University of Gdańsk

Subject card

Subject name and code	Molecular plant physiology, PG_00147015						
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	3		ECTS credits		2.0		
Learning profile	academic		Assessment form		exam		
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	30.0	0.0	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		5.0		15.0	50
Subject objectives	To familiarize students with the current state of knowledge and the latest trends in plant molecular physiology and their relationship with other natural disciplines. Preparing students to conduct basic research in the field of molecular physiology of plants.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[GBEL3_W06] A graduate has an advanced knowledge and understanding of: the development and current state of knowledge and the latest trends in molecular genetics and related fields; indicates their relationship to other disciplines in the life sciences or medical sciences and their potential for use in practice	The graduate is aware of the development and current state of knowledge as well as the latest trends plant physiology	[SW4] test/exam - oral or written
[GBEL3_W04] A graduate has an advanced knowledge and understanding of: knowledge applied to microbial and plant biotechnology.	Graduate has basic knowledge of plant molecular physiology	[SW4] test/exam - oral or written
[GBEL3_W01] A graduate has an advanced knowledge and understanding of: the structure and properties of the main types of biological macromolecules; the molecular mechanisms of basic metabolic pathways and genetic information flow; the sources of genetic variation in organisms and the mechanisms of evolution. They can explain the principles of inheritance, the differences in structure and function between prokaryotic and eukaryotic cells, as well as the structure and functional relationships at the cellular and tissue levels.	Graduate describes the structure and properties of basic types of macromolecules biological, molecular mechanisms of basic metabolism pathways and information flow in plant cells	[SW4] test/exam - oral or written
[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.	Absolwent umie formułować problemy badawcze i analizować wyniki doświadczeń z fizjologii roślin	[SU1] oral statement/conversation/ discussion

Subject contents

Functioning of organelles characteristic of a plant cell. Molecular aspects of the photosynthesis process. Respiration and photorespiration. Uptake and transport of water and minerals in the plant body. Plant hormone synthesis - perception and transduction of hormonal signals. Regulation of physiological processes at the level of protein transcription and translation. Signaling in a plant cell. Basics of plant cells' response to stress. Plant circadian and cellular cycles. Induction and regulation of plant flowering. Plant aging and death.

Prerequisites and co-requisites

Assessment methods and criteria

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

Recommended reading

Basic literature	Buchanan, Gruissem, Jones (red.), 2015. Biochemistry and molecular biology of Plants, Willey Balacwell. Szmidt-Jaworska, Kopcewicz J.(red.). 2020. Fizjologia roślin. Wyd. PWN, Warszawa Taiz L., Zeiger E. (red.). 2010. Plant physiology. The Benjamin/Cummings Publ. Comp. Inc.
Supplementary literature	Scientific publications in the field of experimental biology and molecular physiology of plants Pokora, W., Aksmann, A., Baścik-Remisiewicz, A., Dettlaff-Pokora, A., Rykaczewski, M., Gappa, M., and 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. Renberg L., Johansson A. I., Shutova T., Stenlund H., Aksmann A., Raven J. A., Gardeström P., Moritz T. & G. Samuelsson A Metabolomic Approach to Study Major Metabolite Changes during Acclimation to Limiting CO2 in Chlamydomonas reinhardtii. Plant Physiol. 154(1): 187÷196. Wilmowicz E., Kućko A., Pokora W., Kapusta M., Jasieniecka-Gazarkiewicz K., Tranbarger T.J., Wolska M., Panek K. EPIP-Evoked Modifications of Redox, Lipid, and Pectin Homeostasis in the Abscission Zone of Lupine Flowers. Int. J. Mol. Sci. 2021 (22), 3001.

	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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