General Information			
Course name	Remote Sensing	**ECTS Credits**	6
		Semester	winter/4 hours per week

Aims

This course focuses on explanation of the principles of passive and active methods of remote sensing. Shortly at the begining main physical principles of remote sensing are intorduced. The methods discussed involve: spaceborne multispectral scanning, hyperspectral scanning, airborne photogrammetry, spaceborne thermal sensing, airborne laser scanning, radar interferometry and sonar bathymetry. The practicals are based on the use of satellite multispectral imagery, lidar point clouds using mainly the ArcGIS software platform by ESRI.

Contents

Intro to the course, history of remote sensing, remote sensing platforms
Physical principles of remote sensing, electromagnetic energy, interaction of the energy with objets and atmosphere
Spectral response of particular types of surfaces, resolution of sensors

Passive methods:
Photogrammetry, principles of photography, measurements with the photography, image scale, image and camera properties, image orientation, aerotriangulation, extraction of 3D vector data, applications
Multispectral and hyperspectral scanning.
Thermal sensing

Active methods:
Airborne laser scanning (lidar), physical properties of laser energy, principles of measuring with lidar, web data resources, data formats, planning an airborne lidar mission,aplications.
Radar interferrometry, principles, methods of data processing, applications
Sonar bathymetry, principles, methods of data processing, applications

Practicals: Web-based data sources of remotely sensed data. Physical properties of the EME. Spectral behaviours of particular objects. Geometric parameters of aerial imagery. Planning an airborne photogrammetric and laser scanning mission. Image adjustment and false colour composite imagery. Supervised and unsupervised image classification. The work on practicals expects basic GIS skills.

Assessment Methods and Criteria
The assessment is a combination of continual control during the practicals and the final exam in the examination period. The continual assessment is performed during the semester and it involves 1 written test in the mid-term of the semester and a project report generated according to the assignment and practical skills acquired during the practicals. The student can go for the final exam in case he or she acquired at least the E mark in the continual assessment. The final assessment mark is the result of the average of the marks received in the mid-term test, project report and final exam. The final exam is a written test.

The credits are given in case the student had reached at least the E mark in continual assessment and final exam. The following marking scheme is applied in the assessment: A (100-90 points), B (80-89 points), C (70-79 points), D (60-69 points), E (50-59 points), FX (0-49 points).

Assessment Methods and Criteria

Continuous Assessment Methods and Criteria is based on student's activity in the classes and work on assignments. The course ends with a final written examination.

Grading Scale (in %):

Grading System: The University recognises the following six degrees for the Assessment Methods and Criteria of the study results: a) A – excellent (excellent results) (numerical value 1) b) B – very good (above average results) (1.5) c) C – good (average results) (2) d) D – satisfactory (acceptable results) (2.5) e) E – sufficient (results meet the minimum criteria) (3) f) FX –failed (requires further work) (4)

Bibliography

4. Lillesand, T. M., Kiefer, R. W., Chipman, J. W., 2015. *Remote sensing and image interpretation*. 7th Edition, Wiley, 736 p.
5. Jensen, J. R., 2006. *Remote sensing of the environment: An earth resource perspective*. 2nd Edition, Pearson, 608 p.
6. Campbell, J.B., Wynne, R.H. 2006. *Introduction to Remote Sensing*, 5th Edition. The Guilford Press; 5th edition, 667 p.