

Syllabus for Digital Remote Sensing and GIS, 7.5 ECTS credits

1. Ratified by the Education Committee of the Faculty of Science -2006. The syllabus is valid from 01-07-2007. The course is at the advanced level.

2. General information

The course is part of the main field of study in Physical Geography and Ecosystems Analysis at the Faculty of Science. The course is an elective course in a Bachelor's degree in Science, with a major in Physical Geography and Ecosystems Analysis. The course is also given as a single subject course. The language of instruction is English and is given as distance learning over the Internet.

3. Aim of the course

The course aim is to give basic technical knowledge and practical experience in digital remote sensing (satellite images) for interpretation of e.g. land cover/land use, understand spectral properties for different objects and seasonal differences as well as trends through multiple years for change detection studies.

4. Learning outcomes

Having successfully completed the course, students should have acquired the following knowledge, understanding and skills:

Knowledge and understanding

The student is expected to have:

- Basic knowledge in electromagnetic radiation theories and how the atmosphere affects the radiation.
- Basic knowledge about radiometric and spectral resolutions, and formats for satellite images, and some knowledge and skill to re-calculate digital number to physical values.
- Knowledge about some of the classification algorithms used for digital satellite data.
- Basic knowledge in multi-spectral reflection properties for different objects.
- Basic understanding of accuracy assessment theory and methods for data sampling.
- Knowledge to extract information from multiple satellite images to understand and study seasonal effects.
- Knowledge how to calculate trends from multiple satellite data for long time series and creating maps showing change over time.

Proficiency and skills

The student is expected to be able to:

- Undertake and report an image interpretation project.
- Extract statistics and other information from a digital satellite image.
- On-screen digitization.
- Perform automated and supervised classification of digital satellite data.
- Perform a map accuracy assessment on a classification.
- Perform analyses on digital satellite data integrated with other geographical information in a geographical information system.

Attitude and ability to appraise

The student is expected to be able to:

- Evaluate and discuss choice of satellite data and methods for analyses to solve a given problem.
- critically assess geographical data and have achieved a critical attitude towards analysis results,

5. Course contents

The course consists of the following parts:

1. Radiation theory.
2. Theoretical land-cover classification techniques and accuracy assessment.
3. Supervised classification of high spatial resolution satellite data and reporting. Theory and practical.
4. Phenological effects for different land –cover types and objects during the vegetation season. Theory and practical.
5. Change detection study concerning a 20 year time series of satellite data. Theory and practical.
6. Downloading of free satellite data over the Internet, import and re-calculation o physical units.
7. Examination of theoretical knowledges.

6. Teaching and assessment

Teaching consists of lectures, practical and theoretical exercises and project work. All these course elements are compulsory. Students who fail the first assignment will be provided opportunity to correct the task.

7. Grades

Students are graded for the course according to the following levels: Passed, and Failed.

In order to pass the course the student is required to have passed the theoretical assignments, to deliver acceptable practical reports and project reports and to have participated in all compulsory course elements.

The final grade for the course is determined by the aggregated results of the different parts of the examination.

8. Entrance qualifications

The following are required for admission to the course: basic eligibility

9. Literature

According to a list established by the department, available at least five weeks before the start of the course.

10. Further information

The course cannot be credited as part of a degree along with NGE609 or VFT051.