



Ecological safety
Educational subject description sheet

Basic information

Field of study Safety engineering		Education cycle 2022/23	
Speciality occupational health and safety		Subject code ID000000IIBBHS.I8CO.0535.22	
Organizational unit The Faculty of Environmental Engineering and Geodesy		Lecture languages english	
Study level First-cycle (engineer) programme		Mandatory optional	
Study form Full-time		Block specialization 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	Justyna Hachoł		
Other teachers conducting classes	Justyna Hachoł		
Period Semester 4	Examination exam	Number of ECTS points 5.0	
	Activities and hours lecture: 30 project classes: 30		

Goals

C1	The aim of the course is to make students aware of the essence of ecological safety and the need for an analytical and systemic approach to this problem.
C2	The second aim of the course is to provide students with knowledge of ecological safety and risk, global and local ecological problems, natural and technical hazards, sources of ecological risk in investment projects.
C3	The last goal is to familiarize students with the methods used at individual stages of environmental risk management: risk identification, risk assessment, and planning methods of responding to the risk.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	„ecological safety” and „ecological risk” terms; knows how to classify risk and what precautions should be taken to lower its level.	IB_P6S_WG02	written exam, performing tasks
W2	sources of natural and anthropogenic threats; elements of the environment threatened by natural and technical factors.	IB_P6S_WG09, IB_P6S_WG10	written exam, performing tasks
W3	the meaning of the term 'sustainable development'; has knowledge of business planning that is consistent with the principles of sustainable development.	IB_P6S_WG10	written exam, performing tasks
Skills - Student can:			
U1	identify ecological risk factors of investment projects in terms of water economy, choose the method and conduct an assessment of the likelihood of threats occurrence and their effects to chosen ecosystem elements.	IB_P6S_UW15	written exam, performing tasks
U2	interpret obtained results and basing on them choose methods of reactions to the risk	IB_P6S_UO20, IB_P6S_UW02, IB_P6S_UW15	performing tasks
U3	assess the impact of chosen investment to environment	IB_P6S_UW08, IB_P6S_UW12, IB_P6S_UW15	performing tasks
Social competences - Student is ready to:			
K1	critical analysis of designed technical solutions in the context of ecological security	IB_P6S_KK01	performing tasks

Balance of ECTS points

Activity form	Activity hours*
lecture	30
project classes	30
exam participation	2

consultations	15	
exam / credit preparation	30	
class preparation	13	
report preparation	30	
Student workload	Hours 150	ECTS 5.0
Workload involving teacher	Hours 77	ECTS 3.0
Practical workload	Hours 60	ECTS 2.0

* hour means 45 minutes

Study content

No.	Course content	Activities
1.	<ol style="list-style-type: none"> 1. Sustainable development. Ecological safety in terms of general safety. 2. Global and local environmental problems: global warming, ozon layer devastation, smog, biodiversity threat, soil degradation, forest threat, contamination and water shortage, waste, epidemics. 3. Threats and their characteristic - anthropogenic threats (agriculture, industry etc.), breakdowns and technical disasters, natural threats. 4. Health effects of environmental degradation. 5. Sources of ecological risk in investment projects in water management. 6. Ecological security in civil engineering. Tree protection at the construction site. 7. Ecological safety in the textile and food industry. 8. Analysis of ecological risk in reports of impacts on ecological environment. 9. Elements of ecological risk management: identification of risk factors, risk classification, risk measurement, risk matrixes, planning risk response methods. 	lecture
2.	<ol style="list-style-type: none"> 1. Information and data sources. 2. Hazards identification (Pareto rule, FMEA method, expert methods, brainstorming, analogy method). 3. Estimating the probability and effects of environmental threats. Environmental risk assessment (risk matrix, analysis of threats and opportunities). 4. Responding to the risk. 5. Multi-criteria analysis in ecological safety management. 	project classes

Course advanced

Teaching methods:

teamwork, discussion, lecture, classes

Activities	Examination methods	Percentage in subject assessment
lecture	written exam	50%
project classes	written exam, performing tasks	50%

Entry requirements

Biology and ecology

Literature

Obligatory

1. Kutz M. (Ed.). 2018. Handbook of Environmental Engineering
2. Shankar A. 2019. Environmental Engineering and Safety Engineering Handbook
3. Squires V.R. (Ed.). 2015. Ecological Restoration: Global Challenges, Social Aspects and Environmental Benefits. Nova

Kierunkowe efekty uczenia się

Kod	Treść
IB_P6S_KK01	Absolwent jest gotów do krytycznej oceny posiadanej wiedzy i odbieranych treści;
IB_P6S_UO20	Absolwent potrafi organizować, współdziałać i pracować w grupie, przyjmując w niej różne role oraz określić priorytety służące realizacji wyznaczonego przez siebie lub innych zadania;
IB_P6S_UW02	Absolwent potrafi wykorzystać wiedzę z chemii, biologii i ekologii do rozwiązywania zadań związanych z bezpieczeństwem człowieka, środowiska przyrodniczego oraz infrastruktury technicznej;
IB_P6S_UW08	Absolwent potrafi dostrzec w procesie formułowania i rozwiązywania zadań technicznych aspekty prawne, ekonomiczne, społeczne, oraz ekologiczne;
IB_P6S_UW12	Absolwent potrafi wykorzystywać informacje z różnych źródeł, właściwie je integrować, dokonywać ich interpretacji i krytycznej oceny, wyciągać wnioski oraz wyczerpująco je komentować;
IB_P6S_UW15	Absolwent potrafi wykonać raport bezpieczeństwa, ocenić zagrożenia pracowników oraz środowiska przyrodniczego w czasie budowy i eksploatacji urządzeń oraz obiektów technicznych, przygotować wewnętrzny i zewnętrzny plan operacyjny;
IB_P6S_WG02	Absolwent zna i rozumie w zaawansowanym stopniu wybrane zagadnienia z chemii, biologii i ekologii, które pozwalają planować i rozwiązywać zadania związane z bezpieczeństwem środowiska przyrodniczego, osób oraz infrastruktury technicznej;
IB_P6S_WG09	Absolwent zna i rozumie metody identyfikacji zagrożeń – osób, obiektów technicznych oraz elementów środowiska przyrodniczego, selekcji informacji o tych zagrożeniach oraz oceny ich skutków;
IB_P6S_WG10	Absolwent zna i rozumie zagrożenia środowiska przyrodniczego, których źródłem są działalność człowieka, obiekty i urządzenia techniczne oraz czynniki naturalne;