

## Course Syllabus

### I. General Information

Course name	Basics of plant cytophysiology and ontogenesis
Programme	Biotechnology
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BSc
Form of studies (full-time, part-time)	part-time
Discipline	Biological sciences
Language of instruction	English

Course coordinator/person responsible	Dr Małgorzata Poniewozik
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Type of class ( <i>use only the types mentioned below</i> )	Number of teaching hours	Semester	ECTS Points
lecture	30	II	9
tutorial			
classes	60	II	
laboratory classes			
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	student completed the general education cycle in biology or chemistry
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### II. Course Objectives

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. Course learning outcomes with reference to programme learning outcomes**

Symbol	Description of course learning outcome	Reference to programme learning outcome
<b>KNOWLEDGE</b>		
W_01	The student is able to define basic concepts in the field of cytophysiology and ontogenesis; 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. Based on this knowledge, she/he is able to interpret, correctly describe and present research results.	K_W03
<b>SKILLS</b>		
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.	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
<b>SOCIAL COMPETENCIES</b>		
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. Course Content**

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. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods (choose from the list)	Forms of assessment (choose from the list)	Documentation type (choose from the list)
<b>KNOWLEDGE</b>			
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
<b>SKILLS</b>			
U_01	Laboratory classes	Report, Test	Test / Written test Report file
U_02	Laboratory classes	Report, Test	Test / Written test Report file
U_03	Project-based learning	Test / Written test Paper	Protocol, Paper printout/Paper file
<b>SOCIAL COMPETENCIES</b>			
K_01	Laboratory classes	Observation Report	Rating card / Observation Report Report file

### VI. Grading criteria, weighting factors.....

Mark	Evaluation criteria	
<b>very good (5)</b>	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%
<b>overgood (4.5)</b>	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 %
<b>good(4)</b>	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%
<b>quite good(3.5)</b>	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%
<b>sufficient (3)</b>	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%
<b>insufficient (2)</b>	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. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	90
Number of hours of individual student work	135

### VIII. Literature

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