MODULE DESCRIPTION

Module title	Module code
Geographic Information Systems	

Lecturer(s)	Department where the module is delivered
Coordinator: dr. Albertas Šermokas **Other lecturers: -**	Department of Software Engineering Faculty of Mathematics and Informatics Vilnius University

Cycle	Type of the module
First	Optional

Mode of delivery	Semester or period when the module is delivered	Language of instruction
Face-to-face	6 semester	Lithuanian

Prerequisites
Prerequisites: Database management systems.

Number of credits allocated	Student's workload	Contact hours	Self-study hours
5	130	68	62

Purpose of the module: programme competences to be developed

Purpose of the module - to acquire knowledge of Geographic information system concepts, principles, data models, GIS data analysis, applications in geography and natural science as well as its application expertise to create and analyses GIS data and use programming technology to develop additional GIS functionality

Generic competences:

- Life-long learning *(GK2).*
- Social responsibility *(GK3).*

Specific competences:

- Knowledge and skills of underlying conceptual basis *(SK4).*
- Software development knowledge and skills *(SK5).*
- Technological and methodological knowledge and skills, professional competence *(SK6).*

Learning outcomes of the module: students will be able to	Teaching and learning methods	Assessment methods
Use geographic information system concepts, principles and spatial data model.	✓ Lectures, ✓ Discussions ✓ Analysis of examples ✓ Literary reading, ✓ Two laboratory works.	✓ Laboratory works in GIS (GISTools, ArcGIS) environment and results presentation, ✓ Written exam
Aanalyse GIS data and to interpret them, to make reasoned conclusions		
Self-perform a modelling of nature scientific area in the GIS data models, to design and implement this models in the GIS environment		
Use programming environments to solve problems with the GIS analysis operations and algorithms, and present the results in the GIS environment		
Present the results of the solution, to ground them, and to ground chosen solution		

Content: breakdown of the topics	Contact hours							Self-study work: time and assignments	
	Lectures	Tutorials	Seminars	Practice	Laboratory work (LW)	*Tutorial during LW*	**Contact hours**	**Self-study hours**	**Assignments**
1. GIS definition, application, data model	6				2		**8**	**8**	Self-study of GIS programing environments (GISTools, ArcGIS or other). Self-preparation for 1st laboratory work. Present and pass the results of 1st laboratory work. Preparation and agree the task of 2nd laboratory work Self-preparation for 2nd laboratory work. Present and pass the results of 2nd laboratory work.
2. GIS data building, topology	6				4		**10**	**8**	
3. GIS attribute data, main definitions and general principles, relation between graphic and attribute data in GIS	4				4		**8**	**4**	
4. GIS spatial analysis based on 2D and 3D data models.	8				16		**24**	**12**	
5. GIS modelling methods, convert data from different data models (raster, vector and TIN). General principles of modelling and development GIS options for specific needs..	8				6	*8*	**14**	**10**	
6. Preparing for the exam and taking the final exam (written).		2					**4**	**20**	2 hour for consultation. 20 hour for self-preparation 2 hour exam
Total	**32**	**2**			**32**	*8*	**68**	**62**	

Assessment strategy	Weight %	Deadline	Assessment criteria
1st laboratory work	30	10th week of the semester	Work is assessed on a scale of 0 to 30 points. Minimum evaluation required to pass is 47.5% of the maximum number of points. In other case exam is failed. The penalty for exceeding the deadline is 3 points for each week of delay. Final result of the laboratory work evaluation is obtained dividing by 10.
2nd laboratory work	35	15th week of the semester	Work is assessed on a scale of 0 to 30 points. Minimum evaluation required to pass is 47.5% of the maximum number of points. In other case exam is failed. The penalty for exceeding the deadline is 4 points for each week of delay. Final result of the laboratory work evaluation is obtained dividing by 10.
Exam (written)	35	During exam session	5 questions formulated from topics set out in lectures. Each question is assessed on a scale of 0 to 7 points, which are aggregated. Minimum evaluation required to pass the exam is 47.5% of the maximum number of points. In other case exam is failed. Final result of the written exam is obtained dividing the by 10. Final grade is the sum of evaluations of the exam and both laboratory works.

Author	Publishing year	Title	Number or volume	Publisher or URL
Required reading				
Tumas R.	2006	Environmental geoinformation systems (in Lithuania)		Enciklopedija
Maguire D.J., Goodshild M.F., Rhind D.W.	1991	Geographical information systems	VOL. 1-2	John Wiley & Sons
Nacionalinė žemės tarnyba prie Lietuvos Respublikos Žemės ūkio ministerijos.	2008	Geographic information in-service training project and materials (in Lithuania)		http://www.geoportal.lt/wps/poc?uri=page:RUBRIC.1337
Recommended reading				
Paršeliūnas E.	2001	Geographic information system: technologies (in Lithuania)		Technika
Beconytė G.	2004	Data and databases in cartography: teaching book (in Lithuania)		Vilnius university press
Stewart Fotheringham and Peter Rogerson	1994	Spatial Analysis and Geographic Information Systems		Taylor & Francis
ESRI	2012	What is GIS?		http://www.gis.com
The Open Geospatial Consortium (OGC)	2012	OGC® Standards and Supporting Documents		http://www.opengeospatial.org/standards