

## THE EDUCATION UNIVERSITY OF HONG KONG

### Course Outline

#### Part I

|                              |  |
|------------------------------|--|
| <b>Programme Title</b>       | : Bachelor of Science (Honours) in Integrated Environmental Management (Four-year Full-time) |
| <b>Programme QF Level</b>    | : 5  |
| <b>Course Title</b>          | : Geographical Information Systems for Environmental Management                              |
| <b>Course Code</b>           | : GGP2032  |
| <b>Department</b>            | : Social Sciences and Policy Studies   |
| <b>Credit Points</b>         | : 3  |
| <b>Contact Hours</b>         | : 39   |
| <b>Pre-requisite(s)</b>      | : Nil  |
| <b>Medium of Instruction</b> | : English  |
| <b>Course Level</b>          | : 2  |

#### Part II

The University's Graduate Attributes and seven Generic Intended Learning Outcomes (GILOs) represent the attributes of ideal EdUHK graduates and their expected qualities respectively. Learning outcomes work coherently at the University (GILOs), programme (Programme Intended Learning Outcomes) and course (Course Intended Learning Outcomes) levels to achieve the goal of nurturing students with important graduate attributes.

In gist, the Graduate Attributes for Sub-degree, Undergraduate, Taught Postgraduate, Professional Doctorate and Research Postgraduate students consist of the following three domains (i.e. in short "PEER & I"):

- Professional Excellence;
- Ethical Responsibility; &
- Innovation.

The descriptors under these three domains are different for the three groups of students in order to reflect the respective level of Graduate Attributes.

The seven GILOs are:

1. Problem Solving Skills
2. Critical Thinking Skills
3. Creative Thinking Skills
- 4a. Oral Communication Skills
- 4b. Written Communication Skills
5. Social Interaction Skills
6. Ethical Decision Making

## 7. Global Perspectives

### 1. Course Synopsis

This course provides students with the knowledge of spatial data analysis and skills in using GIS software to conduct environmental data analysis. This is an independent course which can be taken by students from various disciplines and is also beneficial to students with a general interest in the geographical information system, spatial analysis or environmental data processing.

### 2. Course Intended Learning Outcomes (CILOs)

*Upon completion of this course, students will be able to:*

- CILO<sub>1</sub>: Analyse environmental spatial data and provide cartography visualization.
- CILO<sub>2</sub>: Identify the use of geographic information system (GIS) in different areas such as presentation of detailed data, environmental issues, ecological conservation, , and environmental impact assessment.
- CILO<sub>3</sub>: Apply different kinds of data collection methods including digitizing maps, scanning, photo interpretation, and remote sensing to capture measurement data.
- CILO<sub>4</sub>: Evaluate the data quality and to organize appropriate storage and indexing.
- CILO<sub>5</sub>: Recognize the role played by GIS in environmental management.

### 3. Content, CILOs and Teaching & Learning Activities

| Course Content   | CILOs                     | Suggested Teaching & Learning Activities  |
|--|---------------------------|---|
| <b>1. Introduction to Spatial Analysis</b><br>a) Classification and reclassification<br>b) Spatial measurement, aggregation, overlays<br>c) Spatial filtering spatial interpolation<br>d) Digital terrain model<br>e) Network analysis | <i>CILO<sub>1</sub></i>   | <ul style="list-style-type: none"><li>• Lectures</li><li>• Classroom discussions</li><li>• Tutorials or workshops</li></ul> |
| <b>2. Map reading, design and interpretation</b><br>a) Principle of map making<br>b) Design consideration<br>c) Reading and interpretation skills<br>d) Word processing, IT and graphics   | <i>CILO<sub>2,3</sub></i> | <ul style="list-style-type: none"><li>• Lectures</li><li>• Classroom discussions</li><li>• Tutorials or workshops</li></ul> |
| <b>3. Introduction to GIS</b><br>a) Definition and components of GIS   | <i>CILO<sub>2</sub></i>   | <ul style="list-style-type: none"><li>• Lectures</li><li>• Classroom discussions</li></ul>                                  |

| Course Content  | CILOs                     | Suggested Teaching & Learning Activities  |
|---|---------------------------|---|
| b) Georeferencing system<br>c) GIS functions and limitations  |                           | <ul style="list-style-type: none"> <li>Tutorials or workshops</li> </ul>  |
| <b>4. GIS data and collection method</b><br>a) Vector and raster data<br>b) Spatial data modeling<br>c) Remote sensing<br>d) Field survey<br>e) Data quality and transforming<br>f) Cartographic instrument | <i>CILO<sub>2,3</sub></i> | <ul style="list-style-type: none"> <li>Lectures</li> <li>Classroom discussions</li> <li>Tutorials or workshops</li> </ul> |
| <b>5. GIS Project and Database Management</b><br>a) GIS database design<br>b) Data entities<br>c) GIS project design and implementation   | <i>CILO<sub>2,4</sub></i> | <ul style="list-style-type: none"> <li>Lectures</li> <li>Classroom discussions</li> <li>Tutorials or workshops</li> </ul> |
| <b>6. Application of statistical data processing in GIS</b><br>a) Attribute operations<br>b) Statistics package   | <i>CILO<sub>3,4</sub></i> | <ul style="list-style-type: none"> <li>Lectures</li> <li>Classroom discussions</li> <li>Tutorials or workshops</li> </ul> |
| <b>7. Application of GIS on environmental management</b>  | <i>CILO<sub>5</sub></i>   | <ul style="list-style-type: none"> <li>Lectures</li> <li>Classroom discussions</li> <li>Tutorials or workshops</li> </ul> |

#### 4. Assessment

| Assessment Tasks   | Weighting (%) | CILOs                           |
|--|---------------|---------------------------------|
| (a) <b>Exercises</b><br>Exercises assessing students' understanding of technical skills about GIS applications on environmental management.                                  | 40%           | <i>CILO<sub>1, 2</sub></i>      |
| (b) <b>Group project report</b><br>Written report and oral presentation evaluating students' practical skills on environmental studies, such as designing and collecting GIS | 30%           | <i>CILO<sub>1,2,3,4,5</sub></i> |

|   |     |                                |
|---|-----|--------------------------------|
| data, carrying out the planned analysis and providing cartography visualization for the presentation.   |     |                                |
| (c) <b>Examination</b><br>A two-hour written examination comprising of various format of questions aiming to assess different levels of knowledge such as analytical skills of cases, basic concepts and data models. | 30% | <i>CILO</i> <sub>1,2,3,4</sub> |

## 5. Required Text(s)

Heywood, I., Cornelius, S. & Carver, S. (2011). *An Introduction to Geographical Information Systems*, 4th edition. Harlow, England; Hong Kong: Prentice Hall.

## 6. Recommended Readings

Chun, Y. W., Griffith, D. A. (2013). *Spatial Statistics & Geostatistics: Theory and applications for geographic information science & technology*. London: Sage.

DeMers, M. N. (2009). *Fundamentals of Geographic Information Systems*. Hoboken, NJ: Wiley.

Fischer, M. M.; Wang, J. F. (2011). *Spatial Data Analysis: Models, methods and techniques*. Springer Briefs in Regional Science. New York and Heidelberg: Springer.

Lloyd, C. (2007). *Local Models for Spatial Analysis*. Boca Raton: CRC/Taylor & Francis.

Lloyd, C. (2010). *Spatial Data Analysis: An introduction for GIS users*. Oxford University Press.

Scally, R. (2006). *GIS for Environmental Management*. Chicago: ESRI Press.

Stimson, R. J., Haynes, K. E. (2012). *Studies in Applied Geography and Spatial Analysis: Addressing real world issues*. Cheltenham: Edward Elgar.

Wang, F. H. (2006). *Quantitative Methods and Applications in GIS*. Boca Raton, FL: CRC/Taylor & Francis.

Zhu, X (2016). *GIS for Environmental Applications: A Practical Approach*. London: Routledge

## 7. Related Web Resources

Geospatial Analysis - A comprehensive guide  
<http://www.spatialanalysisonline.com>

## 8. Related Journals

*International Journal of Geographical Information Science*

*International Journal of Remote Sensing*

*Cartography and Geographic Information Science*

*Journal of Geographical Systems*

*Mapping Sciences and Remote Sensing*  
*Remote Sensing of Environment*  
*Computers and Geosciences*  
*Transactions in GIS*  
*GeoInformatica*  
*Journal of Geographical Systems*  
*Geofocus International Review of GI Science and Technology*  
*Geographical Analysis*

## **9. Academic Honesty**

The University upholds the principles of honesty in all areas of academic work. We expect our students to carry out all academic activities honestly and in good faith. Please refer to the *Policy on Academic Honesty, Responsibility and Integrity* (<https://www.eduhk.hk/re/uploads/docs/000000000016336798924548BbN5>). Students should familiarize themselves with the Policy.

## **10. Others**

Newspaper articles and other media reports, including contemporaneous reporting, related to the course; recent related reports from scientific organizations and nongovernmental organizations; new video media and websites.

*Updated 16 November 2022*