University of Gdańsk

Subject card

Subject name and code	Monitoring of Radiation Contamination, PG_00168498						
Field of study	Nuclear safety and radiological protection						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		4.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Environmental Chemistry and Radiochemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Dagmara Strumińska-Parulska, prof. UG				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	45.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	45		0.0		55.0	100
Subject objectives	Familiarizing students with the topics listed in the course description						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[BJORL3_W02] Understands the role of physical and chemical experimentation, mathematical theoretical models approximating reality, and computer simulations in scientific research methodology; is aware of technological, apparatus, and methodological limitations in scientific research	1. indicates the advantages and disadvantages of using radioactive contamination models, 2. knows the most important programs describing the processes of spreading radioactive contamination 3. knows the principles of presenting the results of conducted model studies	[SW1] oral statement/ conversation/discussion [SW5] implementation of a problem task
[BJORL3_K03] Is aware of and understands the social aspects of the practical application of acquired knowledge and skills and the associated responsibility	1. recognizes the need to conduct risk assessment for radioactive contamination in a social context; 2. is able to participate in discussions about radioactive contamination issues, 3. understands the need for further education, 4. demonstrates an independent, active approach to problems as much as possible and creativity in independent and team work	[SK1] oral statement/conversation/ discussion
[BJORL3_U04] Can use mathematical and computer apparatus to analyze and solve problems in radiological protection and nuclear safety	1. is able to provide examples of the use of physical and mathematical models in modeling the spread of radioactive contamination 2. is able to use software for modeling radioactive contamination and simulate its spread and exposure to released material	[SU5] implementation of a problem task [SU6] demonstration of practical skills
[BJORL3_U02] Has the ability to perform measurements of basic quantities used in physics and chemistry; can develop, describe and present the results of simple experiments and computer simulations; can perform quantitative analyses and formulate qualitative conclusions on this basis; can estimate measurement uncertainties	1. critically verifies the obtained modeling results; 2. is able to prepare a report (statement) from the conducted research with particular emphasis on the three elements of presentation of results, discussion of the obtained results and correct formulation of conclusions from the conducted modeling	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report [SU6] demonstration of practical skills

Subject contents

1. Key physicochemical properties affecting the persistence and dispersion of chemical compounds in the environment; preparation of a comprehensive risk characterization of selected chemical substances using a scoring method.
2. Quantitative modeling of the relationship between chemical structure and chemical properties (QSPR) for new chemical compounds; critical evaluation of the obtained results; correct preparation of a report on the conducted research, with particular emphasis on three elements: (i) presentation of results, (ii) discussion of the obtained results, and (iii) correct formulation of conclusions from the conducted modeling; issues of intellectual property and copyright protection.
3. Modeling the overall persistence and mobility of tested compounds in the environment based on multicomponent models (MM); critical evaluation of the obtained results; correct preparation of a report on the conducted research, with particular emphasis on three elements: (i) presentation of results, (ii) discussion of the obtained results, and (iii) correct formulation of conclusions from the conducted modeling; issues of intellectual property and copyright protection.

Prerequisites and co-requisites

- basic computer skills (copying files and running applications, spreadsheets, web browsers)
- knowledge of English at the B2 level of proficiency of the Common European Framework of Reference for Languages.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
modelling	51.0%	100.0%

Recommended reading

Basic literature

- Script and instructions for exercises prepared by the instructors.
- Markiewicz M.T., Podstawy modelowania rozprzestrzeniania się zanieczyszczeń w powietrzu atmosferycznym, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2004.
- Migaszewski Z.M., Gałuszka A., Podstawy geochemii środowiska, WNT, Warszawa 2007.
- Rup K., Procesy przenoszenia zanieczyszczeń w środowisku naturalnym, WNT, Warszawa 2006.
- G.W vanLoon, S.J. Duffy: Chemia środowiska. Wydawnictwo Naukowe PWN (2008). ISBN: 978-83-01-15324-3.
- T. Puzyn, A. Mostrąg-Szlichtyng, N. Suzuki, M. Haranczyk. Metody chemometryczne w ocenie ryzyka: Ilościowe zależności pomiędzy strukturą chemiczną a właściwościami (QSPR) dla nowych rodzajów zanieczyszczeń chemicznych. W: Zuba D., Parczewski A. (Eds.): Chemometria w nauce i praktyce. Wydawnictwo Instytutu Ekspertyz Sądowych, Kraków (2009).

	Supplementary literature	• T. Nakajima, T. Ohara, M. Uematsu, Y. Onda, Environmental Contamination from the Fukushima Nuclear Disaster Dispersion, Monitoring, Mitigation and Lessons Learned, 2019, https://doi.org/10.1017/9781108574273 • J. Severa, J. Bár, Handbook of Radioactive Contamination and Decontamination, 1991, Elsevier Science • IAEA-TECDOCs
	eResources addresses	
Example issues/ example questions/ tasks being completed	-	
Work placement	Not applicable	

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