COURSE SYLLABUS

ENVS 455: GIS I

Fall 2017
School of Geosciences
University of Louisiana at Lafayette

Instructor:	Dr. Xander Wang
Time:	Mondays (12:00 - 13:50) and Thursdays (17:00 - 18:50)
Location:	HH 113
Office:	HH 330
Office Hours:	Tuesdays (9:00 - 12:00) and Wednesdays (13:00 - 16:00) Or by appointment
Email:	xander.wang@louisiana.edu
Phone:	(337) 482-6649

Course Description:

This course provides an overview of the theory and general principles underlying geographic information systems (GIS). The lecture portion of this course is designed to help students understand the fundamental knowledge about GIS, while the laboratory component of this course is to complement the lecture materials and to provide students with practical experience in solving real-world environmental problems with GIS. Through this course, students will understand: (a) how spatial information is stored and georeferenced in GIS, (b) what are map projections and coordinate systems, (c) how to create maps in a commercial software package, and (d) how to process and analyze geographic information stored in both raster and vector formats. Students will also learn about the latest progress of geographic information programs or online services. All students must complete a final project to demonstrate a GIS application.

Textbooks and Materials:

- The recommended textbook for this course is: **GIS Fundamentals: A First Text on Geographic Information Systems (5th Edition)**, written by Paul Bolstad, 2016. More details about this textbook can be found at: http://www.xanedu.com/higher-education/educators/custom-books-catalog/gis_fund_5e/
- Another optional textbook is: **Getting to Know ArcGIS (4ᵗʰ Edition)**, written by Michael Law and Amy Collins. More details about this textbook can be found at: http://esripress.esri.com/display/index.cfm?fuseaction=display&websiteID=286&moduleID=1

- In addition, **ArcGIS Online Help** provides very useful documents and examples. Students are strongly recommended to visit http://doc.arcgis.com/en/arcgis-online/ to learn more.

Software:

For the laboratory component of this course, an industry standard software (ArcGIS developed by ESRI) will be used. ArcGIS has been installed to all computers in HH 113. If you prefer to use ArcGIS in your personal computer/laptop, you may go to the website of ESRI to download a 180-day student trial version: http://www.esri.com/landing-pages/software/arcgis/arcgis-desktop-student-trial. You need to create a free ESRI account to access the trial. Note that it may take a couple of hours to download and install ArcGIS on your own computer, please plan accordingly.

Computer Labs:

The lab sessions are designed to allow students to gain practical skills with ArcGIS and to apply the course concepts to real-world data. At the beginning of each lab session, the instructor will specify and demonstrate the tasks to be completed in the lab. By the end of the lab session, students should show their completed tasks to the instructor in order to receive the credit for lab tasks. During the lab session, the instructor will also hand out the lab assignment. Students can use the computers in HH 113 or their own computers to do the assignment. The assignment should be submitted in paper or electronically (only PDF format is acceptable) to the instructor before a due date. Otherwise, 10% of the grade will be deducted for each day that an assignment is submitted late.

Final Project:

The final project is intended to help students understand GIS through an investigation of a particular research program. Students will acquire the spatial data by themselves. The project is expected to involve at least one spatial analysis technique introduced in class. Students should discuss their project topics with the instructor beforehand and then submit a short proposal (1-2 pages). The proposal should include a research question, a description of the spatial data to be used, and a conceptual description of the methods to be used. At the end of the class, students should give an oral presentation which include the following sections: Introduction, Data, Methods, Results, and Conclusions. Graduate students must work on the project individually. Undergraduates may choose to work individually or in a group of no more than 3 on the project. Generally, all students in a group will be assigned the same grade. However, the instructor reserves the right to reduce the grade of an individual who has made little or no contribution to the group work.

Course Grading (subject to change):

Note that the grading components for all students will be the same, but the weights of some components will be different for graduate students:

(a) For **undergraduates**:

Component	Weight
In-class quizzes	10%
Lab tasks	10%
Lab assignments	30%
Midterm exam	15%
Final exam	25%
Project	10%
Total	**100%**

(b) For **graduates**:

Component	Weight
In-class quizzes	5%
Lab tasks	5%
Lab assignments	25%
Midterm exam	15%
Final exam	25%
Project	25%
Total	**100%**

Course Calendar (subject to change):

Day	Topic
Aug 21	Lecture 1: Course Overview & Introduction to GIS
Aug 24	Lab 1: Introduction to ArcGIS
Aug 28	Lecture 2: Coordinate Systems
Aug 31	Lecture 3: Map Projections
Sep 4	Labor Day (no class)

Sep 7	Lab 2: Map Projections in ArcGIS
Sep 11	Lecture 4: Maps and Digitizing
Sep 14	Lecture 5: Data Models in GIS
Sep 18	Lab 3: Digitizing with ArcGIS
Sep 21	Lecture 6: Geographic Database and Tables
Sep 25	Lecture 7: Geographic Database and Tables (continued)
Sep 28	Lab 4: Table Operations (Import, Query, and Join)
Oct 2	Lecture 8: Digital Data Sources (**project proposal due**)
Oct 5	Fall Holiday (no class)
Oct 9	**Midterm Exam**
Oct 12	Lecture 9: Vector Analysis
Oct 16	Lecture 10: Vector Analysis (continued)
Oct 19	Lab 5: Vector Analysis Practices with ArcGIS
Oct 23	Lecture 11: Raster Analysis
Oct 26	Lecture 12: Raster Analysis (continued)
Oct 30	Lab 6: Raster Analysis Practices with ArcGIS
Nov 2	Lecture 12: Terrain Analysis
Nov 6	Lab 7: Terrain Analysis in ArcGIS
Nov 9	Lecture 13: Case Study I
Nov 13	Lecture 14: Case Study II
Nov 16	**Final Project Presentations**
Nov 20	**Final Project Presentations (continued)**
Nov 23	Thanksgiving (no class)
Nov 27	Course Reviews and Q&A
Nov 30	Dead Days (no class)
Dec 4	**Final Exam**