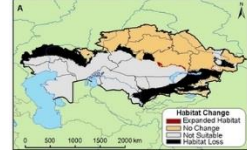


Ecological Niche Modeling & Mapping
GEOS 5300 (Topics) – Spring 2015
Lectures & Labs Tuesday/Thursday 8:15am – 10:15am
323 Ross Hall



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Office hours: Open door policy or by appointment

1. COURSE DESCRIPTION

This course introduces students to applications of GIS within biogeography and conservation, specifically ecological niche modeling (ENM) and species distribution modeling (SDM), with varying levels of difficulty and complexity. We will explore the basics of GIS through the use of environmental data and spatial tools commonly used as precursors to ENM and SDM. Learning these basics through practical lab work will establish a foundation to learn more about fundamental modeling concepts and how to technically apply these concepts. This course is very practice-oriented and involves multiple labs, projects, and reading discussions. We will explore species locality datasets, environmental/climatological data, the Maxent and GARP models, a multitude of additional models via a group project, and, finally, your data and research interests. This course requires no prerequisites, though some knowledge of basic mathematical concepts and familiarity with the Windows operating environment and ArcGIS is beneficial.

Lectures, readings, and discussions will precede labs and focus on the background of each concept, technique, and/or model. Labs will be assigned to demonstrate how these concepts are applied.

You must have a copy of the textbook – Mapping Species Distributions: Spatial Inference and Prediction by Janet Franklin. You will also need an external hard drive (thumb drive) with at least 1 GB of free space (2+ GB recommended). You may need substantially more storage space depending on what you choose for your final project.

A. Course Format

This course combines traditional instruction organized around classroom lectures, reading material, seminar-style discussions, and computer exercises in a lab format. Labs cover selected topics discussed in lectures and/or reading assignments. Skills will be independently applied in a group project where species and environmental data will be given and different modeling methods will be tested, then again in a final project where species and environmental data will be an independently-chosen along with the modeling method to produce a final, journal-style article.

B. Course Requirements

Students will be evaluated according to the following:

Labs/Assignments:

Nine labs are designed to provide students with hands-on exposure to various GIS, cartography, and niche/species modeling tools, programs, and techniques presented during lectures and in readings. Labs will mainly utilize mapping and modeling software available in the computer lab. Instructions and guides will be provided for completing the labs in the allotted time. Students will be expected to use the lab periods for guidance and assistance in completing the exercises.

Projects & Presentations:

Two projects (group and final) will test the skills and abilities of each student. Guidance/options will be provided for each project. The final project and any related data will be independently chosen and created based on skills you have learned during the class. Students will give a presentation to the class for each project. Group project presentations will be on April 7th and each group will turn in a 5-page report. Final project presentations will be on May 5th and each student will turn in a ~10-page journal-style article based on their model.

COURSE REQUIREMENTS & GRADING	
Lab Exercises	180 points
Group Project Presentations	20 points
Group Project Paper	80 points
Final Project Presentations	20 points
Final Project Paper	100 points
TOTAL	400 points

C. Readings

Students are expected to complete all required readings that are assigned occasionally for group discussion. Students are also expected to examine and extract information from relevant literature for their group and final projects.

D. Grading Policy

Grading will follow a generalized graduate school grading scale with no +/- grades. Deadlines for the assignments and projects are strictly enforced and points will be deducted for each day an assignment is late.

Scale	Point Equivalent	Grade
90 - 100	360 - 400	A
80 - 89	320 - 359	B
70 - 79	280 - 319	C
60-69	240 - 279	D
< 60	< 240	F

E. Class Policies

The following policies guide this course

- Silence cell phones while in the class room.
- Respect your classmates and instructor by being on-time and prepared for class.
- Always ask questions!
- No food allowed in the class room.
- If you miss a class for any reason, you are responsible for any assignments and/or obtaining the information discussed in class.

2. TECHNOLOGY REQUIREMENTS, COMMUNICATIONS, AND SUPPORT

This course requires you to use technology as a tool for learning. It is your responsibility to familiarize yourself with the technologies.

A. Technology Support

The GIS lab is open various times throughout the day when another class is not being taught and a **GIS HelpDesk (managed by our Geospatial Graduate Students) is available in the lab M/W from 8:15-10:15am and T/Th from 1:00-3:00pm**. Open lab times will be posted on the lab door once available.

For technical support with a University related technical problem, contact the Office of Information Technology (OIT) at <http://www.etsu.edu/oit/>.

B. Accommodations for Disabilities

If you have a disability that may impact your work in this class and may require accommodations, please inform the instructor and contact Disability Services through the following webpage: (<http://www.etsu.edu/students/disable/>)

3. ACADEMIC RESPONSIBILITY

As a student at East Tennessee State University, you have acknowledged the standards that have been defined in the Student Code of Conduct, and thus you have agreed to adhere to its tenets.

A. Plagiarism

Students are responsible for submitting work that reflects their individual performance. Misrepresentation of your own work either through plagiarism, collusion, or data distortion is a serious breach of the code of student conduct. If you have any questions on what constitutes plagiarism, review it in the [ETSU Student Handbook](#).

4. **TENTATIVE** LECTURE/READING/LAB/PROJECT SCHEDULE

WEEK	Dates	TOPICS & READINGS	ASSIGNMENTS
1	Jan 20/22	Overview of Class; Biogeography, Conservation, and GIS; Intro Conservation GIS (Lab 1)	
2	Jan 27/29	Georeferencing & Digitizing; GIS File Management (Lab 2)	Lab 1 Due
3	Feb 3/5	Cartography & GIS Data Sources (Lab 3)	Lab 2 Due
4	Feb 10/12	Species Distribution Modeling (Read Chapters 1 & 2 prior to 2/12); Interpolation & Density Analysis (Lab 4)	Lab 3 Due
5	Feb 17/19	Niche Theory & Environmental Factors (Read Chapter 3, Peterson & Soberon 2012 prior to 2/17); Species Data (Read Chapter 4, Gilman et al. 2009 prior to 2/19) (Lab 5)	Lab 4 Due
6	Feb 24/26	Environmental Data for Models (Read Chapter 5 prior to 2/24) (Lab 6)	Lab 5 Due
7	Mar 3/5	Maxent Species Modeling (Read pg. 174 & 196-200, Elith et al. 2006 prior to 3/3) (Lab 7)	Lab 6 Due
8	Mar 10/12	Spring Break	
9	Mar 17/19	GARP Niche Model (Read pg. 173 & 194-196, Peterson et al. 2007 prior to 3/17); Accuracy Metrics (Read Chapter 9, McNyset 2005 prior to 3/19) (Lab 8)	Lab 7 Due
10	Mar 24/26	Group Projects: Exploring different modeling methods (Read appropriate chapters and literature)	Lab 8 Due
11	Mar 31/Apr 2	Group Projects (contd.)	
12	Apr 7/9	Group Project Presentations; Niche conservatism and applying climate change data (Read Peterson 2011 prior to 4/9) (Lab 9)	Group Project Due
13	Apr 14/16	Final Project Overview and lab time	Lab 9 Due
14	Apr 21/23	AAG Conference in Chicago; Final project lab time	No Class
15	Apr 28/30	Final project lab time	
16	May 2-7	Exam Week - Final project presentations & paper due (3/5 @ 1:20-3:20pm)	Final Project Due

The course schedule, required readings, and procedures described in the syllabus are subject to change. Students will be informed of any such changes via the D2L course site and/or via email.