



Course number		Course title : Application of GIS and Remote Sensing in Water Resources Management	
Number of weeks: 1	Contact hours: 2 hr lecture, 4 hr practice		Learning hours:
Pre-requisites:		Credits :	
Course coordinator		Lecturers : Jarosław Chormanski Marek Gielczewski	
Course description : Geographical Information Systems theory and application in environmental studies; Mapping non-spatial data; Data management, analysis and generalization methods; Digital Elevation Model theory and application; Raster data model spatial analysis functions; Multi-criteria analysis in vector and raster data models, Conversion of the data models; Application of GIS in hydrology, environmental engineering and environmental studies, including flood extent assessment, nutrient leaching assessment and watershed modelling; GIS freeware software's for hydrological analysis; Internet as a source of GIS information. Remote Sensing for selected aspects of water management and hydrological modelling.			
Syllabus: Content of the lectures: Principles of raster model in GIS; Spatial Analyst - Environmental Modelling in GIS; Geostatistical Analyst – theory and application of non-linear interpolation methods; Model builder – simple programming in ArcGIS; Digital Elevation Model – theory and environmental application; GIS aided hydrological modelling – different models (e.g. SWAT, WetSpa, HecRAS) case studies; Application of Remote Sensing in flood modelling and parameterisation of watershed models. Content of the classes: Presentation of the watershed based environmental attribute data on maps, Digital Elevation Model and raster data model spatial analysis functions; Multi-criteria analysis in vector and raster data models; Estimation of nutrient load in watershed; Assessment of flood extent of different probability; Watershed analysis – Spatial and Hydrological properties of watersheds (determination of watershed divider, stream network, flowpaths and flowlength, calculation of effective rainfall); Integration of analysis and calculation in the vector and raster data models			
Learning outcomes: To apply GIS and Remote Sensing in water monitoring and management, and in environmental protection, to use GIS as tool for decision making in water resources management, to assess possibility of applying GIS to water management issues, to select proper GIS procedure for analysis of hydrological environmental issues, to present environmental data on a map.			
Assessment: Didactic methods: Lectures and practical exercises The form and conditions of passing the course: final pass based on the results of the realization of practical exercises assessed based on the prepared reports			
Recommended texts and other learning resources: Burrough, P.A. and McDonnell R.A., 1998: Principles of Geographical Information Systems. Spatial Information Systems and Geostatistics. Oxford University Press, Oxford, 333 pp. ArcGIS 9: Using ArcGIS Desktop; ESRI Press			