.

And there is an IFAS virtual computer lab that has everything you need. You can log in to this with any device and use R, Office, MARK, etc.

<http://cals.ufl.edu/lab/virtual-lab.php>

There are other text editors available also for free for R, just look around the web.

If you plan on using the computers in the computer lab where the course will be taught, you will need to know your Gatorlink Username and ID to log-in to the computers. **It is also a very good idea to bring a USB flash drive (aka jump drive or thumb drive) that you can save your files to and take them with you from the lab.** These drives are widely available at electronics stores, UF bookstore, or online starting at about \$5.

We have drafted simple guidelines for WEC undergraduates related to basic computing skills, computer software and hardware discounts available to you as a UF student, and a few thoughts on Mac vs. PC for use in this course. These guidelines can be found here:

http://www.wec.ufl.edu/undergrad/computer_policy.php

UF Guidelines

The official UF computing guidelines, which relate to all aspects of hardware, software, and network information at UF are available here

<http://training.helpdesk.ufl.edu/computing.shtml>

The following is the official UF policy on the student computer requirement:

Access to and on-going use of a computer is required for all students to complete their degree programs successfully. The University of Florida expects each student entering the junior year, as well as each student new to the university, to acquire computer hardware and software appropriate to his or her degree program. Competency in the basic use of a computer is a requirement for graduation. Class assignments may require use of a computer, academic advising and registration can be done by computer, and official university correspondence is often sent via e-mail.

A note about the use and sharing of computer code

In this course you are expected to complete your own labs, including writing your own R code, or other computer program to help you complete the analyses and provide the information needed for writing the lab report. Writing your own code is a key part of the lab assignment. Do not simply copy the code from the assignment, type the code into the screen yourself. We will also ask you to review written code and identify errors in the code. To be successful you must learn what the pieces of the code are actually doing. Please do not attempt to re-use someone else's computer code. In several labs, you will be working with a unique data set such that, while it may appear to be similar to someone else's in the course, in reality it is different. When we grade the assignments, we would know that you did not use your code and data, and would also know whose code and data you used. We can also use a variety of electronic code comparison tools that check spacing, syntax, everything between documents. **Re-use of someone else's code and data would constitute a violation of the academic honesty policy for both parties and result in a zero on that assignment and likely referral to academic affairs. Bottom line, do your own work.**

A few references

Via our CANVAS page we will provide links to copies of book chapters, monographs, and peer reviewed literature. For review of basic statistical concepts, we recommend

<http://www.khanacademy.org/> and

<http://onlinestatbook.com/> from Rice University, both are free and are outstanding resources.

The manual for Program MARK is a great reference with lots of examples and tutorials. Although you will NOT be responsible for reading this in its entirety, we strongly recommend that you read the whole thing at some point in your career. It is available for FREE online at:

<http://www.phidot.org/software/mark/docs/book/>

There are TONS of R resources on the web

<https://datacarpentry.org/R-ecology-lesson/> (super cool Data Carpentry lessons)

<https://owi.usgs.gov/R/training-curriculum/intro-curriculum/>

<http://www.r-project.org/>

<http://www.r-gators.com/> (super useful list-serv you can sign up for here)

check YouTube, check our CANVAS/Canvas page, check the library, look around...

Draft

Quantitative Ecology - Schedule Draft August 12

Day	Lecture	Topic	Methods and Models	Readings	Quiz
WEEK 1 Wed, Aug 22	Lecture 1	Part 1: Course Intro Part 2: Asking questions and developing hypotheses: Becoming an Ecological Detective.	Review Canvas Modules	Hilborn 1993	Introduce yourself via Canvas
Fri, Aug 24	Lab week 1	Lab week 1: Intro to R	<u>ASSIGNMENT week 1: R orientation, formulas, plotting your data, naming variables, built in commands</u>		Quiz 1
WEEK 2 Mon, Aug 27	Lecture 2	Part 1: Experimental design: basic principles and guidelines	Planning a study (asking good questions), the basics of sampling design.	Ecological Detective Ch 1 Hilborn and Mangel; Hilborn 1993	
Wed, Aug 29	Lecture 3	Experimental design: Part 2	Sampling from a population	Krebs Ch 10 Johnson 2002	
Fri, Aug 31	Lab week 2	Lab week 2: Graphing in R	<u>ASSIGNMENT week 2: Graphing in program R</u>		Quiz 2
WEEK 3 Mon, Sept 3	Lecture 4	Holiday - Labor Day	Holiday - Labor Day	Holiday - Labor Day	
Wed, Sept 5	Lecture 5	Experimental design: Part 3			

Fri, Sept 7	Lab week 3	Lab week 3: Data management	<u>ASSIGNMENT week 3: Data management, entry, checking for outliers</u>		Quiz 3
WEEK 4 Mon, Sept 10	Lecture 6	Summary statistics	Measures of central tendency, dispersion, frequency distributions	Confidence interval primer	
Wed, Sept 12	Lecture 7	Sampling and basics of probability distributions: Part 1	Normal, Poisson, negative binomial distributions - why does it matter?	Bolker 2002 Chapter 4, Distributions Hints, Wildlife Techniques Chapter 4	
Fri, Sept 14		Lab week 4: Central tendencies and probability distributions in R	<u>ASSIGNMENT week 4: R Central tendencies and fitting data to distributions</u>		Quiz 4
WEEK 5 Mon, Sept 17	Lecture 8	Sampling and basics of probability distributions: Part 2			
Wed, Sept 19	Lecture 9	Exam 1 (tentative)	Exam 1 (tentative)		
Fri, Sept 21	Lab week 4	Lab week 5: Basic parametric stats - t-tests, ANOVA, MCP	<u>ASSIGNMENT week 5: Basic parametric stats - normality and variance checks, t-tests, ANOVA, MCP</u>		Quiz 5
WEEK 6 Mon, Sept 24	Lecture 10	CI, testing means, basic parametric stats Part 1			Intro and assign group project 1

Wed, Sept 26	Lecture 11	Estimating uncertainty and incorporating it into decision making			
Fri, Sept 28	Lab week 5	Lab week 6: Review R skills and work on characterizing and describing uncertainty	<u>Assignment week 6: Uncertainty and confidence intervals</u>	Krebs Ch. 7.4	Quiz 6
WEEK 7 Mon, Oct 1	Lecture 12	Generalized linear model (GLM) 1: Simple liner regression			
Wed, Oct 3	Lecture 13	GLM 2: Poisson, and other			
Fri, Oct 5	Lab week 6	GLM lab	<u>ASSIGNMENT week 7: GLM lab</u>		Quiz 7
WEEK 8 Mon, Oct 8	Lecture 11	Exam 2 (tentative)			
Wed, Oct 10	Lecture 12	Detectability part 1 Quadrat and line transect			
Fri, Oct 12	Lab week 7		<u>ASSIGNMENT week 8. Distance</u>		Group project 1 due

WEEK 9 Mon, Oct 15	Lecture 13	Detectability part 2 $p < 1$		Caughley 1974 LeResche and Rausch 1974	
Wed, Oct 17	Lecture 14	Aerial surveys, eDNA, camera traps, drone counts, and wizardry - pitfalls and promise			
Fri, Oct 19	Lab week 8	Introduction to simulation	<u>Lab week 9 simple abundance estimation</u>		Quiz 8
WEEK 10 Mon, Oct 22	Lecture 15	Aerial surveys, eDNA, camera traps, drone counts, and wizardry - pitfalls and promise			
Wed, Oct 24	Lecture 16	Why do we estimate abundance?		Pollock et al. 1990 Krebs Ch 2.	
Fri, Oct 26	Lab week 9	Lab week 10: Simulating field data: Part 1 of Lincoln-Petersen lab	<u>Week 10: Assignment simulating the sampling process to help plan a capture-recapture study (part 1 of Lincoln-Petersen lab)</u>		Quiz 9
WEEK 11 Mon, Oct 29	Lecture 17	Lincoln-Petersen - using simulations to assess assumptions - Marbles			Assign group project 2
Wed, Oct 31	Lecture 18	Closed population models			
Fri, Nov 2		Lab week 10: Lincoln-Petersen model and assessing assumptions and bias	<u>Homecoming No Lab</u>	White and Burnham 1999	Quiz 10

WEEK 12 Mon, Nov 5	Lecture 19	Open population models - CJS and Robust Design		Program MARK - A Gentle Introduction Chpt. 16 White and Burnham 1999	
Wed, Nov 7	Lecture 20	Case histories w/ abundance estimation exotic species, endangered species			
Fri, Nov 9	Lab week 11		<u>Assignment week 12: Lincoln-Petersen lab, model performance when assumptions are violated (part 2 of 2)</u>		
WEEK 13 Mon, Nov 12	Lecture 21	Veteran's Day			
Wed, Nov 14		Known fate, KM, reporting rates		Mackenzie et al. chapter 4 Karanth and Nichols 1998	
Fri, Nov 16			<u>ASSIGNMENT week 13: MARK closed and CJS models</u>		Quiz 11
WEEK 14 Mon, Nov 19	Lecture 22	Thanksgiving online lecture			Group project 2 assignment due
Wed, Nov 21	Lecture 23	<u>Thanksgiving</u>			
Fri, Nov 23	Lab week 13	<u>Thanksgiving</u>			

WEEK 15 Mon, Nov 26	Lecture 24	Habitat and animal density relationships (online lecture)		Van Horne 1983	
Wed, Nov 28	Lecture 25	Introduction to occupancy			
Fri, Nov 30	Lab week 14		ASSIGNMENT week 13: Occupancy lab 1 December 5		
WEEK 16 Mon, Dec 3	Lecture 26	Last lecture Pine		Krebs Ch. 12	
Wed, Dec 5	Lecture 27	Last lecture Acevedo			
Wed, Dec 12	Exam 3 completed online between 12:30 pm - 2:30 pm	Exam 3 completed online between 12:30 pm - 2:30 pm			