

Subject card

Subject name and code	Biotechnology of plants and algae, PG_00198346						
Field of study	Genetics and Experimental Biology						
Date of commencement of studies	October 2026		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	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 Joanna Rojek				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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	Knowledge of and ability to apply basic plant and algal biotechnology techniques.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[GBEL3_K01] The graduate is prepared to: use of theoretical knowledge in laboratory and production practice		The graduate is ready to apply theoretical knowledge in laboratory and production practice		[SK8] observation of student's independent or team work		
	[GBEL3_U01] The graduate is able to: independently perform practical tasks in the biological and related sciences, formulate research problems, analyse their results and draw conclusions.		The graduate can independently perform simple practical tasks in the field of plant and algal biotechnology		[SU6] demonstration of practical skills [SU8] observation of student's independent or team work		
Subject contents	Basic methods for growing plants/tissues/cells in in vitro culture. Isolation and identification of selected secondary metabolites/recombinant proteins/enzymes from plants. Isolation of nucleic acids from plant tissues. Transformation of plants in the Agrobacterium tumefaciens system. Identification of transformed plants. Somatic hybridisation of plant cells - generation of new species.						
Prerequisites and co-requisites							
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 the credit work - completion of specific practical work		51.0%		50.0%		

Recommended reading	Basic literature	Malepszy S. (red.). 2009. Biotechnologia Roślin, PWN, Warszawa. Kopcewicz J. (red.). 2007. Fizjologia Roślin, PWN, Warszawa. Michalik B. (red. 2009. Hodowla roślin z elementami genetyki i biotechnologii. PWRiL. Stewart CN, Jr. (Ed) 2008. Plant Biotechnology and Genetics: Principles, Techniques, and Applications. John Wiley & Sons, Inc., Hoboken, New Jersey. 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 <i>Lula cylindrica</i> L. and <i>Nicotiana tabacum</i> 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 <i>Crambe abyssinica</i> . 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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