

EVS 281 – INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS IN ENVIRONMENTAL SCIENCE

SPRING 2014

Location: TL 2015

Lecture: Monday 9:00 to 10:50 am

Lab: Wednesday 9:00 to 11:50 am

INSTRUCTOR/LECTURE:

Dr. Narcisa Pricope

104 DeLoach Hall

Tel: 910-962-3499

E-mail: pricopen@uncw.edu

Office Hours:

MW: 11:00 – 12:30; Tue. 12:00 – 2:00 pm

or by appointment

LAB TEACHING ASSISTANT:

Kaitlyn Costin

125 DeLoach Hall

E-mail: ksc9654@uncw.edu

Office Hours:

Tue. 12:00 – 4:00 pm or by appointment

Course Description:

This course is designed to introduce students to fundamental concepts and principles of Geographic Information Systems (GIS), as well as tools, functions and capabilities afforded by proprietary GIS desktop software (ESRI ArcGIS). You will understand how these tools are used and how you can use them to address environmental management issues.

Course Objectives: By the time you complete this course, you should be able to:

- ✚ Define Geographic Information Systems (GIS)
- ✚ Identify, compare and contrast vector and raster GIS
- ✚ List and evaluate the capabilities of various GIS programs, both proprietary (the basics of one of the main GIS packages currently in use, ESRI's ArcGIS 10.x), as well as freely-available software such as QGIS.
- ✚ Apply cartographic principles of scale, resolution, projection and data management to a problem of a geographic nature.
- ✚ Describe in detail the basic components of a GIS, including sources of data, data structures, data storage, hardware equipment, software, spatial analysis, and input and output operations;
- ✚ Apply spatial analysis functions using a GIS to a geospatially-explicit problem, as well as design effective, informative maps using available data and software.
- ✚ Compile primary geographic information from source materials such as maps, aerial photos/imagery, and GPS data;
- ✚ Explain uncertainty as it relates to scale, resolution and projection; be aware of uncertainty propagation within a GIS as you work with data from various sources and different quality.
- ✚ Discuss the value and applications of GIS in the various aspects of the environmental sciences.

Examinations, exercises and lab projects will test the student's understanding of the structure of a GIS, its major concepts and the relevance of their application to geographical problems.

Prerequisites: None but good computer literacy and desire to think spatially for 15 weeks are essentials for this course.

Required Text and Material:

- GIS Concepts and ArcGIS Methods: Basics (v10), 5th Edition by David Theobald. \$19.99. Conservation Planning Technology, Inc., Fort Collins CO. Available to purchase as a .pdf from: <http://consplan.com/buy.htm>
- We might also need to order the advanced, second part of the eBook but I am reserving the right to make that decision about half way through the semester depending on progress.
- A USB device (i.e. a flash drive or removable hard drive) for data storage (at least 1 GB).

- Additional readings and course materials will be either handed in class or made available on Blackboard.

Other Material: ESRI and ArcGIS also have very good on-line help; online labs and instructional resources:
<http://edcommunity.esri.com/Resources/ArcLessons>

E-mail Requirement: Since I will be sending messages to you each week about the course's progression and issues, all students taking this course **must** monitor their UNCW student email accounts. If you have your UNCW student account forwarded to another email service such as Gmail, it is your responsibility to ensure that the forwarding is working. Please check your email on a regular basis for important announcements.

Course Structure: This course is organized as a five-hour class. The class meets twice a week, Mondays for a 2-hour lecture/discussion and/or brief demonstration/exercise period, followed by a three-hour lab period on Wednesdays focused on working with data and GIS software. The course will be divided into two major parts:

1. The first several weeks will consist of an introduction to GIS and cartographic principles and techniques, along with doing exercises based on tutorials in the ESRI Virtual Campus that you will receive access to. A series of exercises using existing maps and data (themes) will provide the basis for learning the structure and capabilities of a GIS program in a step-by-step fashion.
2. The last few weeks will be spent working more on GIS labs and short projects with relevance for environmental science applications, also accompanied by lectures but to a slightly lesser extent. The student will work out solutions to the problems using the newly acquired GIS skills and knowledge. The problems will consist of a variety of local, regional, national, and international issues that are typically encountered in environmental and ecological analysis, resource management, planning, mapping, and public information access. Map production of the 'problem' will focus on making it suitable for display and interpretation.

Even though some of the time in class will be spent working on the labs and projects, you should expect to spend a reasonable amount of time outside of class as well in order to complete homework assignments or anything that you have not completed during the 3-hour lab period on Wednesday.

GIS Lab Room in TL 2015: While we will be meeting in the Geospatial Computer Lab for class, we will not always be using the computers. Therefore, there are a few rules that I would like all students to abide by:

- ✚ There is absolutely **NO** food or beverages allowed on the tables, desks, or floor anywhere near the computers.
- ✚ During lecture/discussion no monitors will be turned on at any time.
- ✚ During lecture/discussion place your keyboard out of the way.
- ✚ Clean up your surrounding area when you leave.
- ✚ Keep an organized and clean personal drive and/or data storage device or personal folder on the computers and use this space only for academic purposes.

Although you will be working closely together, each lab exercise, project, and write-up will be **your own responsibility**. Over the term you should collect all of your work in a dedicated folder of maps, tables, and written responses and submit them for evaluation before the next Wed. when we start a new lab. Effective and timely participation in the class and lab is important since lectures, the tutorials, and the exercises progress rapidly ... **catching up is not an option in this class - you cannot wait until the last minute for anything!**

Grading scheme: Below is listed a tentative schedule of class topics, assignments, and exams. There will be two examinations given during the semester and a final exam. The grading breakdown and scheduled dates of the exams are:

	<u>Weight</u>
✓ Attendance and Participation	5%
✓ Bi-Weekly GIS Log	5%
✓ Exam One	15%
✓ Exam Two	15%
✓ Labs and projects	40%
✓ Final Exam/Project	20%

The exams will be based on the material covered in class and lab and in your textbook or other assigned readings; therefore, class attendance and keeping up with materials and information posted on Blackboard are essential to understanding the material. Extra credit is not available to anyone in this course under any circumstances. No make-up exams will be given! It is your responsibility to inform me of conflicts ahead of time so that arrangements can be made. All assignments for this class are to be completed by the scheduled time – **nothing late will be accepted or if they are, there is a 10% deduction for every day your assignment is late!** All your grades and scores will be recorded on a weekly basis on the Blackboard site I have created for the class and, as such, you will be able to maintain an up-to-date knowledge of your standing and performance in the class. If you have any questions regarding your performance in the class, please do not hesitate to ask or see me during office hours. Below is a breakdown of the grading scale and an explanation of your grade distribution:

100-94 = **A**
93-90 = **A-**
89-87 = **B+**
86-84 = **B**
83-80 = **B-**
79-77 = **C+**
76-74 = **C**
73-70 = **C-**
69-65 = **D**
< 65 = **F**

A: outstanding work meeting expectations of course that needs no revision. (100-90)
B: excellent work meeting expectations of course that needs some revision (89-80)
C: acceptable work meeting expectations of course-needing extensive revision (79-70)
D: minimal work meeting expectations of course (69-65)
F: work that does not meet expectations of course (65 and below)

Important Reminder: All students are responsible for announcements in class regarding changes or modifications of class schedule or grading policies.

Academic Honor Code. Academic dishonesty, including cheating and plagiarism, are not tolerated in this class. Students must conform to the Academic Honor Code at all times. Please familiarize yourself with the Code as outlined in the UNCW Student handbook and at <http://www.uncw.edu/stuaff/odos/honorcode/>.

Students with Disabilities. Students requiring special accommodations to complete the lecture or laboratory sections of EVS 281 should contact the Office of Disability Services in Westside Hall (962-7555), or at <http://www.uncw.edu/stuaff/disability/>

Religious Observance Policy

In accordance with NC SL 2013-14, you are entitled to two excused absences for religious observances **per academic year**. You must inform me in writing the first week of class if you will be missing any classes due to religious observance and using one of the two permissible absences for the academic year. In addition, please inform the Registrar the first week of class who will then confirm your intentions to miss class with the impacted course instructors. Any absence for religious purposes will be considered unexcused unless you submit the request in writing the first week to either me or the Registrar.

The UNCW Statement on Diversity in the University Community

As an institution of higher learning, the University of North Carolina Wilmington represents a rich diversity of human beings among its faculty, staff, and students and is committed to maintaining a campus environment that values that diversity. Accordingly, the university supports policies, curricula, and co-curricular activities that encourage understanding of and appreciation for all members of its community and will not tolerate any harassment or disrespect for persons because of race, gender, age, color, national origin, ethnicity, creed, religion, disability, sexual orientation, political affiliation, marital status, or relationship to other university constituents.

Zero Tolerance Policy

UNCW practices a zero tolerance policy for violence and harassment of any kind. For emergencies contact UNCW CARE at 962-2273; Campus Police at 962-3184; or Wilmington Police at 911. For University or community resources visit: <http://www.uncw.edu/safe-relate/campusResources.htm>. Violence prevention information and resources available at <http://www.uncw.edu/safe%2Drelate/>

TENTATIVE SCHEDULE

Lab attendance for this class is MANDATORY! Missing more than **two lab sessions** results in an automatic incomplete for the course. Below is a tentative list of topics and laboratory exercises for the term.

WEEK	DATE	DAY	TOPICS	Labs
1	1/13/14	Monday	Introduction: syllabus, Q&A	
	1/15/14	Wednesday		Lab 1: Getting started with GIS (Virtual Campus module 1)
2	1/20/14	Monday	NO CLASS - MLK	
	1/22/14	Wednesday		Lab 2: Creating map symbology (Virtual Campus module 2)
3	1/27/14	Monday	Introduction to GIS and Desktop and Web-Based GIS Overview (Ch1)	
	1/29/14	Wednesday		Lab 2B: Exploring maps and imagery in Google Earth
4	2/3/14	Monday	Data models and geodatabases (Ch2)	
	2/5/14	Wednesday		Lab 3: Table and shapefile functions (change in population density USA)
5	2/10/14	Monday	Projections, Scale and Coordinate Systems (Ch3)	
	2/12/14	Wednesday		Lab 4: Working w/ map symbology
6	2/17/14	Monday	Cartography basics and information presentation (Ch4)	
	2/19/14	Wednesday		Lab 5: Query and data analysis
7	2/24/14	Monday	EXAM 1	
	2/26/14	Wednesday		Lab 6: Suitability analysis
8	3/3/14	Monday	NO CLASS – SPRING BREAK	
	3/5/14	Wednesday	NO CLASS – SPRING BREAK	NO LAB
9	3/10/14	Monday	Querying and Managing Spatial and Tabular Data (Ch5)	
	3/12/14	Wednesday		Lab 7A: GPS field data collection
10	3/17/14	Monday	Thematic Mapping: Creating and Working with Data (Ch6)	
	3/19/14	Wednesday		Lab 7B: Working with GPS data
11	3/24/14	Monday	Relational spatial analysis (Ch5&6)	
	3/26/14	Wednesday		Lab 8: Raster-based analyses
12	3/31/14	Monday	EXAM 2	
	4/2/14	Wednesday		Lab 9: Critical habitat analysis
13	4/7/14	Monday	Data collection and integration; Practical Applications of GIS	
	4/9/14	Wednesday		Lab 10: Hurricane vulnerability
14	4/14/14	Monday	ArcGIS extensions: analysis and modeling	
	4/16/14	Wednesday		Lab 11: Spatial Analyst modeling
15	4/21/14	Monday	Integrated geospatial analyses	
	4/23/14	Wednesday		Final project work
16	4/28/14	Monday	Discussion, review, questions, ideas	Final project work
	4/30/14	Wednesday		Final project work