

Nazwa zajęć/ <i>Course title:</i>	Fizjologia roślin II	ECTS	2
Nazwa zajęć w j. angielskim/ <i>Course title in English:</i>	Plant physiology II		
Zajęcia dla kierunku studiów/ <i>Degree program name:</i>	Biotechnology		

Język kursu/ <i>Course language:</i>		English		Poziom studiów/ <i>Study level:</i>		I	
Typ studiów/ <i>Form of studies:</i>	X intramural .. extramural	Status zajęć/ <i>Course status</i>	podstawowe/ <i>Basic</i> X Kierunkowe/ <i>major</i>	obowiązkowe/ <i>mandatory</i> X do wyboru/ <i>elective</i>	Semestr/ <i>Semester:</i>	4 semestr zimowy/ <i>winter semester</i> X semestr letni/ <i>summer semester</i>	
Rok akademicki/ <i>Academic year:</i>				2022/2023	Numer katalogowy/ <i>Catalogue number:</i>	BBT_BTa-1S-4L-34_5	

Koordinator zajęć/ <i>Course coordinator:</i>	Prof. dr hab. Agnieszka Gniazdowska-Piekarska			
Prowadzący zajęcia/ <i>Teachers responsible for the course:</i>	Prof. dr hab. Agnieszka Gniazdowska-Piekarska, dr Katarzyna Ciąčka, dr Paweł Staszek			
Założenia, cele i opis zajęć/ <i>Aims, objectives and description of the course:</i>	<p>The aim of the course is to learn about such issues as: (i) adaptation and acclimatization of plants in changing environmental conditions, (ii) interdependence between life processes, (iii) activation of alternative metabolic pathways under specific conditions, (iv) The role of hormones in the regulation and coordination of life processes plants.</p> <p>Lectures: (1) seed dormancy and germination, the impact of endogenous and exogenous factors on seed germination, (2) adaptation of photosynthesis to various environmental conditions, (3) mechanisms of plant reaction to environmental stresses, allelopathy, (4) mechanisms of plant tissue aging, participation of free radicals, induction of oxidative stress and activation of the antioxidant system.</p> <p>Classes: (1) seed germination (the role of phytochrome, GA, ABA, activation of backup materials, influence of external factors); (2) comparison of photosynthesis intensity under different light conditions, (3) plant reaction to biotic stresses: allelopathy, influence of allelopathic compounds on seed germination and the growth and development of young seedlings, plant reaction to abiotic stresses (salinity, heavy metals), damage assessment tissues; (4) plant aging, the role of hormones in the aging regulation, oxidative stress, activity of the antioxidant system.</p>			
Formy dydaktyczne, liczba godzin/ <i>Teaching forms, number of hours:</i>	<p>a) Lectures - number of hours 15; b) laboratory classes - number of hours 15;</p>			
Metody dydaktyczne/ <i>Teaching methods:</i>	Monographic lecture, experience / experiment, project, discussion, problem solving - with the use of distance learning methods.			
Wymagania formalne i założenia wstępne/ <i>Formal requirements and prerequisites</i>	botany, cell biology, biochemistry, plant physiology - basic course; Knowledge of the basic physiological processes in plants and the basics of their regulation. Knowledge of classic phytohormones and the scope of their activity in plants.			
Efekty uczenia się/ <i>Learning outcomes:</i>	treść efektu przypisanego do zajęć/ <i>the content of the effect assigned to the course:</i>		Odniesienie do efektu kierunkowego <i>/Relation to the course outcomes</i>	Siła dla ef. kier* <i>/Impact on the course outcomes*</i>
Wiedza (absolwent zna i rozumie) <i>/Knowledge:</i> (the graduate knows and understands)	W1	He knows, describes and monitors the basic life processes of the plant	K_W03 K_W05 K_W06 K_W08	3 2 3 3
	W2	understands the influence of environmental and endogenous factors on the course of physiological processes in plants	K_W03 K_W05 K_W06 K_W08	3 2 3 3
Umiejętności (absolwent potrafi) <i>/Skills:</i> (the graduate is able to)	U1	analyzes the influence of environmental and endogenous factors on the course of physiological processes in plants (e.g. photosynthesis under various radiation intensity conditions, the effect of hormones on seed germination, allelopathy)	K_U05	2
	U2	has the ability to search for and use the necessary information from various sources and use them creatively to achieve the set goal	K_U07 K_U22	2 2
Kompetencje (absolwent jest gotów do) <i>/Competences:</i> (The graduate is ready to)	K1	is able to select and evaluate basic experimental methods for studying the physiological responses of a plant	K_K01 K_K02	1 1

<i>Treści programowe zapewniające uzyskanie efektów uczenia się: /Program contents ensuring the achievement of the learning outcomes:</i>	Understanding and understanding the mechanisms of regulation of life processes at various stages of ontogenesis - from seed germination to plant aging
<i>Sposób weryfikacji efektów uczenia się/ Methods of the verification of the learning outcomes:</i>	Effect: W, U, K - activity during the discussion of a defined problem, also in working conditions with the use of distance learning methods; Effect: U1, U2, K1 - preparation of a project and / or presentation, also in the conditions of distance learning
<i>Szczegóły dotyczące sposobów weryfikacji i form dokumentacji osiągniętych efektów uczenia się /Details on the verification methods and of the ways of documenting the learning outcomes:</i>	Project content with assessment or multimedia presentation
<i>Elementy i wagi mające wpływ na ocenę końcową/Elements and weights influencing the final grade:</i>	The assessment of the learning outcomes consists of: 1) Observation of the student's involvement during the discussion of a defined problem and during laboratory classes and / or classes taking place in the form of distance learning 2) preparation of a project or preparation of a multimedia presentation. Weight of individual elements: 1-10%, 2 - 90%. The final grade is calculated as the sum of points obtained for each element (taking into account their weight). You can get 100 points for each element. The condition for passing the course is to obtain a minimum of 51% of points including all elements.
<i>Miejsce realizacji zajęć/ Teaching place:</i>	Classroom, laboratory, in the case of the subject being realized in a remote or mixed form, an application for remote communication
<i>Literature / Literature:</i>	
Fizjologia roślin, red. J. Kopcewicz, S. Lewak, PWN Warszawa 2002, (2) Fizjologia roślin wprowadzenie red. S. Lewak, J. Kopcewicz, PWN Warszawa 2009, (3) Fizjologia roślin red. M. Kozłowska, PWRiL, Poznań 2007, (4) Fizjologia roślin sadowniczych Tom I i II, red. Jankiewicz L.S., Lipecki J., PWN, Warszawa 2011. uzupełniająca: (1)Taitz L., Zeiger E. 2005. Plant Physiology. Eds. Sinauer Associates, Sunderland, (2) Hopkins W.G., Huner N. P. A. 2004. Introduction to Plant Physiology. Eds. John Wiley & Sons, New York – USA, (3) Fizjologia plonowania roślin. R.J. Górecki, S. Grzesiuk. UWM, Olsztyn 2002.	
<i>UWAGI/ANNOTATIONS</i>	
The following scale is used to calculate the final score: 100-91% points - 5.0 90-81% points - 4.5, 80-71% points - 4.0 70-61% points - 3.5 60-51% point - 3.0	

*) 3 – zaawansowany i szczegółowy, 2 – znaczący, 1 – podstawowy/ 3 – significant and detailed, 2 – considerable, 1 – basic,

Wskaźniki ilościowe charakteryzujące moduł/przedmiot/*Quantitative summary of the course:*

Szacunkowa sumaryczna liczba godzin pracy studenta (kontaktowych i pracy własnej) niezbędna dla osiągnięcia zakładanych dla zajęć efektów uczenia się - na tej podstawie należy wypełnić pole ECTS / <i>Estimated number of work hours per student (contact and self-study) essential to achieve the presumed learning outcomes - basis for the calculation of ECTS credits:</i>	50 h
Łączna liczba punktów ECTS, którą student uzyskuje na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich lub innych osób prowadzących zajęcia/ <i>Total number of ECTS credits accumulated by the student during contact learning:</i>	1.2 ECTS