



Spatial analysis for safety engineering
Educational subject description sheet

Basic information

Field of study Safety engineering		Education cycle 2020/21	
Speciality -		Subject code WIKSiGIBS.MI1BO.2354.20	
Organizational unit The Faculty of Environmental Engineering and Geodesy		Lecture languages english	
Study level Second-cycle (engineer) programme		Mandatory optional	
Study form Full-time		Block major subjects (conducted) in foreign languages	
Education profile General academic		Disciplines Environmental engineering, mining and energy	
		Subject related to scientific research Yes	
		Subject shaping practical skills Nie	
Teacher responsible for the subject	Iwona Kaczmarek		
Other teachers conducting classes	Iwona Kaczmarek		
Period Semester 1	Examination exam	Number of ECTS points 4.0	
	Activities and hours lecture: 15 project classes: 30		

Goals

C1	The course includes theoretical and practical classes aimed at provide knowledge and skills in analysis and spatial modeling using GIS tools for the purpose of safety engineering. Students learn the basic methods of searching, processing, analysis and visualization of spatial data to solve problems in the field of safety engineering.
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Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	Student knows the modern methods and techniques used for safety engineering and emergency management. Knows tools for assessment of social, economic and environmental effects of hazards and disasters.	IB_P7S_WG04	test
Skills - Student can:			
U1	Student has the ability to perform analysis and interpretation of social, economic and environmental conditions in spatial terms. Has the ability to perform the spatio-temporal analysis and anticipate the potential impact caused by hazards and disasters. Has the ability to identify and prioritize the priorities and criteria to determine the potential hazards and their consequences.	IB_P7S_UW08	project, performing tasks
Social competences - Student is ready to:			
K1	Student can work with other participants of decision process. Understands the need for creative and alternative solutions.	IB_P7S_KK01	observation of student's work, active participation

Balance of ECTS points

Activity form	Activity hours*	
lecture	15	
project classes	30	
report preparation	25	
exam / credit preparation	15	
project preparation	20	
consultations	15	
Student workload	Hours 120	ECTS 4.0
Workload involving teacher	Hours 60	ECTS 2.0

Practical workload	Hours 55	ECTS 2.0
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* hour means 45 minutes

Study content

No.	Course content	Activities
1.	Lecture 1. Basics of geographic information systems for safety engineering. Lecture 2. The use of GIS in safety engineering - practical examples. Lecture 3. Spatial data models for spatial analysis. Lecture 4. Functions of vector analysis. Lecture 5. Functions of raster analysis. Lecture 6. Spatial analysis of crime phenomena. Lecture 7. Spatio-temporal analysis of spatial accessibility. Lecture 8. Network analysis. Lecture 9. Multi-criteria decision analysis – Boolean. Lecture 10. Multi-criteria decision analysis – soft factors. Lecture 11. Spatial Decision Support Systems. Lecture 12. Sources of spatial data in safety engineering. Lecture 13. INSPIRE web services. Lecture 14. The role of INSPIRE in safety engineering. Lecture 15. Spatial information infrastructure.	lecture
2.	Exercise 1. Determining the optimum route for hazard and disaster situation. Exercise 2: Spatial analysis of crime phenomena. Exercise 3. Search and integration of spatial data resources in INSPIRE services for crisis management.	project classes

Course advanced

Teaching methods:

computer lab/laboratory, lecture, classes

Activities	Examination methods	Percentage in subject assessment
lecture	test	40%
project classes	project, observation of student's work, active participation, performing tasks	60%

Literature

Obligatory

1. Smith M., Goodchild M., Longley P.: Geospatial Analysis. SPLiNT. Leicester 2009.
2. Keranen K., Kolvoord R.: Making Spatial Decisions Using GIS and Remote Sensing. A Workbook. Redlands 2014.

Kierunkowe efekty uczenia się

Kod	Treść
IB_P7S_KK01	Absolwent jest gotów do formułowania i komunikowania opinii dotyczących zagadnień bezpieczeństwa oraz do ich krytycznej oceny;
IB_P7S_UW08	Absolwent potrafi przygotować projekt z wykorzystaniem m.in. profesjonalnego oprogramowania, prowadzić badania eksperymentalne, analizować, oceniać i porównywać alternatywne rozwiązania problemów z zakresu inżynierii bezpieczeństwa;
IB_P7S_WG04	Absolwent zna i rozumie w pogłębionym stopniu możliwości wykorzystania systemów SIP/ GIS w inżynierii bezpieczeństwa;