

Discipline/Course title	Quantitative and qualitative spatial modelling in environmental research					
Conveyors course/practical work/seminar	PROF.DR. ARMAȘ IULIANA, PROF.DR. MIHAI BOGDAN, PROF.DR. PATRU STUPARIU ILEANA, PROF.DR. IOJA CRISTIAN					
Subject/branch of science	Geography					
Study program	Doctoral School Simion Mehedinți					
Credits	6					
Education level		Bachelor		Master	x	Doctoral
Class time budget	24 hours course 12 hours practical work/project					
Preliminary acces condition	Admission colloquium, doctoral school Simion Mehedinți					
Themes/course content/practical work content/seminar content	<p>A. Background</p> <p>1. Variables and data of different types; data versus information/knowledge; 2. Scientific reality and scientific approach; 3. spatial model and modeling of spatial variables, 4. Testing and validation</p> <p>B. Optical remote sensing issues:</p> <p>1. Digital remote sensing data typology. 2. Advanced methods and techniques in digital remote sensing image processing: image calibration, image orientation/geometry, image enhancement, image analysis. 3. Applications to environmental modelling. Applications/examples on Sentinel 2-MSI, Landsat TM/OLI, MODIS, World-View imagery data and aerial orthophotos: image classification, land cover mapping and analysis, change detection analysis, object-oriented analysis.</p> <p>C. Radar remote sensing issues:</p> <p>1. Active Microwave Systems: Side Looking Radar. Imaging radar principles. Real aperture radar /Synthetic aperture radar. 2. Geometrical distortions, speckle effect, and georeferencing of radar images. 3. acquisition modes of radar images (synthetic aperture radar sensors, data sources). 4. Principles and applications of radar interferometry and polarimetry techniques. Stage development and limitations of traditional interferometry techniques 5. Processing of SAR images and their</p>					

	<p>applications in the environment 6. Analysis of InSAR time series by the Permanent Scatterers technique.</p> <p>D. Environmental and Landscape approach. Information about the methodological, conceptual and practical integration of the environment/landscape in studies of interdisciplinary and cross-disciplinary analysis and evaluation.</p> <p>1. Knowledge on main sources of environmental data and their credibility level. Knowledge and understanding of specific conditions and restrictions in collecting environmental data. 2. How to use specific equipment and how to quantitatively assess environmental factors. 3. Experimental designs: factorial, randomised, covariant, hybrid. 4. Knowledge on the causes of spatial and temporal landscape changes. 5. Data collection. Understanding data types (simple, multidimensional, binary, etc.). 6. Data processing using multivariate statistical analysis (PCA, RDA). 7. Data processing using the theoretical DPSIR model.</p> <p>E. Hydraulic modeling and flood maps</p> <p>Practical work themes</p> <p>RS optical: 1. Remote sensing data visualisation and calibration. Geometric and radiometric corrections. Atmospheric correction issues. 2. Image enhancement for environmental modelling and analysis. 3. Model development from optical remote sensing imagery for specific topics in physical and human geography (project themes).</p> <p>RS radar: 1. Pre-processing of SAR images 2. Processing and interpreting SAR images. Polarimetry. Interferometry. 3. Use of polarized SAR images for land cover study 4. Use of SAR imagery for flood monitoring. 5. Interferometric processing for subsidence detection. 6. Interferometric processing for landslide detection and monitoring</p> <p>Practical class Environmental and Landscape approach: Establishing contextual aspects for data collecting - influence factors, autocorrelations, external factors, deontology. It will take place as a workshop with the aim of spatializing, interpreting and proposing landscape scenarios (Software: ArcGIS, R and FRg)</p>					
Evaluation form	Research project adapted to the current research theme of the PhD thesis.					
Status of the discipline	x	Compulsory		Optional		Facultative

References

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