SOSC 3240 APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEMS

Fall, 2022

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COURSE WEBSITE:	http:/canvas.ust.hk		
LECTURE:	Tuesday: 12:00-1:20 PM	G002, CYT Bldg	
LAB:	Tuesday: 1:30-2:50 PM	Room 4402 (Computer Barn A)	by Lift 17-18
Office Hour:	Friday: 3:00 -4:00 PM	Room 3005	by Lift 4

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%)

- PREREQUISITE: Basic computer and computing skills.
- QUIZZES: In-class exercises
- EXAM: The test will be close-notes with multiple choices and essay question
- ASSIGNMENTS & LABS: Lab tutorials and two assignments (each assignment due in two weeks).
- GROUP PROJECT: a spatial analysis of a real world problem and a group presentation for about 20 minutes.
- GIS projects can be both technical demanding and time consuming. Peer Evaluation may be conducted.

TENTATIVE COURSE SCHEDULE

Week 1 (Sep 6)

Course Introduction

Lab: Tutorial Introduction

- Introduction to lab section (Computer Barn A)
- Create your first ArcGIS Map

Week 2 (Sep 13)

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 and 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 20)

Lecture: GIS basics

- GIS, computer systems, and information systems

Lab: Data displaying

- Symbolizing data
- Labeling features
- Mapping using ArcMap (layers and layouts)

Week 4 (Sep 27)

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 operations in ArcMap

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

i. Project Grouping

Week 6 (Oct 11)

Lecture: GIS Data Structures I

- Basic data structures and algorithms in GIS (raster data and vector data)

Lab: Georeferencing

- Georeferencing with XY data
- Adding background by using GoogleEarth map

Week 7 (Oct 18)

Lecture: Feature relationship and topology

Lab: Analyzing feature relationship using ArcMap

- Union and intersect
- Merge and dissolve
- Buffering data
- Spatial join

ii. Project Proposal Submission

Week 8 (Oct 25)

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 Spatial Data using ArcGIS

- Spatial Analysis in social science and other fields

iii. Project Topic Discussion

Week 9-11 (Nov 1, 8, 15)

Project Progress discussion with instructors

Lab: Project data collection, input, and analysis

iv. Project Topic Finalizing and Project Processing

Week 12-13 (Nov 22, 29)

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.
3. ESRI. 2018. Introducing GIS. *Getting to Know ArcGIS Desktop, Chapter 1, Fifth Edition*.
4. ESRI. Getting to Know ArcGIS. *Getting Started with ArcGIS, Chapter 1*.

USEFUL Spatial Data WEBSITES:

http://hub.arcgis.com/pages/open-data https://earthexplorer.usgs.gov/
http://sedac.ciesin.columbia.edu/ https://opentopography.org/ http://www.diva-gis.org/