SOSC 3240 APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEMS

Fall, 2023
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COURSE WEBSITE: http://canvas.ust.hk

LECTURE: Friday: 3:00-4:20 PM Room 4472 by Lift 25-26
LAB: Friday: 4:30-5:50 PM Room 4402 (Computer Barn A) by Lift 17-18
Office Hour: Wednesday: 1:30 -2:30 PM Room 2359 by Lift 3

COURSE DESCRIPTION
Geographic Information Systems (GIS) is a set of computer-based systems integrated for collecting, checking, storing, integrating, analyzing, and presenting spatial information.

Objectives:
1. the fundamental understanding and comprehensive knowledge of GIS basic concepts
2. a working knowledge of GIS technical issues
3. a practical training of using ArcMap 10.8.2 from ESRI and associated hardware
4. GIS applications to various fields such as marketing, planning, social and environmental studies.

Main Form: a lecture section + a lab tutorial section (Computer Barn A from the 1st class)

Evaluation: attendance & quizzes (10%), lab exercises & assignments (20%), exam (30%)
group project (40%) = presentation (20%) + discussion (5%) + report in PPT file (15%)

o PREREQUISITE: Basic computer and computing skills.

o QUIZZES: In-class exercises

o EXAM: The test will be close-notes with multiple choices and essay question

o ASSIGNMENTS & LABS: Lab tutorials and two assignments (each assignment due in two weeks).

o GROUP PROJECT: a spatial analysis of a real world problem and a group presentation for about 20 minutes.

o GIS projects can be both technical demanding and time consuming. Peer Evaluation may be conducted.

TENTATIVE COURSE SCHEDULE

Week 1 (Sep 1)
Course Introduction
Lab: Tutorial Introduction (in Computer Barn A)
- Introduction to lab section
- Examples of past students’ GIS projects

Week 1 (Sep 8)
Lecture: Introduction to GIS and Social Analysis
- What is GIS? Why use a GIS? Who uses a GIS?
- Applications of GIS to Social Science and other fields
Lab: Introduction to ArcGIS Pro
- Introduction to ArcCatalog/ArcMap/ArcTools
- Creating your first map

Week 2 (Sep 15)
Lecture: GIS basics
- GIS, computer systems, and information systems
Lab: Basic functions of ArcGIS Desktop
- Introduction to ArcCatalog/ArcMap, ArcTools
- Data input, storage output in ArcView GIS
- Navigating layers and tables in ArcView GIS
- Data selection and querying for social analysis

Week 3 (Sep 22)
Lecture: GIS data and data presentation
- Spatial information, spatial data, data models, and maps
- GIS coordinate and projection systems
- GIS Data input and output
Lab: Data displaying
- Symbolizing data
- Labeling features
- Mapping using ArcMap (layers and layouts)

i. Project Grouping

Week 4 (Sep 29)
Lecture: GIS Data Structures I
- Basic data structures and algorithms in GIS (raster data and vector data)

Lab: Data operations in ArcMap
- Creating new data in ArcMap
- Editing spatial data and social data using ArcMap
- Joining and relating tables of socio-demographic attributes

Week 5 (Oct 6)
Lecture: Feature relationship and topology
Lab: Georeferencing
- Georeferencing with XY data
- Adding background by using GoogleEarth map

ii. Project Topic Discussion

Week 6 (Oct 13)
Lecture: GIS Applications (Case studies)
- Resource planning and management - Case 1: Conservation studies.
- Marketing and network planning - Case 2: Precise marketing.
- Social Science - Case 3: Clinton-Gore election

Lab: Analyzing feature relationship using ArcMap
- Union and intersect
- Merge and dissolve
- Buffering data
- Spatial join

iii. Project Proposal Submission

Week 7 (Oct 20)
Project Progress discussion with instructors
Lab: Analyzing Spatial Data using ArcGIS
- Spatial Analysis in social science and other fields

iv. Project Topic Improving and Finalizing

Week 8-10 (Oct 27 & Nov 3, 10)
Project Progress discussion with instructors
Lab: Project data collection, input, and analysis

v. Project Processing

Week 11-12 (Nov 17, 24)
PowerPoint Presentation of Project Report (to be announced)

ESSENTIAL LEARNING MATERIALS
We will not use a required textbook for this course, but instead use material we created or available on Canvas:
1. Lecture notes and Lab tutorials
2. ESRI. 2012. What is GIS. ESRI.
4. ESRI. Getting to Know ArcGIS. Getting Started with ArcGIS, Chapter 1.

USEFUL Spatial Data WEBSITES: