University of Gdańsk

Subject card

Subject name and code	Biotechnology of plants and algae, PG_00147104		
Field of study	Genetics and Experimental Biology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
Education level	undergraduate studies	Subject group	Obligatory subject group 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 polish
Semester of study	4	ECTS credits	1.0
Learning profile	academic	Assessment form	
Conducting unit	Katedra Biologii Eksperymentalnej i Biotechnologii Roślin -> Faculty of Biology		
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	15.0	0.0	0.0	0.0	0.0	15

E-learning hours included: 0.0

Additional information:
lecture with multimedia presentation

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	15	3.0	7.0	25

Subject objectives

To acquire knowledge in the field of biotechnology of higher plants and algae. To understand the contribution of genetically modified plants and plant biotechnology techniques to the development of biological sciences and the emergence of new research directions and disciplines.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[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.	Graduates will be familiar with the principles of planning research based on the achievements of the biological sciences and the possibilities of using their results in practice, the principles of functioning of the equipment and apparatus used in research in the field of plant and algal biotechnology and the principle of interpreting biological phenomena and processes based on empirical data in research work and practical action, taking into account the sustainable use of biodiversity	[SW4] test/exam - oral or written
[GBEL3_W04] applied knowledge in microbiology and plant biotechnology.	Graduates have a basic knowledge applied to microbial and plant biotechnology	[SW4] test/exam - oral or written

Subject contents

The role of plants in meeting human needs. Developmental processes in plant in vitro cultures. Techniques for growing plants and algae in in vitro cultures. Production, extraction and purification of primary and secondary plant metabolites. Methods of obtaining species with new traits: crossing, somatic hybridisation, haploidisation and diploidisation, transformation and gene editing. Creation of gene constructs of genes for plant modification. Genetic transformation of plant cells. Genetically modified plants. Cytogenetic and molecular diagnosis of plants with new traits. Social and legal aspects of plant biotechnology.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">lack</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>exam</td><td>51.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">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</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3"></td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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