



Subject card

Subject name and code	INSTRUMENTAL TECHNIQUES IN ENVIRONMENTAL BIOLOGY, PG_00048656						
Field of study	Green Technologies						
Date of commencement of studies	October 2023	Academic year of realisation of subject				2023/2024	
Education level	second-cycle 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	1	Language of instruction				English	
Semester of study	1	ECTS credits				5.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Laboratorium Genetyki Bakterii -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr Satish Raina				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	15.0	60
	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	60		5.0		60.0	125
Subject objectives	Review of various problems related to techniques used in environmental biology, biotechnician in the production of biofuels and genetically modified plants, techniques in biological research and in the development of biosensors, research on stress-related proteins, including chaperone proteins.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K7_W01] a broader and deeper knowledge of certain branches of mathematics, including elements of applied mathematics and optimization methods including mathematical methods, useful to formulate and solve complex tasks in the field of environmental technologies and modern analytical methods		student is able to provide a feasibility study for alternative biotechniques for bioremediation based on quantitative statistics			[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects	
	[K7_K03] can consciously and supported by the experience to present your work, provide information in a manner commonly understood, to communicate, to make self-assessment and constructive criticism of the work of others, the reasons for different points of view		student is able to design techniques for testing and monitoring environmental pollution, design ways of producing new, renewable products and design new antibiotics			[SK3] Assessment of ability to organize work [SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills [SK2] Assessment of progress of work	
	[K7_U02] able to operate equipment and perform typical analyzes of studies of environmental pollution and design and oversee the environmentally friendly technologies and zero-waste technologies, can perform expert on the environmental impact of technology already working		student is able to use biosensors to monitor environmental pollution, knows how to choose and apply metabolic engineering techniques to obtain highly efficient biofuels			[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools	

Subject contents	1. Microbiological techniques in environmental biology. 2. Biological methods of wastewater treatment. 3. Biological methods of biofuel production. 4. GMO plants. 5. Biological methods of producing various components used in environmental biology. 6. Biological research used in environmental biology.		
Prerequisites and co-requisites	basic knowledge of chemistry, analytical methods, necessary knowledge of microbiology, molecular biology and toxicology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test	60.0%	60.0%
	laboratory	60.0%	20.0%
	presentation and discussion	60.0%	20.0%
Recommended reading	Basic literature	T. Srinivas, Environmental Biotechnology, New Age International Publishers, 2008 Mike Calver, Alan Lybery, Jen McComb, Mike Bamford, Environmental Biology, Cambridge University Press, 2009 Alan Scragg, Environmental Biotechnology, Oxford University Press, New York, 2005	
	Supplementary literature	the latest review articles in scientific journals on techniques in environmental biology	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	1. Biological methods of biofuel production. 2. Biological methods of wastewater treatment. 3. Techniques for obtaining genetic modification of plants and ecological concerns associated with it.		
Work placement	Not applicable		