



Spatial analysis for safety engineering
Educational subject description sheet

Basic information

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|--|---|--|--|
| Field of study Safety engineering | | Education cycle 2021/22 | |
| Speciality - | | Subject code WIKSiGIBS.MI1BO.2354.21 | |
| 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

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|----|---|
| 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 |

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|---------------------------|--------------------|--------------------|
| Practical workload | Hours 55 | ECTS 2.0 |
|---------------------------|--------------------|--------------------|

* hour means 45 minutes

Study content

| No. | Course content | Activities |
|-----|---|-----------------|
| 1. | The use of geographic information systems in safety engineering. Application of GIS in safety management - practical examples. Spatial data models for spatial analysis. Vector analysis functions. Raster analysis functions. Spatial analyzes of crime phenomena. Spatial multi-criteria analysis in safety engineering. Spatial decision support systems. Sources of spatial data in safety engineering. Spatial information infrastructure for crisis management. | lecture |
| 2. | Exercise 1. Spatial analysis of crime phenomena. Exercise 2. 3D analysis in crisis management. Exercise 3: GIS multi-criteria analysis in crisis management. Exercise 4: Individual project. | project classes |

Course advanced

Teaching methods:

computer lab/laboratory, lecture, classes, Some of the classes are conducted in the form of remote education.

| 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; |