香港中文大學太空與地球信息科學研究所
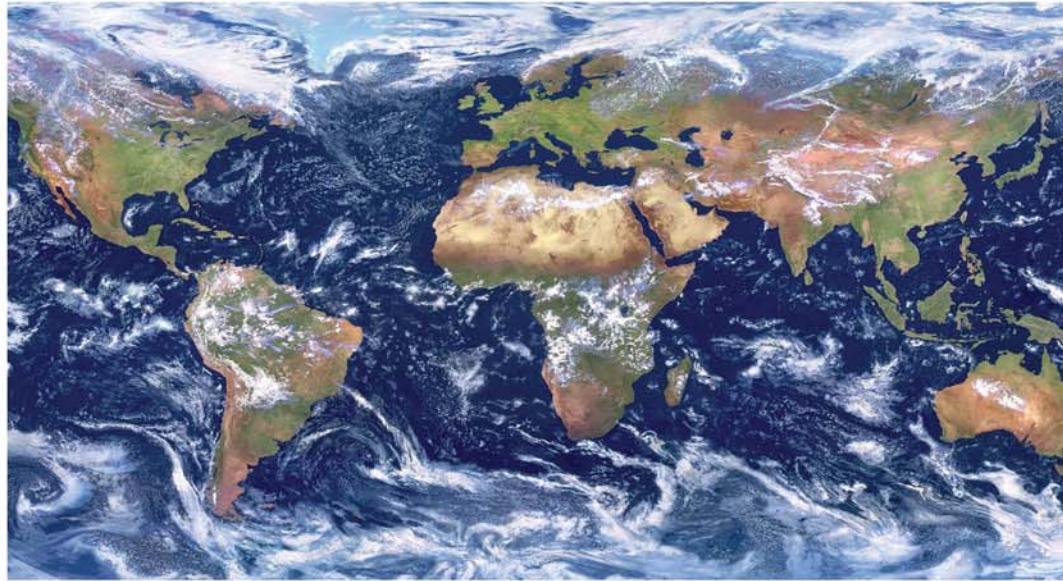INSTITUTE OF SPACE & EARTH INFORMATION SCIENCE CUHK

地理國情監測與公共政策理學碩士

Master of Science in National Geo-survey and Public Policy

Introduction

National Geo-Survey has become very critical for national, provincial and city governments, especially for public policy studies and public management. Many countries have formed the national agencies for geo-survey, such as US Geological Survey in USA. Chinese government has allocated ¥17 billion to start the national geo-survey programme in 2013. Governmental units at every level are demanding new graduates and professionals with an advanced background in National Geo-Survey for precise public management.

To meet this growing demand, Institute of Space and Earth Information Science, The Chinese University of Hong Kong, as a leading institute in the field of GeoInformation Science and Earth System Science in Hong Kong, offers the first and unique Master of Science programme in National Geo-survey and Public Policy in the territory.

Objectives

1. Students get an appreciation of geo-information on national conditions,
2. Be knowledgeable in national geo-survey and geo-analysis methods,
3. Be better prepared for public policy studies and precise public management.

Expected Learning Outcomes

Upon completion of the course, students should demonstrate an understanding of:

1. Basic knowledge on national geo-survey and geo-analysis methods,
2. Techniques for geoinformation collection and analysis for public policy studies.

VGE Laboratory

Fok Ying Tung Remote Sensing Science Building

Chen Shupeng Geoinformation Science Book Gallery

Students can study in either one year full-time or two years part-time programme.

The full-time programme provides a platform for experienced professionals or fresh graduates from universities to pursue an intensive course of study. It is expected to attract non-local students coming from Mainland China, Southeastern Asia and other parts of the world.

The part-time programme provides a flexible mode of study for local civil servants and commercial and academic professionals to pursue this degree.

Students, upon successful completion of this program, should be able to:

1. Select a proper method for related data collection of geo-survey,
2. Present and interpret the results of geo-survey with a proper geo-analysis method,
3. Participate in the planning work on early warning and crisis management, and
4. Analyze the public policies with geo-spatial modeling and geo-analysis methods.

Teaching Staff

Prof. ANG Put O, Jr

Ph.D. (University of British Columbia, Canada)
School of Life Sciences
The Chinese University of Hong Kong

Dr. PANG Yick Cheung Matthew

Ph.D. (The Hong Kong Polytechnic University, Hong Kong)
Institute of Space and Earth Information Science
The Chinese University of Hong Kong

Prof. CHEN Yongqin David

Ph.D. (University of Georgia, USA)
Department of Geography & Resource Management
The Chinese University of Hong Kong

Prof. TANG Guoan

Ph.D. (Ph.D., Salzburg University, Austria)
School of Geography Science
Nanjing Normal University

Prof. CHU Lee Man

Ph.D. (University of Liverpool, UK)
School of Life Sciences
The Chinese University of Hong Kong

Prof. WONG Chong Kim

Ph.D. (University of Toronto, Canada)
School of Life Sciences
The Chinese University of Hong Kong

Dr. HUANG Zhen

Ph.D. (The Chinese University of Hong Kong, HK)
Institute of Space and Earth Information Science
The Chinese University of Hong Kong

Prof. WU Renguang

Ph.D. (University of Hawaii, USA)
Institute of Space and Earth Information Science
The Chinese University of Hong Kong

Dr. LI Rongrong

Ph.D. (The Chinese University of Hong Kong, HK)
Institute of Space and Earth Information Science
The Chinese University of Hong Kong

Prof. YIM Hung Lam Steve

Ph.D. (The Hong Kong University of Science and Technology, Hong Kong)
Department of Geography & Resource Management
The Chinese University of Hong Kong

Prof. LIN Hui

Ph.D. (State University of New York at Buffalo, USA)
Institute of Space and Earth Information Science
The Chinese University of Hong Kong

Prof. YIM Wai Shu Wyss

Ph.D. (Unversity of Tasmania, Australia)
Department of Earth Sciences
The University of Hong Kong

Prof. PAN Jiayi

Ph.D. (Chinese Academy of Sciences, China)
Institute of Space and Earth Information Science
The Chinese University of Hong Kong

Dr. ZHANG Hongsheng

Ph.D. (The Chinese University of Hong Kong, Hong Kong)
Institute of Space and Earth Information Science
The Chinese University of Hong Kong

Who should Apply?

- Anyone working in the national geo-survey and geo-analysis for the precise natural resource management and environmental assessment, integrated development planning and public policy making, government agencies, and private sectors in China (including Hong Kong SAR) and other developing countries, and ASEAN countries in particular.
- Professionals who use information related to population and economic census, agriculture productivity, public services, education, environmental issues and public health, crime analysis, technological spillover, etc..
- University professionals and high school teachers who want to acquire an interdisciplinary and integrated understanding of national geo-survey and geo-analysis to better educate the next generation governmental functionary and professionals.

Programme Structure

- The full-time MSc programme will cover one year with three semesters.
- The part-time MSc programme will cover two years with two semesters in each year and one summer semester in the second year.

Required Courses

Course Code	Course Title	Description	Units
ESGS 5002	Special Topics in GeoInformation Science	This course discusses the principles, structures and applications of geographic information systems. It emphasizes on the use of GIS in organizing and managing spatial data, and how to perform spatial analysis with GIS. Topics include hardware/software components, raster and vector data structures, spatial database, spatial analysis and application issues.	3
ESGS 5011	Introduction to National Geo-survey and Public Policy	This course introduces the framework and major methods of national geo-survey, including the information collection, management and analysis methods and their applications in natural resources management, environmental monitoring, socio-economic development and planning, emergency responses, national defense and public safety.	3
ESGS 5015	Spatial Analysis for Public Policy	This course provides an introduction to a wide selection of spatial analytics and their applications in different aspects of public policy. The course has two major aims. On the technical front, this course aims to teach students fundamental concepts and recent progress of spatial analysis. On the substantive front, this course integrate the introduction to spatial analytics with their applications in public policies, ranging from mapping the inequality among economic and health outcomes, to land use choices, and innovative census from remote sensing and locational based service.	3
ESGS 5016	Urban Networks	This course introduces the applications of network analysis in understanding social affairs. Facilitated the development of telecommunication and transportation technologies, a city is increasingly organized as connections between and within it. Such connections can take various forms – social, economic, political, and environmental. Therefore this course look at how network analysis can be used to address a number of urban issues, such as how could we define community in an era of human mobility? How do streets layout affect local economy? And what mechanism gives rise to the megacity region such as the Pearl River Delta?	3
ESGS 5017	Geoinformation Technologies for Risk and Crises Management	This course is to inform, explain, analyze, interpret and communicate the role of Geoinformation technologies in EW and CM situations (tsunamis, earthquakes, fires, landslides, anthropogenic disasters) and improvement of their use in adequate operations with aim to show their till now under-evaluated potentials and way how to integrate knowledge of cartographic, geographic, and ITC community to EW and CM into wide decision making process.	3
ESGS 5018	Environmental Remote Sensing Technology	The course helps students to understand remote sensing principles and basic skills in remote sensing image processing and analysis. The students will develop the capability to solve practical problems in the Earth System Science by using remote sensing methods. The theory, methods, and applications of environmental remote sensing are taught in the course. The lectures cover the principles of electromagnetic radiation, satellite observation sensors, digital image processing, Earth target classifications, and the remote sensing applications in land and ocean. ERDAS Imagine software will be used for lab practices.	3
ESGS 6061	Project in National Geo-survey and Public Policy	Each student is required to carry out an independent research project under the supervision of a teacher.	4

Elective Courses

Course Code	Course Title	Description	Units
ESGS 4005	Understanding Our Biosphere	The course introduces students to basic concepts in the physical environment of the biosphere, biodiversity, conservation and ecological restoration. Topics include: Organic production and nutrient cycling within the biosphere, oceanic currents and the global conveyer belts, physical and biological interactions; global and historical patterns of biodiversity, ecological factors controlling biodiversity, measurement and maintenance of biodiversity, habitat conservation and protected areas, as well as ecosystem degradation and restoration. *(For those who have taken BIOL2210 or have degree in Biology or Environmental Science should select another elective course.)	3
ESGS 5001	Earth System Science	This course introduces the concept of the Earth System Science - the study of the Earth as a system consisting of many inter-related and interacting components. The topics of lectures include individual components of the Earth System and their respective roles in the changing system. The emphasis is on interactions among different components of the system-atmosphere, hydrosphere, cryosphere, lithosphere, biosphere, and anthrosphere.	3
ESGS 5003	Transportation Applications of GIS	This course provides an overview and hands-on experience in the design, use, and interpretation of Geographic Information Systems for Transportation. Topics covered include transportation layers, transportation related referencing systems, data structures, network structures, urban transportation planning models and other spatial models. At the end of the course, students will have a sound working knowledge of transportation GIS and an ability to work directly with real-life problems.	3
ESGS 5004	Earth's Lithosphere	This course provides an introduction to the Earth's Lithosphere. The course will mainly introduce the concept of geological time, the building blocks of the solid Earth (i.e., minerals and rocks), plate tectonics, the relationship of the interior of the planet to the lithosphere, and some important processes within the crust of Earth.	3
ESGS 5006	Principles of Hydrology	Water is a major formative factor and driving force of the physical and biological environment. Water also provides a critical link between biophysical environment and the society. This course introduces the hydrologic concepts, principles, and techniques that are necessary for understanding the occurrence, distribution, and circulation of water that pervades, links, and drives various components and processes of the Earth System. Emphasis will be placed on the various components in the land phase of the hydrologic cycle, including precipitation, evaporation and transpiration, infiltration and soil physics, and surface and subsurface flow to streams. Special topics on hydrologic modeling and impact studies will also be addressed. *(For those who have taken GRMD3221 should select another elective course.)	3
ESGS 5007	Microwave Remote Sensing	This course describes microwave remote sensing and its applications. Starting from the physics of Electro-Magnetic waves, their propagation and interaction with matter, the principles of their use in remote sensing are introduced. Passive and active systems as well as airborne and spaceborne sensors are analyzed, giving a review of past and present remote sensing missions. Imaging radars and Synthetic Aperture Radars (SAR) are described as well together with more advanced topics as Interferometry, Polarimetry and Tomography. Applications range from atmosphere sounding (clouds, precipitations, water vapor), ocean studies (temperature surface, wind speed and direction, tropical cyclones, oil spill detection), land analysis (snow cover, soil moisture, terrain classification, change detection), surface deformation monitoring (earthquakes, landslides, subsidences).	3

Elective Courses

Course Code	Course Title	Description	Units
ESGS 5008	Geodetic Science and Global Reference System	This course describes a broad principles and applications of Geodetic Science, Global Navigation Satellite System (GNSS) and Reference System in Earth System Science. Geodetic Science - as a science that determines the shape, dimension and precise co-ordinates on the Earth, is the foundation of co-ordinate reference systems associating with any kind of scientific data and observations in Earth System Sciences (e.g. GIS / GPS data, satellite images, ground observations and field data) The course will cover essential concepts of Geodetic Science including definition of the Earth's shape, datum, international geodetic reference systems, co-ordinate transformations and GPS survey methods.	3
ESGS 5010	Terrain Analysis and Digital Terrain Modelling	Digital terrain modelling is important component of modern geo-spatial information technology. Natural terrain surface can be modelled using digital terrain models to form digital data sets that can further be used for terrain parameter derivation and feature interpretation, This subject aims to introduce students the basic concept of digital terrain modelling and analysis. Methods and techniques will be introduced for digital representation of 3-dimensional terrain surface and data structure of digital terrain data. The analytical tools and methods will also be introduced to derive terrain parameters and to extract geomorphic or terrain features from the terrain data. Applications of digital terrain modelling to hydrology soil, ecology and environment will also be discussed.	3
ESGS 5012	Introduction to Earth Environmental Simulations	The course introduces the basic knowledge of earth environmental model simulations. Numerical models serve as important tools for earth environmental research and operations. While the topic of earth environmental modelling is broad, this course will focus on the fundamental concepts of numerical modelling, such as temporal and spatial discretizations, parameterizations, model uncertainty and evaluation. Various components of coupled climate and earth system model will be introduced, including atmospheric general circulation model, regional climate model, weather prediction and land surface model, oceanic general circulation model, air quality model, and integrated assessment model. In addition, this course will discuss numerical model design, application and testing. Practical exercises are also provided for students to gain technical skills in modelling.	3
ESGS 5013	Physical Oceanography	This course describes physical properties (temperature, salinity, and density) and motions (current, waves, and tide) of ocean waters, and explains dynamic mechanisms of seawater movement. Air-sea interactions including energy and momentum exchanges are introduced, as well as the ocean's role on climate.	3
ESGS 5014	Atmospheric Science	This course introduces observations and principals of the Earth's atmosphere. The topics covered include atmospheric composition and structure, atmospheric thermodynamics, radiative transfer in the atmosphere, aerosol and cloud microphysics, atmospheric dynamics, mid-latitude and tropical weather systems, atmospheric general circulations, climate variability and change. The principles for numerical weather predictions will be introduced.	3
ESGS 5060	Seminars in GeoInformation Science	Earth system science is a study of the Earth as an integrated system with its major components of atmosphere, hydrosphere, lithosphere and biosphere. This seminar course is an open forum which aims at making students acquire up-to-date knowledge and techniques of the Earth system and Geoscience. Well-known scholars, professional, researchers and officials from local institutions and from overseas will be invited to present their latest research and timely topics relevant to Earth System Science.	1.5 x 2

Guaduation Requirement

1. **Coursework Requirement**
   a) **For Full-time Students:**
   Students are required to complete 28 units for graduation including 6 required courses, 2 elective courses and project in one year.

   Required courses:
   ESGS5002, ESGS5011, ESGS5015, ESGS5016, ESGS5017, ESGS5018   9 units

   Elective courses:
   Any two courses to be chosen from the following:
   ESGS4005*, ESGS5001, ESGS5003, ESGS5004, ESGS5006^, ESGS5007,
   ESGS5008, ESGS5010, ESGS5012, ESGS5013, ESGS5014, ESGS5060   6 units

   * For those who have taken BIOL2210 or have degree in Biology or Environmental Science should select another elective course.
   ^ For those who have taken GRMD3221 should select another elective course.

   Project in National Geo-survey and Public Policy:
   ESGS6061   4 units

   b) **For Part-time Students:**
   Students need to complete 28 units for graduation including 6 required courses, 2 elective courses and a final year project in the second year within two years.

2. **GPA Requirement**
   Minimum Cumulative GPA of 2.0
   A student who obtains a cumulative grade point average (GPA) below 2.0 in the preceding term or receives a failure grade in thesis monitoring course (for Research Postgraduate Programmes) will be put on academic probation. For details, please refer to Clause 14.0 "Unsatisfactory Performance and Discontinuation of Studies" of the General Regulations Governing Postgraduate Studies which can be accessed from the Graduate School Homepage:
   http://www.cuhk.edu.hk/gss

Qualification for Admission

1. Applicants shall have graduated from a recognised university and obtained a Bachelor's degree. (Those who expect to obtain a Bachelor's degree in the current academic year may also apply for admission)
2. All students should fulfil the English Language Proficiency Requirement prescribed below before they are admitted:
   a. Possess a pass grade in English in one of the following examinations:
      - Hong Kong Advanced Level Examination (AS Level);
      - Hong Kong Higher Level Examination;
      - CUHK Matriculation Examination; or
   b. Have a degree from a university in Hong Kong or an English speaking country; or
   c. Submit one of the following scores for assessment by the programmes concerned:
      - TOEFL;
      - GMAT (Verbal);
      - College English Test (CET) of PRC;
      - Public English Test System (PETS-5) of PRC;
      - IELTS (Academic); or
   d. Have obtained a recognized professional qualification awarded in Hong Kong or an English speaking country.

Application Procedures

1. Application form can be obtainable:
   a. by email request (email your postal address to iseis@cuhk.edu.hk)
   b. in person at Fok Ying Tung Remote Sensing Science Building, The Chinese University of Hong Kong, Shatin, Hong Kong.
   c. in person at General Office of Graduate School, The Chinese University of Hong Kong, Shatin, Hong Kong.
2. Online application at the homepage of the Graduate School (http://www.cuhk.edu.hk/gss)

Application Period

For admission of 2015 - 2016:

1 November 2014 - 30 April 2015

Fees

For admission of 2015 - 2016:

Please refer to the official webiste of Master of Science in National Geo-survey and Public Policy for detailed information. Tuition fee will be collected in two installments per year.

Official Webiste of Master of Science in National Geo-survey and Public Policy:

http://www.iseis.cuhk.edu.hk/msc_ngpp

Enquiries

Graduate Division of Earth System and GeoInformation Science
Institute of Space and Earth Information Science,
Fok Ying Tung Remote Sensing Science Building,
The Chinese University of Hong Kong,
Shatin, New Territories, Hong Kong

Tel: (852) 3943 4082
Fax: (852) 2603 7470
Email: esgs@cuhk.edu.hk
Website: http://www.iseis.cuhk.edu.hk/msc_ngpp