GEOG2156 Understanding Global Environmental Changes from Images#

 # Fulfill requirements of method-related courses

TIMETABLE ARRANGEMENT: Annual; 2nd Semester **CREDITS:** 6

COURSE TEACHER: Professor Shunlin LIANG

ASSESSMENT:

EXAMINATION 50 %	COURSEWORK 50 %
• 2 hours	• Lab assignements

OBJECTIVES:
This course aims to provide students with the following techniques and experience, (1) Image processing techniques for extracting thematic and/or quantitative information from raw images and remote sensing datasets, for example signals and images captured by satellites; (2) Comprehensive understanding of image processing techniques to handle remotely sensed images of different aspects, for example urban land-use, forests, geoscience and air pollution applications; (3) Hands-on experience to analyze remotely sensed imageries for making geographical and environmental decisions; (4) Gaining knowledge of the latest research articles in above-referenced areas, summarizing image processing techniques applied, and outlining possible future extension.

COURSE SYNOPSIS:
This course introduces students to fundamental concepts of physical geography via infographic and imaging approaches, in particular analyzing global environmental changes and potential threats, studying and extracting observable spatial and temporal patterns from image spectrums in different fields, namely meteorology, climatology and air pollution. A variety of geographical skills and investigations will be established, including topographical map reading skills, geographical data analysis, usage of statistical indices in optimizing visualization, the analysis of different kinds of photography and remotely sensed imageries, with the aim of guiding students to extract quantitative and thematic information from images. Then, we will connect these techniques with practical case studies in socio-economic, environmental and geoscience perspectives. Students are required to submit a short essay and complete worksheets on analyzing contemporary environmental issues and/or air pollution during this course.

LECTURE TOPICS:
- Overview of available types of Remote Sensing Imageries
- Data Collection: Digital Image Processing
- Elementary Image Processing Techniques
- Geographical and Scientific Visualization
- Case Studies and Applications (e.g., Land Cover and Land Use Changes Spatial and Temporal Variations of Water Resources and Carbon fluxes, Retrieval of Social and Economical Information)

RECOMMENDED READING LIST:

- Campbell, J.B. and Wynne, R. H. 2011. Introduction to Remote Sensing. Guildford Press, New York. 5th Edition. ISBN 978-1-60918-176-5.
- Jensen, J.R., Remote Sensing of the Environment - An Earth Resource Perspective, 592 pp., Prentice Hall, Upper Saddle River, NJ, 2007. ISBN: 0131889508, Second Edition.

	Course Learning Outcomes (CLOs) After completing this course, students would be able to:	Alignment with Programme Learning Outcomes (PLOs)* 1	2	3	4	5	6	Course Assessment Methods
1	acquire basic understanding of global environmental changes and potential threats from image perspectives		✔	✔	✔			Lab assignments & exam
2	demonstrate knowledge in extracting information from images, understanding of different geographical indices and visualization of images in terms of spatial and temporal variations			✔	✔		✔	Lab assignments & exam
3	relate the interpreted images to daily life applications, and make corresponding geographic and environmental judgments	✔	✔			✔	✔	Lab assignments & exam
4	learn and become more aware of socio-economic issues, like air pollution, climate change and global warming	✔	✔	✔	✔	✔	✔	Lab assignments & exam

*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.**