



SZKOŁA GŁÓWNA
GOSPODARSTWA
WIEJSKIEGO

In-Vitro Techniques in the Propagation of Ornamental Plants

Educational subject description sheet

Basic information

Field of study Course Offer for exchange students - second cycle studies, including uniform master studies (MA programmes)		Didactic cycle 2024/25	
Speciality -		Subject code PWMPWM2S_D.B100000P.06368.24	
Organizational unit Course Offer for exchange students		Lecture languages english	
Study level second cycle studies, including uniform master studies (MA programmes)		Mandatory Elective subjects	
Study form full-time studies		Block Basic subjects	
Education profile General academic		Disciplines	
Coordinator	Andrzej Pacholczak		
Teacher	Andrzej Pacholczak		
Period Winter semester	Examination Pass with grade	Number of ECTS points 3	
	Activities and hours Lecture: 15 Laboratory exercises: 15		

Goals

Code	Goal
C1	The aim of classes is to make students acquainted with principles of functioning of the tissue culture laboratory, to teach them to work in sterile conditions and to start and maintain plant tissue cultures. Students gain theory of application of the in vitro cultures for propagation of ornamental plants, they develop ability to prepare culture media, to initiate and maintain cultures and to apply different technologies to propagate different plant species.

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge - Student knows and understands:			
W1	the organization of the in vitro culture laboratory and the principles of its functioning.		Presentation, Test (written or computer based), Assessment of work in the laboratory
W2	the types of media used for in vitro plant cultures and the types of tissue cultures.		Presentation, Test (written or computer based), Assessment of work in the laboratory
W3	the methods of assessing the regeneration of plant material.		Presentation, Test (written or computer based), Assessment of work in the laboratory
Skills - Student can:			
U1	how to prepare solid and liquid nutrients.		Presentation, Test (written or computer based), Assessment of work in the laboratory
U2	how to choose the appropriate regeneration model for the selected plant species or the type of planned research.		Presentation, Test (written or computer based), Assessment of work in the laboratory
Social competences - Student is ready to:			
K1	make individual decisions and work in a group.		Assessment of work in the laboratory
K2	taking care of the appropriate quality of ornamental plant propagation material.		Presentation, Assessment of work in the laboratory

Study content

No.	Course content	Subject's learning outcomes	Activities
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1.	Student will gain knowledge concerning construction and functioning of a laboratory of plant tissue cultures; will learn the composition of the most popular liquid and solid culture media and get to know successive stages of culture; will compare conventional and modern in vitro techniques, including somatic embryogenesis and suspension cultures.	W1, W2, W3, U1, U2, K2	Lecture
2.	Student will learn principles of working of installations used in sterile conditions (a chamber with laminar air flow), method of tool and glass sterilization (autoclave); will learn how to prepare culture media (solid and liquid), how to initiate a culture in vitro, how to choose plant material, how to sterilize the initial explants and how to place them onto a medium. Student will learn to induce direct and indirect organogenesis, to transfer regenerants onto new media, to multiply plant material in different culture types, to prepare explants for rooting, to root them and to transfer them to ex vitro conditions.	W1, W2, W3, U1, U2, K1, K2	Laboratory exercises

Course advanced

Activities	Methods of conducting classes
Lecture	Problem lecture, Presentation, Field observations
Laboratory exercises	Presentation, Teaching technique in the form of play, exact, task, Individual work, Laboratory (experiment), learning by experiment, Observation

Activities	Examination method	Percentage
Lecture	Test (written or computer based)	50%
Laboratory exercises	Assessment of work in the laboratory	25%
Laboratory exercises	Presentation	25%

Activities	Credit conditions
Lecture	Pass the exam.
Laboratory exercises	Multimedia presentation concerning micropropagation of a chosen species.

Literature

Obligatory

1. Leva A., Rinaldi L. 2012. Recent Advances in Plant in vitro Culture. IntechOpen, ISBN: 978-953-51-0787-3
2. Smith R. 2012. Plant tissue culture - Techniques and experiments. 3rd Edition. Academic Press, ISBN: 978-012-41-5920-4.
3. Gupta S.D. 2017. Light Emitting Diodes for Agriculture. Springer, Singapore; ISBN 978-981-10-5806-6.

Optional

1. Gupta, S.D., Jatothu, B., 2013. Fundamentals and applications of light-emitting diodes LEDs in in vitro plant growth and morphogenesis. Plant Biotechnology Reports 7: 211-220.
2. Farhadi, N., Panahandeh, J., Azar, A. M., and Salte, S. A. 2017. Effects of explant type, growth regulators and light intensity on callus induction and plant regeneration in four ecotypes of Persian shallot (*Allium hirtifolium*). Scientia Horticulturae 218: 80-86.
3. Alabadí, D., and Blázquez, M. A. 2009. Molecular interactions between light and hormone signaling to control plant growth. Plant Molecular Biology 69: 409-417.

Calculation of ECTS points

Activity form	Activity hours*
Lecture	15
Laboratory exercises	15
Preparation of a multimedia presentation	10
Preparation for the exam	20
Conducting empirical research	20
Student workload	Hours 80
Number of ECTS points	ECTS 3

* hour means 45 minutes