

Course name:	Plants' mysteries under microscope	ECTS	3.0
Translation of the course name into English:	-		
Study field:	General Horticulture		

Language of lectures:	English	Study level: Master of science	
Study form: <input checked="" type="checkbox"/> stationary <input type="checkbox"/> extramural	Status of lectures: <input type="checkbox"/> primary <input type="checkbox"/> directional <input type="checkbox"/> obligatory <input checked="" type="checkbox"/> facultative	Semester number: 3	<input type="checkbox"/> winter semester <input checked="" type="checkbox"/> spring semester
Academic year from which the description applies		2021/2022	Catalog number: OGR-O2-S-3L18.16 ang

Course coordinator:	Dr hab. Agata Jędrzejuk		
Lecturers:	Dr hab. Agata Jędrzejuk		
Unit running the course:	Department of Ornamental Plants		
Unit ordering the course:	Faculty of Horticulture		
Assumptions, objectives and description of the course:	The purpose of the subject is to give the student the possibility to acquire the basic skills in using techniques of microscopy to study plant development and senescence as well as transgenic plants (FISH/GISH). Lectures will present microscopical techniques used in plant research (light, scanning, transmission, confocal microscope). Bases of flowering and reproduction processes will be shown and explained: flower formation and its genetical base (ABC model) will be explained. Flower senescence will be studied and the symptoms of PCD followed. Application of techniques of molecular biology in connection with classical microscopical analyses will be demonstrated (immunohistochemistry, in situ hybridization, cytogenetics).		
Didactic forms, number of hours:	Lectures: hours 15 Practical classes: hours 15		
Teaching methods:	Microscopical techniques used in plant research; molecular methods used in plant research (immunohistochemistry, in situ hybridization); FISH – chromosome painting; ABC model in flower development; basal aspects of pollen structure and development; plant pattern of pollinization and fertilization.		
Formal requirements and prerequisites:	Plant anatomy		
Learning outcomes:	Knowledge: W_01 – student knows how to use different types of microscope W_02 – student knows plant anatomy and physiology W_03 – student knows how to interpretate scientific results	Skills: U_01 - student uses an appropriate microscopic technique to an appropriate scientific issue U_02 - is able to work in a team	Competences: K_01 - is open to new technological solutions
The way of verification of learning outcomes :	Effect W_01,02,03; U_01, 02 – an evaluation test		
Form of documentation of achieved learning outcomes :	written test of classes, and the exam		
Elements and weights affecting the final grade:	Test results – 50%, exam results – 50%		
Place of classes:	Plant collections of DOP, microscopes, photo cameras enabling documentation of the students' work, laminar flow bench and the equipment of the plant anatomy laboratory in DOP		
Basic and supplementary literature :	Robinson DG, Ehlers U, Herken R, Herrmann B, Mayer F, Schuermann FW (1987) Methods of Preparation for Electron Microscopy. An introduction for the Biomedical Sciences, Springer – Verlag, Berlin, Heidelberg, New York, London, Paris, Tokyo.		
COMMENTS			

Quantitative indicators characterizing the module / object:

Estimated total number of student work hours (contact and own work) necessary to achieve the assumed learning outcomes - on this basis, complete the ECTS field:	52 h
The total number of ECTS points that a student receives in classes requiring direct participation of academic teachers or other lecturers:	1,5 ECTS

Table of compliance of the directional learning outcomes with the effects of the course:

Effect category	Learning outcomes for the course:	Reference to learning outcomes specific for study program on particular study field (direction)	The impact of course on the directional effect *)
Knowledge - W_01	student knows how to use different types of microscope	K_W01	3
Knowledge - W_02	student knows plant anatomy and physiology	K_W01; K_W04	2
Knowledge - W_03	student knows how to interpretate scientific results	K_W01; K_W04	2
Skills - U_01	student uses an appropriate microscopic technique to an appropriate scientific issue	K_U01; K_U02; K_U04	3
Skills - U_02	is able to work in a team	K_U11	1
Competences - K_01	is open to new technological solutions	W_K01	2