KARTA PRZEDMIOTU

I. Dane podstawowe

Nazwa przedmiotu	Basics of plant cytophysiology and ontogenesis
Nazwa przedmiotu w języku angielskim	Basics of plant cytophysiology and ontogenesis
Kierunek studiów	Biotechnology
Poziom studiów (I, II, jednolite magisterskie)	BSc
Forma studiów (stacjonarne, niestacjonarne)	part-time
Dyscyplina	Biological sciences
Język wykładowy	English

Koordynator przedmiotu/osoba odpowiedzialna	Dr Małgorzata Poniewozik

Forma zajęć *(katalog zamknięty ze słownika)*	Liczba godzin	semestr	Punkty ECTS
wykład	30	II	9
ćwiczenia	60	II	

Wymagania wstępne	student completed the general education cycle in biology or chemistry

II. Cele kształcenia dla przedmiotu

Understanding the ultrastructure, functions, life processes of cells and plant tissues, as well as acquiring basic knowledge in the field of plant ontogenesis.
Acquiring the knowledge about scientific equipment, research techniques, such as microscopy, fixation and staining of freshly prepared slides.

III. Efekty uczenia się dla przedmiotu wraz z odniesieniem do efektów kierunkowych

Symbol	Opis efektu przedmiotowego	Odniesienie do efektu kierunkowego
WIEDZA		
W_01	The student is able to define basic concepts in the field of cytophysiology and ontogenesis, the knowledge of which is used in biotechnological processes; indicates differences between an animal and a plant cell; describes the structure of cell organelles and also indicates their functions in the plant cell.	K_W01
W_02	The student knows about the structure of plant tissues and is able to recognize their individual types on microscopic sample slides and knows the internal and external structure of vegetative and generative organs of higher plants.	K_W01
W_03	The student has a basic knowledge of biotechnological methods based on the use of plants and physiological processes that take place in plant cells and tissues.	K_W03
UMIEJĘTNOŚCI		
U_01	The student can use light microscopy, independently performs microscopic slides from various types of material, conducts observations and draws drawings. They can conduct experiments using plant material. Based on knowledge acquired, she/he is able to interpret, correctly describe and present research results.	K_U01, K_U02, K_U03
U_02	The student uses a variety of sources of knowledge in the learning process. She/he has the ability to obtain information from professional literature and can assess the pros and cons of the usage of plants in various branches of life and economy.	K_U03, K_U12, K_U13, K_U17
U_03	The student can prepare a speech and a multimedia presentation, and report a given topic, share her/his knowledge with others, and can present her/his point of view.	K_U12, K_U13, K_U17
KOMPETENCJE SPOŁECZNE		
K_01	The student is responsible for entrusted equipment and his own work, respects his own work and work of other people, shows appropriate habits necessary to work with plant material while maintaining the principles of health and safety at work.	K_K04

IV. Opis przedmiotu/ treści programowe

Introduction to research techniques and laboratory equipment. Selected techniques of light microscopy. Techniques of preparation of slides from plant material. Dyeing techniques for preparations. Microscopic analysis of preparations. Intercellular connections – symplast, apoplast. Specific components of plant cells: cell wall, cell membranes, cytoplasm and cytoskeleton, intracellular signalling, autonomous cell organelles, nucleus. Cell division and cell cycle. Plant tissues - the specificity of the structure and physiology of cells of various tissues. Meristems. Anatomy and morphology of the root, stem and leaf. The structure of generative organs in angiosperms. Oogenesis and spermatogenesis. Laboratory techniques used in analyzing plant material,

advantages and disadvantages of particular methods.

V. Metody realizacji i weryfikacji efektów uczenia się

Symbol efektu	Metody dydaktyczne *(lista wyboru)*	Metody weryfikacji *(lista wyboru)*	Sposoby dokumentacji *(lista wyboru)*
WIEDZA			
W_01	Conventional lecture	Exam / Written test, Paper	Test / Written test
W_02	Laboratory analysis, Laboratory classes	Report, Test	Test / Written test / Report file
W_03	Laboratory analysis, Laboratory classes	Report, Test	Test / Written test / Report file
UMIEJĘTNOŚCI			
U_01	Laboratory classes	Test / Written test / Report	Test / Written test / Report file
U_02	Laboratory classes	Test / Written test / Report	Evaluated test / written test / Report file
U_03	Project-based learning	Test / Written test / Paper	Protocol /paper printout/paper file
KOMPETENCJE SPOŁECZNE			
K_01	Laboratory classes	Observation / Report	Rating card / Observation / Report file

VI. Kryteria oceny, wagi…

Mark	**Evaluation criteria**	
very good (5)	the student realizes the assumed learning outcomes at a very good level	the student demonstrates knowledge of the education content at the level of 91-100%
overgood (4.5)	the student accomplishes the assumed learning outcomes an over good level	the student demonstrates knowledge of the education content at the level of 86-90 %
good(4)	the student accomplishes the assumed learning outcomes at a good level	the student demonstrates knowledge of the education content at the level of 71-85%
quite good(3.5)	the student accomplishes the assumed learning outcomes at a quite good level	the student demonstrates knowledge of the education content at the level of 66-70%
sufficient (3)	the student accomplishes the assumed learning outcomes at a sufficient level	the student demonstrates knowledge of the education content at the level of 51-65%

insufficient (2)	the student accomplishes the assumed learning outcomes at an insufficient level	the student demonstrates knowledge of the education content below the level of 51%

VII. Obciążenie pracą studenta

Forma aktywności studenta	Liczba godzin
Liczba godzin kontaktowych z nauczycielem	90
Liczba godzin indywidualnej pracy studenta	135

VIII. Literatura

Literatura podstawowa
Alberts A., Bray D., Johnson A., Lewis J., Raff M., Roberts K., Walter P.2014. Essential Cell Biology. Garland, New York.
Literatura uzupełniająca
Taiz L., Zeiger E. Sinauer P. Plant physiology. Associated Inc. 6 th Edn scientific articles available in the internet sources