

GIS3043/5107C Syllabus Fall 2015

NOTE: THIS IS ALMOST BUT NEVER QUITE THE FINAL SYLLABUS AS OF 24 August 2015

GIS3043: Foundations of Geographic Information Systems

GIS5107C: Geographic Information Systems in Research

General Information

Instructor and Teaching Assistants:

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Office Hours	Tuesdays 3-5 pm (TUR 3141A)	Wednesdays 2-4 PM (TUR 3018A)	Thursdays 3-5 PM (TUR 3018A)

Important Dates to Remember:

- Quizzes: Every 2 weeks, given after the lecture
- *Midterm Exam*: 3:00 – 4:55 pm; Monday, 26 October 2015
- *Project Proposal/Presentations*: **November 4/5 2015** (Lab sessions)
- *Final Project Presentations*: Last week of classes – 7 **December 2015 (Graduate students)**, **9 December 2015** (Undergraduate students)
- No final examination

Textbooks (optional):

“*GIS Fundamentals: A first text on Geographic Information Systems*” by Paul Bolstad, 3rd or later version
(The book website: <http://www.paulbolstad.net/gisbook.html>)

“*Introduction to Geographic Information Systems*” By Kang-tsung Chang, 4rd or later version (You can order the e-Book at <http://ebooks.primisonline.com/eBookstore/index.jsp> with saving)

Course Description

Geographic Information Systems (GIS) are very powerful theoretical and computing tools used to accumulate, store, manipulate, display, and analyze spatial data. GIS is recognized as a “decision support system involving the integration of spatially referenced data in a problem-solving environment”. GIS are often employed as decision support tools in various governmental applications such as environment management, public health, public safety, public works, zoning, tax collection, education and so on. Geographic location is a key feature of 80-90% of all government data. US Department of Labor identified Geo-technology as one of the three most important emerging and evolving fields only second to Nano-technology.

This course is designed for students with no prior Geographic Information Systems experience. It involves both a weekly theoretical lecture and a computer lab session where hands-on experience using GIS software allows you to reinforce knowledge gained during the lecture. Lab exercises are a major part of the course and provide the opportunity for students to acquaint themselves with the many practical issues related to using GIS as an analytical and research tool. Many of the topics of the course lectures and lab exercises are related to governmental administrations, public interests, and environmental research such as public safety and health, real estate, wildlife management and education.

Lab exercises are completed almost entirely using Windows-based computers. While the course requires no prior GIS experience, you must have a basic understanding of computers and how to use them. If you do not feel that you have basic computer skills, I recommend that you take advantage of the resources on campus at the earliest possible time. There are online courses (<http://www.at.ufl.edu/>) available to you at UF through Academic Technologies. You are also invited to talk to me about your individual situation.

Goals & Objectives

In this course you will learn about the fundamentals of Geographic Information Systems (GIS) theory and technologies through the use of **problem solving** and **spatial thinking** skills. The approach used in this course is problem-based learning applied to spatially explicit problems. These concepts are essential to the use of GIS. You will develop your own analytical skills by addressing real-world decision making problems within the spatial framework of GIS.

Problem solving is basic to the scientific method and refers to the process you will use to understand and reach a conclusion about something unknown. Throughout the course, you will become familiar with the process by describing the steps you take to solve problems using GIS theory and methods. You will also develop your **spatial thinking** skills by incorporating space into the analysis of a particular problem. Spatial thinking is the process of understanding and recognizing objects within space and recognizing the importance of the space surrounding those objects and the relationships that occur within the whole system.

Unlike many other GIS classes, this is **NOT** a software package tutorial class. We will be using software for both the lab sessions and the weekly lectures and we feel that, rather than teaching the student how to use a particular software package, it is better to teach the student the concept of **problem solving**, underlying GIS concepts and the basics of **spatial thinking** that will allow you to use the knowledge acquired in the class regardless of the software package available.

The specific objectives of this course are to:

1. Develop and improve geographic **problem solving** (decision making) abilities through the application of
 GIS knowledge and spatial thinking skills;
2. Learn geographic concepts and **spatial skills** and determine their relevance to you;
3. Sharpen critical thinking skills about geographic information – its reliability, accuracy and precision;
4. Acquire competency in basic knowledge and skills regarding GIS.

Evaluation

There will be several in-class **quizzes** that occur at about a two-week interval. These will test you on material covered usually within the most recent two weeks, although testing outside of this period may also occur due to the nature of the subject. **Quizzes can only be made up if the instructor receives prior notification of absence. The absence of such a notice will prevent students from making up missed quizzes.**

- There will be one **in-class exam** in the middle of the semester. **This exam cannot be made-up.**

Exemptions may be granted at the instructor’s discretion with written documentation if the student misses the exam due to illness, family emergencies or academic conferences. Excuses such as waking up late, forgetting about the exam etc. will not be tolerated.

- The **laboratory exercises** comprise the most important part of your final grade. Labs will reinforce the material discussed in the lectures and as such there will be a close association between material covered in the lecture and lab periods. **Lab attendance is mandatory and counts towards your attendance and participation** grade. Students may only be excused if approval is given by the instructor or teaching assistants. Each lab exercise will be submitted on the Sakai e-learning system and as such must be typed.
- **Project:** Each student is required to complete a GIS project covering any topic in their area of interest. The proposal should reflect the fundamentals of GIS theory and technologies through the use of problem solving and spatial thinking skills. Graduate students are encouraged to have discussions with their advisor to develop a project in own research fields. **All projects are to be done individually** (no group projects).
- **Extra Credit:** This course **does not offer extra credit.**

Undergraduates

Mid-Exam

10%

Quizzes

15%

Graduates

Mid-Exam

10%

Quizzes

15%

Attendance and participation	5%	Attendance and participation	5%
Lab	40%	Lab	40%
Project Proposal	10%	Project Proposal	10%
Final Project	20%	Final Project	20%
TOTAL	100%	TOTAL	100%

Grading Scale

A	92.00-100%	A-	90.0-91.9%	
B+	88.00-89.9%	B	83.5-87.9%	B- 80.0-83.4%
C+	78.00-79.9%	C	70.0 - 77.9%	C- 68.0 - 69.9%
D+	65.0 - 67.9%	D	60-64.9%	
E	Less than 60%			

Attendance

Weekly attendance at **both** lectures and labs is **mandatory** for all students and counts towards your attendance and participation grade. Attendance is the easiest way to do well in any class. To encourage uninterrupted participation in class, it is expected that cell phones be turned off or put on silent prior to entering the classroom.

Absences may be excused if they are documented. For expected absences, you must provide advance notice of the absence. Acceptable reasons for absences include but are not limited to official university activities, personal or family illness or emergency, religious holidays, etc. per UF Attendance Policies. Oversleeping, missing the bus, etc. are not acceptable excuses. You may be required to provide written documentation in order to receive an excused absence.

If your absence is excused, you may have the opportunity to re-take missed quizzes and/or be exempted from missing the mid-term exam. In-class activities are designed to credit class attendance, and cannot be made up under other circumstances. Students are responsible for material missed during any class session (lab or lecture). (S)he should obtain notes from a peer for the material covered in class. If the absence is unexcused, assignments not turned in at the assigned time will be considered late and a penalty applied.

Late Assignments

Labs given out in Wednesday's lab periods are due at **8:30 am** of the following **Wednesday**. Labs given out in Thursday's lab periods are due at **8:30 am** of the following **Thursday**.

A 10% penalty per day will be **AUTOMATICALLY** applied to late assignments up to 7 days after they are due. Assignments received after the 7 day late period will not be graded, and will automatically receive 0 points.

UF Honor Code

The University of Florida Honor Code states: "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity." As such, cheating of any kind (copying homework, plagiarism, cheating on a test, etc.) will not be tolerated and if caught you will be treated according the UF policies, and a grade of 'E' will be recorded for the course.

Software/Computer Use

All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software/computer 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.

Course Schedule: Lecture topics and lab assignments

DATE of MONDAY Lecture	Week	Lecture	Text Reading	Lab Title
24 August	1	0: Introduction to the course and GIS , 6-slide handouts; 1: GIS Data Models , 6-slide handouts lecture_1_2015-08-24_Define_GIS-GIS_Data_Models_Handout.pdf	B1/C1*	Lab Setup
31 August	2	2: GIS Data Models , 6-slide handouts; 3: Coordinate Systems and Map Projections , 6-slide handout	B2-3/C3-4; C2	ArcGIS File Management
7 Sept (no lecture – Labor Day) LABS WILL BE HELD THIS WEEK	3	None; Enjoy the Holiday		Coordinate Systems and Map Projections

14 Sept	4	QUIZ 1 4: Coordinate Systems and Map Projections II; 6-slide handout	B3, B8/C8, C10	ArcGIS File Geodatabases and Database Operations
21 Sept	5	5: Databases,Metadata, Geodatabases; 6slide.pdf	B4, B7, B14/C5, C8	Census Data Mapping
28 Sept	6	QUIZ 2 - Quiz 2 key (available for limited time) 6: Data Sources, Data Quality Assessment pdf; 6-slide handout pdf	B9 (P 395), C16	Geocoding and Data Analysis
Start to think about your final project ideas that you might find interesting				
5 October	7	7: A few more data sources, Geocoding pdf; Geocoding 6slide pdf 8: GPS Basics; GPS basics 6-slide	B5, B9/C5, C11	GPS Data Collection and Georeferencing
12 October	8	QUIZ3 - Key 9: GIS Vector Analysis; 6-slide/page handout. 10: Basic Raster Analysis pdf file; 6-slide/page handout Study Guide for Midterm - uploaded Monday, 20 October at 10:45 AM.	B10, B9/C12	Vector Analysis: Spatial analysis methods
19 October	9	Basic Raster Analysis II pdf file, 6-slide handout pdf file. Spatial Interpolation pdf file; 6-slide handout pdf file.	B12/C15	Heads-up Digitizing FINAL PROJECT GUIDELINES
26 October	10	MID-TERM EXAM		Crime Scene Investigation
2 November	11	Network analysis (Dr. Liang Mao)	B11/C13	Campsite

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Your idea for your final project should be clear now

9 November	12	QUIZ4 Terrain Analysis, Hydrological Modeling pdf file; 6-slide/page pdf file	B6/C5	PROJECT PROPOSAL PRESENTATIONS; Note that the written proposals will be due 8:30 AM, Tuesday 12 November. One potential template for proposal presentations. Note that this follows directly from the section in the Final Project Guidelines document
16 November	13	Remote Sensing pdf file; Remote Sensing 6slide handout pdf	B13, Programming reading/C18	Work on Final Project
23 November	14	QUIZ5 - BRING YOUR CALCULATOR!! Cartographic Modeling, Spatial Models, GIS Programming pdf file; 6-slide handout file.	B9 (p 390)/C17	No Labs – Thanksgiving Break Work on Final Project and Practice Final Project Presentations (Optional)
30 November	15	Employment, Future Trends, Advanced Research Topics (Macrosystems); Binford PechaKucha Macrosystems Presentation	Literature reading for project	Work on Final Project and Practice Final Project

				Presentations (Optional)
7 December	16	<p>FINAL PROJECT PRESENTATIONS</p> <p>News article with excellent section on "Limitations of Analysis"</p> <p>This news article should <u>NOT</u> be used as a model for your project report because it is just a news article. Nonetheless, it is a GIS analysis of the distribution of something that may interest you, and has an excellent description of the limitations of the analysis in the very last paragraph that begins "About the Data:". This is the kind of explanation of the limitations that is important. Please read the guidelines for the final report for further instructions on the project.</p>		FINAL PROJECT PRESENTATIONS
		<p>Link to Final Project Presentation Template (You may have to save this file to your own drive and then open it)</p>		

*B1: Chapter 1 of Bolstad textbook; C1: Chapter 1 of Chang textbook.