Master of Science in Geo-survey and Public Management

Graduate Division of Earth System and Geoinformation Science
The Chinese University of Hong Kong
About the Programme

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 geo-survey programme in 2013. Governmental units at every level are demanding new graduates and professionals with an advanced background in 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 Geo-survey and Public Management in the territory.

Objectives

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

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.

Upon successful completion of this program, Students 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.
Anyone working in the 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.

Who should apply?

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

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Units</th>
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<tbody>
<tr>
<td>ESGS 5002</td>
<td>Special topics in Geoinformation Science</td>
<td>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.</td>
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<tr>
<td>ESGS 5011</td>
<td>Introduction to Geo-survey and Public Management</td>
<td>This course provides an overview and hands-on experience in the surveying, mapping, use, and interpretation of geo-survey for supporting the public management, which greatly depend on public policy analysis. Although the study of public management and public policy addresses two subjects that are often treated separately academically, but which in practice are closely inter-related. The course topics covered the both sides: the principles, techniques and methodologies of geo-survey, as well as the foundations of public management which has crucial relationship with policy-making. At the end of the course, students will have a comprehensive knowledge of national geo-survey for supporting the public policy analysis and evaluation, hence the rational and efficient public management.</td>
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<tr>
<td>ESGS 5015</td>
<td>Spatial Analysis for Public Management</td>
<td>This course provides an introduction to a wide selection of spatial analytics and their applications in different aspects of public management. The course has two major aims. On the technical front, this course aims to teach fundamental concepts and recent progress of spatial analysis. On the substantive front, this course integrates the introduction to spatial analytics with their applications in public policies and management, ranging from mapping the inequality among economic and health outcomes, to land use choices, and innovative census from remote sensing and locational based service.</td>
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<tr>
<td>ESGS 5016</td>
<td>Urban Networks</td>
<td>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 looks 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?</td>
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<tr>
<td>ESGS 5017</td>
<td>Geoinformation Technologies for Risk and Crimes Management</td>
<td>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.</td>
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<td>ESGS 5018</td>
<td>Environmental Remote Sensing Technology</td>
<td>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.</td>
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<tr>
<td>ESGS 6061</td>
<td>Project in Geo-survey and Public Management</td>
<td>Each student is required to carry out an independent research project under the supervision of a teacher.</td>
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### Elective Courses

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<tr>
<td>ESGS 5001</td>
<td>Earth System Science</td>
<td>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.</td>
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<tr>
<td>ESGS 5003</td>
<td>Transportation Applications of GIS</td>
<td>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.</td>
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<td>ESGS 5006</td>
<td>Principles of Hydrology</td>
<td>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. <em>If those who have taken GRMD4202 should select one of the elective courses for replacement</em></td>
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<tr>
<td>ESGS 5010</td>
<td>Terrain Analysis and Digital Terrain Modelling</td>
<td>Digital terrain modelling is an 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.</td>
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<tr>
<td>ESGS 5012</td>
<td>Introduction to Earth Environmental Simulations</td>
<td>The course will introduce numerical simulation theories and technologies on earth systems which include abiotic complexes of atmosphere, hydrosphere, pedosphere and biotic elements of growth processes and population dynamics. The lectures and tutorials will provide students with basic knowledge on use of High Performance Computing simulations of the earth system dynamics, in particular, the global climate change and the adaptation and risk management.</td>
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<tr>
<td>ESGS 5019</td>
<td>Global Navigation Satellite System (GNSS) and Sensor Network for Environmental Monitoring</td>
<td>This course describes broad principles of Environmental Sensor Network (SN), the integration with positioning technologies and its roles in contemporary environmental studies and smart cities developments. The integration of SN and positioning technologies offers a powerful combination of distributed sensing capacity, real-time data visualization and spatial analysis and integration with remote sensing data sources. The combined technologies are greatly needed in large-scale environmental monitoring and Smart Cities developments. Another half of the course introduces the Global Navigation Satellite System (GNSS) and other indoor positioning technologies. It covers the basic principles, advanced techniques as well as their applications in Earth System Sciences and urban management. With the background knowledge and the practical skills, students shall be able to integrate GNSS and SN in their future research and studies.</td>
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<tr>
<td>ESGS 5060</td>
<td>Seminars in Geo-information Science</td>
<td>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.</td>
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Graduation Requirements

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 a project in one year.

   Required courses:
   
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<tr>
<td>ESGS5002, ESGS5011, ESGS5015, ESGS5016, ESGS5017, ESGS5018</td>
<td>18 units</td>
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   Elective courses:
   Any two courses to be chosen from the following:

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<tbody>
<tr>
<td>ESGS5001, ESGS5003, ESGS5006*, ESGS5010, ESGS5012, ESGS5019, ESGS5060</td>
<td>6 units</td>
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   * For those who have taken GRMD4202 should select another elective course.

   Project in Geo-survey and Public Management:

<table>
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<th>Course Code</th>
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<tbody>
<tr>
<td>ESGS6061</td>
<td>4 units</td>
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</tbody>
</table>

   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
Qualifications 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 fulfill the University’s minimum English Language requirements for admission to postgraduate programmes, applicants should have:
   a) obtained a degree from a university in Hong Kong or taken a degree programme of which the medium of instruction was English; or
   b) achieved scores in the following English Language tests as indicated:
      • TOEFL (Paper-based: 550; Computer-based: 213; and Internet-based: 79)*;
      • IELTS (Academic) (Band 6.5)*;
      • GMAT (Verbal)(Band 21); or
   c) obtained 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;
      • General Certificate of Education Examination (GCE) Advanced Level (A-Level)/Advanced Subsidiary Level (AS-Level); or
   d) achieved Level 4 or above in the English Language subject of the Hong Kong Diploma of Secondary Education (HKDSE) Examination; or
   e) obtained a recognized professional qualification, provided that the examination was conducted in English.

*TOEFL and IELTS are considered valid for two years from the test date; GMAT is considered valid for five years from the test date.

Application Procedures

Online application at the homepage of the Graduate School (http://www.cuhk.edu.hk/gss)

Application Period

mid-September - 30 April

Fee

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

Official Website of Master of Science in Geo-survey and Public Management:
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