GEOG2141 Remote Sensing Applications

 # Fulfill requirements of method-related courses

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

COURSE TEACHER(S): Professor Steven H.S. ZHANG

ASSESSMENT:

EXAMINATION 50 %	COURSEWORK 50 %
• 2 hours	• 1 individual essay

OBJECTIVES:
The aim of this course is to provide a solid theoretical understanding and comprehensive introduction to the use of remote sensing technologies for different applications in geography. This course presents the basic technical and methodological skills needed to employ various types of remotely sensed images and aerial images as a source of quantitative information in geography; including urban planning, landscape ecology, recreation resource management, wildlife management and others. Students will be exposed to several common image and analysis techniques and will have the opportunity to develop these skills further with an independent project.

COURSE SYNOPSIS:
The course provides a substantial and balanced introduction to the basic theory and methodology of applied remote sensing technologies. It explores the principles of electromagnetic radiation, as well as the interactions of solar radiation with the earth's atmosphere. The spectral reflectance of main land cover types; e.g., forest vegetation, soil, crops, and urban areas, will be emphasized. During the course, students will compare the spatial, spectral, radiometric and temporal characteristics of different multispectral sensor systems and their data products. Hands-on experience with image classification techniques will be provided.

LECTURE TOPICS:
• Theoretical fundamentals of optical, radar remote sensing
• Characteristics of remote sensing systems
• Remote sensing data types and formats
• Remote sensing of vegetation
• Land use/land cover mapping
• Image analysis and classification

RECOMMENDED READING LIST:
• Lillesand T., Kiefer, R.W., & Chipman J., (2015). Remote Sensing and Image Interpretation, 7th Edition.
• Tempfli C., Kerle, N., Janssen, Lucas, L.F., & Huurneman, G.C., (Eds.), (2009). Principles of Remote Sensing: An Introductory Book. The International Institute for Geo-Information Science and Earth Observation (ITC), The Netherlands.

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	have a solid theoretical background of remote sensing and its application in geography			✔	✔			Essay & exam
2	understand how to process remotely sensed data to make it useful in geographic information systems			✔	✔			Essay & exam
3	critically assess the strengths and weaknesses of remote sensing instruments and platforms for a variety of application scenarios	✔	✔			✔		Essay & exam
4	apply acquired knowledge and critical thinking skills to solve a real-world problem with appropriate remote sensing data and processing methods				✔	✔	✔	Essay & exam
5	extract information from remotely sensed data using a variety of manual and automated techniques			✔	✔		✔	Essay & exam
6	develop multi-step remote sensing workflows to solve problems in a variety of application areas	✔	✔		✔		✔	Essay & 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.