

SOSC 3240 APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEMS

Fall, 2014-2015

Instructor: Prof. John Ma (Office: 3381 Email: sojohnma@ust.hk Phone: 2358 7829)

Assistant Instructor: Ying Deng (Office: 3001 Email: daphneddy@ust.hk Phone: 2358 6020)

COURSE WEBSITE: <http://lmes2.ust.hk/portal>

LECTURE: Room 2463 by Lift 25-26

LAB: Room 3001 by Lift 4

Computer Barn A (ArcGIS 10.0) by Lift 17-18

Office Hour: Tuesday Room 3001 3-4PM 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 ArcGIS 10.2 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.

Evaluation: attendance & quiz (10%), lab exercises (10%), assignments (20%), mid-term test (20%), group project: 1. presentation (20%) 2. discussion (5%) 3. report in PPT file (15%)

PREREQUISITE: basic computer skills.

Week 1 (9/2)

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 ArcView GIS

- Introduction to ArcGIS/ArcView GIS
- Create your first ArcView Map

Week 3 (9/16)

Lecture: GIS basics

- GIS, computer systems, and information systems

Lab: Basic functions of ArcView

- Data input, storage output in ArcView GIS
- Navigating layers and tables in ArcView GIS
- Data selection and querying for social analysis

Week 4 (9/23)

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 ArcView GIS (layers and layouts)

Week 5(9/30)

Lecture: GIS Data Structures I

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

Lab: Data operations in ArcView GIS

- Creating new data in ArcView

- Editing spatial data and social data using ArcView
- Joining and relating tables of socio-demographic attributes

Week 6 (10/7)

Lecture: Feature relationship and topology

Lab: Analyzing feature relationship using ArcView GIS

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

Week 7 (10/14)

GIS Applications (Case studies)

- Resource planning and management.
 - Case 1: Conservation studies.
- Marketing and network planning.
 - Case 2: Precise marketing.
- Project discussion

Lab: Analyzing Spatial Data using ArcView 10.1

- Spatial Analysis in social science and other fields

Week 8 (10/21)

Mid-term test

Week 9 (10/28)

Field trip to CUHK

Week 10 to 13 (11/4-11/25)

Project group discussion with instructors

Lab: Project data collection, input, and analysis

Quiz: in-class PRS exercises with multiple choices

Test: the mid-term test will be in-class close-notes with multiple choices.

ASSIGNMENTS AND LABS: two assignments, each due in two weeks.

Group Project: spatial analysis of a real world problem with a power point presentation (15 minutes).

ESSENTIAL LEARNING MATERIALS

1. ESRI. 2012. *What is GIS*. ESRI.
2. ESRI. 2013. *Getting to Know ArcGIS Desktop, Third Edition*. ESRI.
3. Paul Longley, Michael Goodchild, David Maguire and David Rhind, 2005, *Geographic Information Systems and Science, 2nd edition*, John Wiley & Sons, Ltd. ISBNs: 0-470-87000-1 (HB); 0-470-87001-X (PB)

REFERENCES

1. Stillwell, J. and Clarke, G. 2004. *Applied GIS and Spatial Analysis*. John Wiley & Sons: Chichester, UK.
2. Walker, Joan and Li, Jieping. 2007. *Latent Lifestyle Preferences and Household Location Decisions*. Journal of Geographical Systems, Vol 9, No.1, pp. 77-101. Springer Berlin / Heidelberg.
3. ESRI, Jul 2011, *Understanding GIS: An ArcGIS Project Workbook*, ESRI
4. Dangermond, Jack & Goodchild, Michael F., Apr 2013, *Introducing Geographic Information Systems With Arcgis: A Workbook Approach to Learning GIS*, John Wiley & Sons Inc

USEFUL WEBSITES:

1. <http://www.esri.com/>
2. <http://www.gislounge.com/>
3. <http://www.geocomm.com/>
4. <http://www.diva-gis.org/>