

Subject card

Subject name and code	Biotechnology of plants and algae, PG_00147097						
Field of study	Genetics and Experimental Biology						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Experimental Biology and Plant Biotechnology -> Faculty of Biology -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. Wojciech Pokora				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	30.0	0.0	0.0	0.0	30
	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	30		2.0		18.0	50
Subject objectives	Understand the applicability of biotechnology techniques in experimental plant biology: creation of new species, GMOs in plant reproduction research, use of biotechnology in agriculture, horticulture, medicine						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[GBEL3_K01] The utilization of theoretical knowledge in laboratory and production practice.		The graduate is ready to apply theoretical knowledge in laboratory and production practice		[SK1] oral statement/conversation/discussion		
	[GBEL3_W05] the principles of research planning based on achievements in biological sciences and related fields, the potential application of their results in practice, the principles of operation of equipment and apparatus used in molecular genetics research, and the principle of interpreting biological phenomena and processes based on empirical data in research and practical activities, with consideration for sustainable use of biological diversity.		The graduate will be familiar with the principles of research planning based on the achievements of the biological sciences and the possibilities of using their results in practice, the principles of operation of equipment and apparatus used in plant and algal biotechnology research and the principle of interpretation of biological phenomena and processes based on empirical data in research work and practical action, taking into account the sustainable use of biodiversity		[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report		

Subject contents	Legal aspects of working with GMOs, description and identification of gene donor and recipient organisms. Tools bioinformatics in plant and algal biotechnology. Differences between plant and other expression systems, adaptation of nonplant to expression in plant cells. Methods of production and extraction of plant secondary metabolites. Application of biotechnological techniques in experimental plant biology and agriculture.		
Prerequisites and co-requisites	lack		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	determination of a pass mark on the basis of partial marks received during the semester	51.0%	50.0%
	completion of a credit work - project or presentation	51.0%	50.0%
Recommended reading	Basic literature	Malepszy S. (red.). 2009. Biotechnologia Roślin, PWN, Warszawa. Michalik B. (red.). 2009. Hodowla roślin z elementami genetyki i biotechnologii. PWRiL Naukowe publikacje przeglądowe z zakresu biologii eksperymentalnej i biotechnologii roślin.	
	Supplementary literature	Cole C. [Ed]. 2014-2020. Compendium of Plant Genomes. Springer Loyola-Vargas V.M., Vázquez-Flota F. (red.). 2006. Plant Culture Protocols. W: Methods in molecular Biology. Humana Press, Totowa, New Jersey. Pokora, W., Aksmann, A., Baścik-Remisiewicz, A., Dettlaff-Pokora, A., Rykaczewski, M., Gappa, M., Tukaj, Z. Changes in nitric oxide/hydrogen peroxide content and cell cycle progression: Study with synchronized cultures of green alga Chlamydomonas reinhardtii. Journal of Plant Physiology (2017) 208, 8493. Rojek J, Tucker MR, Rychłowski M, Nowakowska J, Gutkowska M. 2021. The Rab Geranylgeranyl Transferase Beta Subunit Is Essential for Embryo and Seed Development in Arabidopsis thaliana. International Journal of Molecular Sciences. 22(15):7907. https://doi.org/10.3390/ijms22157907 Rojek J, Tucker MR, Pinto SC, Rychłowski M, Lichocka M, Soukupova H, Nowakowska J, Bohdanowicz J, Surmacz G, Gutkowska M. 2021. Rab dependent vesicular traffic affects female gametophyte development in Arabidopsis. Journal of Experimental Botany. 72(2): 320-340. doi: 10.1093/jxb/eraa430 Chincinska I.A., Kapusta M., Zielińska E., Miklaszewska M., Błażejewska K., Tukaj Z. Production of recombinant human deoxyribonuclease I in Lua cylindrica L. and Nicotiana tabacum L.: evidence for protein secretion to the leaf intercellular space. Plant Cell, Tissue and Organ Culture (2019) 136 (1), 5163. Miklaszewska M., Banaś A., Królicka A. Metabolic engineering of fatty alcohol production in transgenic hairy roots of Crambe abyssinica. Biotechnology and Bioengineering (2017) 114(6), 1275-1282. Chincinska, Izabela Anna. "Leaf infiltration in plant science: old method, new possibilities." Plant Methods 17.1 (2021): 1-21.	
	eResources addresses		
	Example issues/ example questions/ tasks being completed		
Work placement	Not applicable		

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