Syllabus for GEOG653

Instructor

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Office Hours: Wednesdays (3:00pm-5:00pm)
(Additional office hours can be scheduled by appointment via email or phone.)

Teaching Assistant

Office Hours: TBA (Email to make appointment)

About the Course

Time:

- Lecture: 5:30 PM - 7:30 PM, Wednesdays
- Lab Section#1: 5:30 PM - 7:30 PM, Thursdays

Location:

- Class room for Lectures: Lefrak Hall 1158
- Lab: Lefrak Hall 1136
- Online – (URL to WebEx virtual room will be posted on ELMS before 5:30pm)

Description

This course is designed to help student develop a systematic and in-depth understanding of spatial analysis methods and learn practical skills in using GIS and spatial analysis to discover features of spatial distribution. The class covers the methods of spatial analysis including measuring aspects of geometric features and identifying spatial patterns of geospatial objects that are represented as point, line, network, areal/polygon data, and 3-D surfaces. Spatial statistics, geospatial processing, and modeling will be used for analyzing the data. In terms of the software used in this class, we will be primarily using ArcGIS Pro 2.1 which is a new platform that represents the trend in GIS field and expected to replace Desktop ArcGIS in a few years. We also use Desktop ArcGIS10.6. The material will be presented in lectures, lab assignments, exercises, readings, and final project.

Textbooks

No required textbooks. However, the following books are recommended for reading:

- Amy Collins and Michael Law, Getting to Know ArcGIS Pro, ISBN: 9781589484573, 2016
- Andy Mitchell, The ESRI Guide to GIS Analysis, Volume 2. ESRI Press, 2005. ISBN: 978-1-58948-116-9.

Assignments

There are totally eight (8) lab assignments to be completed. Each of these lab assignments will count 9% of the final grade. Lab reports are due by the date specified in the Course Schedule. Late submission of lab reports will result in a reduction of the grade for that assignment of 10 points (out of 100 in total) per day. However, in some rare situations (e.g. medical or family emergency), if you need extra time, you will have to contact the instructor before the due date so that the deadline may be extended.

There are also eleven (11) exercises that are optional and for your practice.

Final Project

Because this course is designed to be practical emphasizing on GIS analysis, a final project is considered a better option compared to a final exam. This will allow students spend more time focusing on how to use GIS as a tool in their study/research/work.

A written proposal of research (~2 pages) must be submitted in class by the date specified in the Course Schedule. The proposal should: (1) identify research problem; (2) provide background information; (3) list objectives; and (4) describe data and methods. Students are encouraged to contact the instructor early during the semester to discuss potential topics and scope. This proposal will be worth 5% of your final grade

The project must be carried out individually and independently. This project should be limited in scope and designed for completion during the semester. Students are required to report their research project in a poster format. The poster must be submitted by the deadline and it will account for 20% of your final grade.

Grading

The distributions of grade are:

Lab Assignments	=	72%
Final Project	=	25%
Quiz	=	2%
Discussion/Participation	=	1%

The plus/minus grading system will be used to assign student grades which will be determined as follows:

97-100 = A+
93-96.99 = A
90-92.99 = A-
87-89.99 = B+
83-86.99 = B
80-82.99 = B-
77-79.99 = C+
73-76.99 = C
70-72.99 = C-
67-69.99 = D+
63-66.99 = D
60-62.99 = D-
<60 = F

Minor adjustments to this scale might be made based on the performance of the class as a whole.

Course Schedule

Week	Date	Lecture Topics*	Readings	Assignments
1	Feb 28	Course Overview Introduction to Spatial Analysis Introduction to ArcGIS Pro Introduction to ArcGIS Online Demonstrations and Examples	Lecture Slides	Exercise 1,2,3
2	Mar 7	Fundamental Spatial Analysis – Spatial Query – Spatial Join – Overlay Operations – Buffering ModelBuilder	Mitchell 1-20 Collins & Law, Chap1,2	Lab 1 out Exercise 4
3	Mar 14	Point Pattern Analysis –Geometric Measurements –Quadrat Count Analysis –Kernel Density Analysis –Nearest Neighbor Analysis	Mitchell 21-50, 80-103, 135-145, 147-162 Collins & Law, Chap3,4	Lab 1 due Lab 2 out Exercise 5
4	Mar 21	**Spring Break**		
5	Mar 28	Line Data Analysis –Line Length –Line Density –Line Direction -Line Orientation	Mitchell 51-60 Collins & Law, Chap5	Lab 2 due Lab 3 out Exercise 6
6	Apr 4	Network Analysis –Routing –Service Area –Closest Facilities –O-D Cost Matrix –Location-Allocation Analysis	Lecture Slides Collins & Law, Chap6	Lab 3 due Lab 4 out Exercise 7
7	Apr 11	Areal Analysis –Spatial Autocorrelation –Joint Count	Mitchell 104-132, 163-180 Collins & Law, Chap7	Lab 4 due Lab 5 out Exercise 8
8	Apr 18	Surface Analysis –Spatial Interpolation –Distance Analysis –Density Analysis –Surface Analysis Operations Map Algebra	Lecture Slides Collins & Law, Chap8	Lab 5 due Lab 6 out Exercise 9

9	Apr 25	3D Analysis - Draping - Extrusion - Line-of-Sight - Viewshed - Skylines - Volumetric Analysis - Animation	Lecture Slides Collins & Law, Chap9	Lab 6 due Lab 7 out Exercise 10
10	May 2	3D in ArcGIS Pro CityEngine Other GIS software and tools - QGIS	Lecture Slides Collins & Law, Chap10	Lab 7 due Lab 8 out Exercise11
11	May 9	Getting to Know Business Analyst New Development in GIS Summary	Lecture Slides	Lab 8 due Final project proposal due
12	May 16	Final Project		Final project due on May 18

Note:

Besides lectures, there will be lab sessions which may cover a variety of topics depending on the interests and needs from students.

This is a tentative schedule and may be adjusted and updated to better suit our class.