SPATIAL MODELS AND DECISION ANALYSIS
FNR 4461 (3 credits)
Spring 2018

Course Overview
Decisions about how to manage natural resources and how to best answer ecological and environmental questions often require the consideration of spatial context. For instance, natural resource professionals are often limited in where they can manage, may have to employ different management techniques in different locations, and given limited resources, need to prioritize some locations over others for management actions. Regarding research, scientific findings often vary among locations. Therefore, the causes of this spatial variability need to be identified and accounted for in order to properly interpret findings. Various spatial modeling approaches can assist in these circumstances.

This course will teach students how to utilize spatial models (e.g., statistical and computational) to inform natural resource decisions and scientific investigations. It will also teach students about basic statistical and modeling principles, including a better understanding of what a model is and the importance of understanding the assumptions inherent to various types of spatial models. Students will learn these skills through a combination of lectures, group projects, and lab exercises that utilize multiple computational approaches, including GIS and R.

Course objectives
By the end of this course students will be able to:
- Understand how to ask spatial questions
- Determine when asking such questions are necessary
- Understand the utility, assumptions, and limitations of various spatial analytical approaches
- Utilize these approaches to answer applied ecological and environmental questions
- To communicate findings of spatial analyses to enhance their real-world utility

Hours and Locations

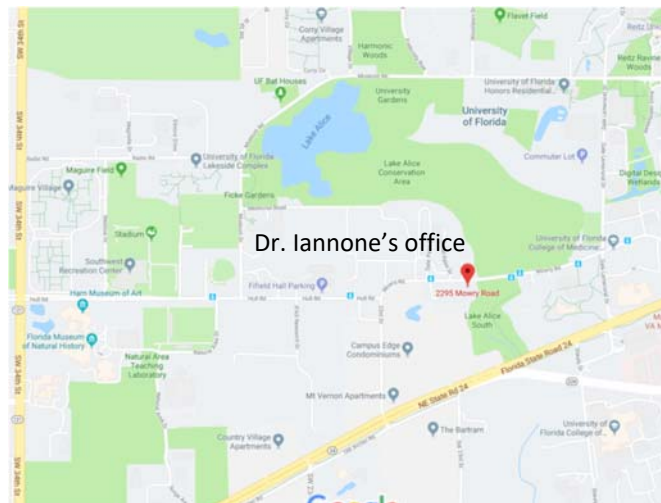|				
Lecture:	Tuesday 9:35am – 10:25am	Location:	MCCB 3108
Lab:	Thursday 11:45am – 1:40pm	Location:	MCCB 3086

Instructor
Dr. Basil Iannone (Assistant Professor)
RM 4 Bldg 106, 2295 Mowry Rd.
Email: biannone@ufl.edu
Phone: 352-294-7499

Office hours: By appointment

Dr. Iannone's office

Class readings

We will read and discuss important research papers throughout the semester. Papers will be assigned and may change as the class progresses and as new research is published.

Grading

Labs: 50%
Quizzes: 20%
Group presentation: 15%
Group project: 15%
Participation: 10%

Final Grading

Grading scale follows University standards:

100-93% = A	77-73%= C
90-92% = A-	72-70% = C-
89-88%= B+	69-68%= D+
87-83% = B	67-63%= D
82-80% = B-	62-60% = D-
79-78%= C+	< 59% = E

Quizzes

Quizzes will be given throughout the semester. They will be in the form of short answer or short essay. I prefer frequent quizzes over test as they allow me to assess the progress of the class and to identify when topics need to be revisited.

Lab Assignments

These are intended as hands-on opportunities to apply principles, methods, etc. covered in this course.

Group Presentation

Students will present an *approved* spatial analytical approach not covered in the class. Presentations should include the details of the procedure, its assumptions, multiple case studies that utilized the approach, and the findings that the approach generated.

Group Project 2

Student teams will work together to address a spatial question that incorporates the concepts, principles, and methods learned throughout the course. The project will include (1) an initial proposal stating need, objectives, methods, and expected findings, (2) a written report, and (3) a presentation to the class.

Policy on Questioning Grades on Assigned Work and Quizzes

Questions regarding quiz, lab, or project scores must be addressed within one week of when an assignment is returned to you.

TENTATIVE SCHEDULE:

Date	Topic	Note/readings/assignments
Jan 9 (lecture)	What is a model? Different types of models	

Jan 11 (lab)	Introduction to R	
Jan 16 (lecture) Jan 18 (lab)	Visualization of spatial data	Lab Assignment 1 due
Jan 23 (lecture) Jan 25 (lab)	Detecting and quantifying spatial patterns	Lab assignment 2
Jan 30 (lecture) Feb 1 (lab)	Detecting indirect and direct drivers of spatial patterns	Lab assignment 3 due
Feb 6 (lecture) Feb 8 (lab)	Accounting for spatial autocorrelation and covariability	Topic for Presentation due
Feb 13 (lecture) Feb 15 (lab)	Macrosystems / Teleconnections / Modifiable Areal Unit Problem Mixed effects models / bootstrapping	Lab assignment 4 due
Feb 20 (lecture) Feb 22 (lab)	Social ecological considerations in spatial analysis	
Feb 27 (lecture) March 1 (lab)	Student Presentations on Analytical Methods	Presentation Due
March 6 (lecture) March 8 (lab)	SRPING BREAK	HAVE FUN
March 13 (lecture) March 15 (lab)	Story Maps	
March 20 (lecture) March 22 (lab)	Spatial considerations for species habitat Data reproducibility	Lab assignment due 5 / Project topic/proposal due
March 27 (lecture) March 29 (lab)	Introduction to Bayesian statistics for hierarchical data	Lab assignment due 6
April 3 (lecture) April 5 (lab)	Complex adaptive systems and Individual based models	Lab assignment due 7
April 10 (lecture) April 12 (lab)	TBD	Lab assignment due 8
April 17 (lecture) April 19 (lab)	Project presentations Project Presentations	

April 24 (lecture)	Project Presentations	Project reports due
April 26 (lab)	READING DAY	
May 1 (lecture)	FINAL'S WEEK	
May 3 (lab)		

Attendance
Attendance is required. Labs and quizzes cannot be made up. Student are required to learn the material covered in missed classes and to get notes from classmates.

Policy on Software Use
All faculty, staff and students of the university are required and expected 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.

Campus Helping Resources

Counseling: Students having personal issues or that lack clear academic and career goals that hinder their academic performance are encouraged to utilize these counseling services. These services are free and confidential.

The Counseling and Wellness Center can provide services pertaining to personal or couples counseling, crisis and emergency, alcohol and drug problems, psychiatry, etc.
Ph: 352-392-1575, Website: https://counseling.ufl.edu/

Career Resource Center can provide services pertaining to development of professional skills, career advising, etc. Ph: 352-392-1601, Website: https://www.crc.ufl.edu/next-level/

Student Legal Services: https://www.studentlegalservices.ufl.edu/Home.aspx

Students with Disabilities
The Disability Resource Center coordinates needed accommodations of students with disabilities, including registering disabilities, making recommended academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues. Disability Resource Center, 0001 Building 0020 (Reid Hall), Ph: 352-392-8565, Email: accessUF@ufsa.ufl.edu, Website: https://drc.dso.ufl.edu/

Online Course Evaluation Process
Students are expected to provide feedback on the quality of this course and it instruction. Evaluations are completed online and available to students during the last 2 to 3 weeks of the course at the following website https://evaluations.ufl.edu/results. Evaluations are an important way of contributing to the UF community by helping to improve the quality of education provided.