General Information

Course name	Spatial Analyses and Modelling	**ECTS Credits**	4
		Semester	winter 4 hours/week

Aims

This course introduces students to advanced GIS methods for spatial analysis nad modelling. By the end of the course the student will be able to:
- use complex GIS tools to solve spatial problems
- parameterise various interpolation methods and evaluate interpolation results using selected statistical methods
- simulate selected landscape processes using sophisticated simulation tools in GRASS GIS

Contents

Classification of spatial analyses, specifics of data models
Databases, selections, queries, SQL
Overlay operations, applications
Classification methods for geographic data
Spatial interpolation - TIN, IDW, kriging, RST
Spatial interpolation - Assessment Methods and Criteria of spatial interpolation - statistical methods, geomorphometry and digital terrain applications
Kernel density methods
Map algebra - local, focal, zonal, incremental, examples
Modelling and simulations, solar radiation modelling using the r.sun model
Modelling and simulations , water flow and water erosion modelling using the USPED and SIMWE model
Geographically weighted regression, 3D (volume) interpolation using v.vol.rst, applications
Modelling and simulations - case studies, examples from various projects
Practical seminars using ArcGIS and GRASS GIS

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. The final assessment is calculated as a weighted average of the assessment from seminars (1/3) and the final test (2/3), however, the student must obtain at least mark E from both parts to earn the credits.

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

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LONGLEY, P. A., GOODCHILD, M. F., MAGUIRE, D. J., RHIND, D. W. 2001: Geographic Information Systems and Science. John Wiley & Sons.

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SHEKHAR, S., XIONG, H. 2008: Encyclopedia of GIS. Springer.

WILSON, J. P., FOTHERINGHAM, A. S. 2008: The Handbook of Geographic Information Science. Blackwell Publishing.