

## GEOG2147 Building Smart Cities with GIS #

# Fulfill requirements of method-related courses

**TIMETABLE ARRANGEMENT:** Annual; 1st Semester

**CREDITS:** 6

**COURSE TEACHER(S):** Mr. Kelvin SHUM (Co-ordinator), Dr. Winnie TANG

### ASSESSMENT:

#### COURSEWORK 100 %

- GIS Lab Work
- Individual Paper
- In-class Participation
- In-class Quiz
- Group Project

### OBJECTIVES:

The aim of this course is to provide an awareness of the importance of GIS to building Smart Cities and the ways in which the technology can be integrated with other ICT in order to support different aspects in urban development. It will present Smart City concepts and applications and also cover the operation skills needed to use GIS software and geospatial cloud technology to build web-based GIS applications.

### COURSE SYNOPSIS:

Transforming into a Smart City is a hot topic in Hong Kong and around the world. The concept of a Smart City is based on the application of Information and Communications Technology (ICT) across various aspects of the city to connect and integrate its systems and services for better synergy and efficient use of resources. There is no doubt that the data and systems that support Smart City development are location-based, a process which must be managed and applied by using Geographic Information System (GIS). This course provides an introduction to Smart Cities and how various GIS applications are being used and integrated in Smart Cities to support urban planning, city monitoring and citizen engagement. It also explores the relationships between GIS and other technologies such as 3D, Artificial Intelligence (AI), Big Data and Internet of Things (IoT) under various Smart City aspects. Throughout the course, students will learn the Hong Kong Smart City Blueprint and how to operate GIS software, gain hands-on experience in processing geospatial open data, and work with a commercial geospatial cloud package to build web and mobile GIS applications that facilitate Hong Kong's transformation into a Smart City.

### LECTURE TOPICS:

- Introduction to Smart City and its Components
- Enabling technologies for Smart City
- GeoSpatial Open Data and Common Spatial Data Infrastructure
- Using 3D GIS in Smart City Planning and Development
- Using Web GIS and GeoSpatial Cloud in Smart City Applications Delivery
- Using Mobile GIS in Smart City Data Collection and Public Engagement
- Handling Real-Time GeoSpatial Data for Smart City Parameters Monitoring
- Applying Spatial Analytics to Solve Spatial Problems and Predictive Analysis in Smart City Planning

### RECOMMENDED READING LIST:

- Hong Kong Smart City Blueprint. HKSAR Government, 2017, The Smart City for Hong Kong, [www.smartcity.gov.hk/](http://www.smartcity.gov.hk/).
- Kumar, TM Vinod. Geographic Information System for Smart Cities. Copal Publishing Group, 2014.
- Tang, Winnie. Smart City 3.0. 1st ed., Smart City Consortium, 2017, Smart City 3.0, <http://arcg.is/2jw4uOM>
- Harder, Christian. The ArcGIS Book. Edited by Clint Brown, 2nd ed., Esri Press, 2017, The ArcGIS Book, <http://learn.arcgis.com/en/arcgis-book-series/>.
- Fu, Pinde. Getting to Know Web GIS. 3rd ed., Esri Press, 2018

	Course Learning Outcomes (CLOs) After completing this course, students would be able to:	Alignment with Programme Learning Outcomes (PLOs)*						Course Assessment Methods
		1	2	3	4	5	6	
1	define and understand the concepts of Smart Cities and recognize Smart City development directions of Hong Kong	✓					✓	GIS lab work, individual paper, in-class participation, in-class quiz & group project
2	know the relationships and importance of using GIS in Smart Cities		✓		✓			GIS lab work, individual paper, in-class participation, in-class quiz & group project
3	use GIS to build applications for the development of Smart Cities			✓		✓	✓	GIS lab work, individual paper, in-class participation, in-class quiz & group project
4	acquire GIS software operation skills						✓	GIS lab work, individual paper, in-class participation, in-class quiz & group project
5	process GeoSpatial Open Data						✓	GIS lab work, individual paper, in-class participation, in-class quiz & group project
6	build GIS applications using GeoSpatial Cloud technology						✓	GIS lab work, individual paper, in-class participation, in-class quiz & group project

### **\*Geography Major Programme Learning Outcomes (PLOs)**

In order to meet the demands and challenges in this dynamic and ever-changing world, the Department has designed a series of well-structured and contemporary courses to cater to the different interests of students. Its courses are designed to align with the University's educational aims which hope to nurture future generations not only with a critical and intellectual mindset, but also with a passion to contribute to society in general.

After completing the programme, Geography Major students should be able to:

**PLO1** critically analyse the geographical aspects of the relationship between people and the natural environment;

**PLO2** demonstrate and develop an understanding of how these relationships have changed with space and over time;

**PLO3** identify, collect and utilize primary and secondary data to investigate and analyse the issues and problems facing people, places and society;

**PLO4** integrate, evaluate and communicate information from a variety of geographical and other sources;

**PLO5** participate in promoting social, economic and environmental sustainability at the local, regional and global scales; and

**PLO6** effectively apply a range of transferable skills in academic, professional and social settings.