

Study Program : Urban Engineering			
Type and level of studies: Bachelor			
<b>Course unit: Geographic Information Systems</b>			
<b>Teacher in charge: Goran Bošković</b>			
Language of Instruction: <i>English</i>			
ECTS: 6			
Course requirements: No			
Semester: <i>Winter Semester</i>			
<b>Course unit objective</b>			
<ul style="list-style-type: none"> <li>- Introduction to the basic elements of a geographic information system</li> <li>- Introduction to tools for managing geographic data, GIS technology and application to solve specific problems in urban areas,</li> <li>- Train students to choose and use appropriate software tools to address critical infrastructural problems of the urban environment,</li> <li>- To train students to follow and accept the improvements and innovations in this field.</li> </ul>			
<b>Learning outcomes of Course unit</b>			
Upon completion of the course the student will be able to:			
<ul style="list-style-type: none"> <li>- understand the principles of GIS, including the structure and quality of the data,</li> <li>- to apply GIS in urban traffic and public utility service based on the acquired theoretical knowledge and practical experience of the application of GIS</li> <li>- analyze and present geographical data and to implement spatial queries independently.</li> </ul>			
<b>Course unit contents</b>			
<i>Theoretical classes</i>			
Introduction to GIS. Basic definitions and concepts. Application of GIS. Data models. The concept of raster and vector data. GIS standards. Spatial database. Cartography. Georeferencing - coordinate systems, map projections. Data collection, GPS, photogrammetry, remote sensing. Using software packages. Software development methods based GIS applications. GIS: Maps and spatial information. Thematic mapping. The visualization of spatial data. Analysis of data in GIS. Modelling and analysing networks. GIS in urban traffic and public utility service (heating system, gas, water)			
<i>Practical classes</i>			
Georeferencing of scanned maps and plans. Connection of CAD and GIS software. Working with GPS receivers. Connecting a GPS receiver with computer link and GIS packages. Production of digital maps, working with a database. The visualization of spatial data. Designing a web-based GIS applications. ArcGIS, OpenGIS, Google Earth, SketchUp, kml			
<b>Literature</b>			
Drummond J., Gitting B., Joao E., GIS for Environmental Decision-Making, CRC Press Taylor & Francis Group, 2008			
Gorr W., Kurland K., GIS tutorial for ArcGIS 10, ESRI, 2012			
<b>Number of active teaching hours</b>			<b>Other classes</b>
Lectures: 2	Practice: 2	Other forms of classes: 	
<b>Teaching methods</b>			
Teaching is done through lectures, exercises and independent work of students. In the lectures, students obtain basic information. In the exercises, students acquire practical knowledge and skills to use specific tools for specific areas. Students will made independent tasks, which encompass and integrate the skills to use certain tools.			
<b>Examination methods ( maximum 100 points)</b>			
<b>Exam prerequisites</b>	<b>No. of points:</b>	<b>Final exam</b>	<b>No. of points:</b>
Student's activity during lectures	10	oral examination	
practical classes/tests		written examination	30
Seminars/homework	30	.....	
Project	30		
Other			
<b>Grading system</b>			
<b>Grade</b>	<b>No. of points</b>	<b>Description</b>	
10	91-100	Excellent	
9	81-90	Exceptionally good	
8	71-80	Very good	
7	61-70	Good	
6	51-60	Passing	
5	0-50	Failing	