GEOG 4047: Geographic Information Systems (Online)
Syllabus for Spring 2021

Instructor: Dr. Fahui Wang
Contact: Office phone 225-578-6629, E-mail fwang@lsu.edu

Lectures: Not scheduled. Notes in PPTs posted for you to study on your own pace.
Labs: TA available for Q/A on Thursday 10:30 am -11:50 am, online
(If desirable, a demo will be arranged for a project)

Teaching Assistant: Mr. Cehong Luo (cluo6@lsu.edu)

COURSE OBJECTIVES (3 credit hours)
1. To understand basic GIS and spatial analysis concepts and process.
2. To utilize geographic information systems (GIS) for conducting spatial analysis.
3. To develop skills in the written communication of geographic information including maps.

This course is a required course for the GIS Concentration in Geography BA/BS, GIS Undergraduate Minor or GIS Graduate Certificate.

PHYSICAL OR LEARNING DISABILITIES
Any student with a documented disability needing academic adjustments is requested to speak with the Office of Disability Services and the instructor, as early in the semester as possible. All discussions will remain confidential. This publication/material is available in alternative formats upon request. Please contact the Office of Disability Services, 112 Johnston Hall, 225-578-5919. I look forward to talking with you soon to learn how I may be helpful in enhancing your academic success in this course.

EVALUATION
"Walk the walk". The only way to learn GIS is to practice, practice and practice. The course is projects-oriented, and concepts, themes and skills are built into each project.
1. *Six class projects*: designed to build your basic GIS and spatial analysis skills and help you understand the theories and methods discussed in class; all with detailed step-by-step instructions; accounting for 60% of your grade.
2. *Final exam*: online in Moodle; covering major GIS concepts and methods; accounting for 40% of your grade.

Policy:
- Late answers to projects will not be accepted.
- No make-up exams, nor exams in advance, may be arranged.

A final numerical score for the course is calculated as the weighted average of all components (six class projects, and final exam). Based on the final score, a final letter grade is assigned, according to a distribution curve. Based on my experience in the past, usually the top 35% gets A, the next 35% gets B, then 20% C, 10% D or F. The letter grades A, B, C, and D have the suffix plus (+) or minus (-) to distinguish higher and lower performances within each of the letter grades. The letter grade F does not include the +/- distinction.

SOFTWARE AND DATA

Follow the instructions via the link https://lsu.box.com/s/rh0cifchzizjpwnv7s3aef1zcjy0pcf1, and use your LSU account to sign into ArcGIS Pro **(Windows only)**, the software for all projects. Download the project data via the Box link: https://lsu.box.com/s/bihqysnfygmwdckw9bdddz6a2emgscwh.

PREREQUISITES: None.

TEXTBOOKS

- **Required**: Wang, F. 2015. *Quantitative Methods and Applications in GIS*. Boca Raton, FL: CRC Press. ISBN 978-1-4665-8472-3 (http://www.crcpress.com/product/isbn/9781466584723) A direct link to the free eBook is: http://libezp.lib.lsu.edu/login?url=http://www.crcnetbase.com/isbn/9781466584730
- **Reference**: Price, M. 2020. *Mastering ArcGIS Pro* (1st Ed.). New York: McGraw-Hill. (https://www.mheducation.com/highered/product/mastering-arcgis-pro-price/M9781260587333.html)

The first book covers most of the topics and will also be used in a more advanced class: GEOG 7945 (Socio-Economic Applications of GIS). The second book may be used as a reference for specific tools in ArcGIS Pro. For the purpose of completing the class projects, my instructions are detailed enough for you to follow without referencing the books. The books are useful for understanding the concepts and methods behind specific tools.

COURSE OUTLINES

1. Getting started with ArcGIS (data models, map projection, attribute join, working with tables, attribute queries & mapping) [Chapter 1]

Project 1. Mapping Population Density Pattern in Baton Rouge 2010 [Case study 1: Part 1]

2. Basic spatial analysis tools in ArcGIS (spatial queries, spatial join & map overlays) [Chapter 1]

Project 2. Analyzing Urban Density Pattern across Concentric Rings in Baton Rouge 2010 [Case study 1: Part 2]

3. Spatial smoothing and spatial interpolation [Chapter 3]

Project 3. Spatial Smoothing & Spatial Interpolation of Place Names in Guangxi, China [Case study 3A]

4. Geocoding, Geodatabase model and location analysis [Chapters 2&4]

Project 4. Estimating Trade Areas of Public Hospitals in Louisiana [Case studies 2 & 4B]

5. Spatial statistics: Measuring geographic distributions, nearest neighbor analysis & spatial association indexes [Chapter 8]

Project 5. Applications of Basic Spatial Statistics in Analysis of Demographic Distribution and Crime Patterns in Chicago [Case studies 8A&8C]

6. Spatial accessibility measures [Chapter 5]

Project 6. Measuring Spatial Accessibility to Primary Care Physicians in Chicago [Case study 5]

Final Exam (multiple-choice and short-essay questions): 3-5 PM Fri (Apr 30, 2021) on Moodle