

Subject name	Spatial Information System	
Subject code	E.1.SIS.SC.ECTIE.A	
Department	Institute of Agricultural Engineering and Computer Science	
Faculty	Faculty of Production and Power Engineering	
Subject supervisor/Lecturer	Anna Krakowiak-Bal, Ph.D.	
General information	Teaching period	1 semester/ winter semester
	ECTS credit	6
	Lectures total	10
	Lab practicals	20
Objective and general description	<p>Spatial Information Systems implement a unique mix of geographical principles, computer science and mathematics. This course will examine both geographical and technical components of GIS. Course includes introduction to Geographic Information Systems (GIS) using both raster and vector spatial data models, with hands on experience utilizing computers to aid problem solving. Applications to be mastered include data entry, verification, database construction, cartographic modeling, and mapping of spatial data. Basic concepts of remote sensing are introduced.</p>	
Lectures 5 x 2 hours	<ol style="list-style-type: none"> 1. Introduction to GIS. Concept of space and time in Spatial Information Systems,. 2. Characteristics of spatial data, History of GIS, various elements of GIS. 3. Data Models of spatial and non-spatial information used in GIS, Concept of Layers and Coverage in GIS. 4. Overview of Data Structures (file structures, database management systems), Database models for spatial data, Role of RDBMS in GIS, Digitizing process – its type. Data quality and sources of errors in GIS. 5. Introduction to map projections, map scale, properties of map projections, projection types, Overview of co-ordinate system. 	
Lab practicals 5 x 4 hours	<ol style="list-style-type: none"> 1. Introduction to GIS software – IDRISI, models of geographic data, visualization. 2. Basic layer analysis, overlay maps and layers. 3. Orthophoto map analysis. 4. Raster and vector maps, aerial and satellite photo, algorithms for spatial databases, terrain models. 5. Map generalization, vector map simplification and polygonal approximation. 6. Individual project of chosen spatial analysis 	

References	<p>MacEachren, A. M. & Kraak, M.: Cartography and Geographic Information Science, Vol.28, No.1, 2001</p> <p>Longley,P.A., Goodchild,M.F., Maguire,D.J., Rhind,D.W.: Manual of Geographic Information Systems, ASPRS, UK, 2009</p> <p>D. Maguire, M. Batty, M. Goodchild, GIS, Spatial Analysis, and Modeling, ESRI Press, 2007.</p> <p>Encyclopedia of GIS, Eds. S. Shekhar, H. Xiong, Springer, 2008.</p>
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