EC 15-VII Methods of in vitro Culture of Vascular Plants

Code	EC 15-VII
ECTS credits	4
Attendance time	8 Semester
Language of instruction	Ukrainian
Duration	1
Cycle	Each Winter Semester
Coordinator	Associate professor, PhD Olha Avksentieva
Instructor(s)	-
Allocation of study programmes	Biology
Recommended prerequisites	Biotechnology, Plant physiology and biochemistry, knowledge of the disciplines of natural science
Learning objectives	- Know: - historical information on the development, formation and modernity of methods of in vitro culture of higher plants; - terminology (conceptual apparatus) of modern plant biotechnology; - features of a plant organism as an object of biotechnology: - variety of types of in vitro cultures of higher plants; - the use of theoretical knowledge of the basics of in vitro plant cultivation in the practice of modern biotechnology. Be able: - analyze, structure, integrate theoretical educational and lecture material; - to organize the work of the in vitro culture laboratory of plant cells, tissues and organs; - carry out sterilization of plant material; - introduce plant objects into in vitro culture using various types of explants;

	- carry out work in a laminar box; - study callus and suspension cultures; - carry out microclonal propagation of plants.
Syllabus	Topic 1. Basic principles of work in the in vitro culture laboratory of higher plants. - Organization of work in the laboratory of plant biotechnology. - General characteristics of nutrient media. - Features of sterilization of plant material Topic 2. Types of plant cultures in vitro. - Callus culture. - Suspension culture - Culture of isolated protoplasts Topic 3. Secondary differentiation in vitro. - Direct and indirect morphogenesis in vitro. -Somatic embryogenesis. - Factors affecting differentiation in cell culture Topic 4. Biotechnologies based on in vitro culture - Microclonal propagation - Improvement of planting plant material - Cell cultures - producers of valuable biologically active substances - In vitro cultures in plant breeding and genetic engineering - Use of plant cell cultures to preserve the gene pool of plants - Cryopreservation of cell cultures and meristems
Literature	1. Avksentieva O. O., Chumakova V. V. Biotechnology of higher plants: culture in vitro: educational and methodological manual. Second edition. Kh.: V.N. Karazin KhNU, 2021. 88 p. 2. Drobyk N.M., Humenyuk G.B., Grubinko V.V. Laboratory workshop on biotechnology. Ternopil, 2019. 124 p. 3. Kushnir G. P., Sarnatska V. V. Microclonal propagation of plants. Kyiv: Naukova dumka, 2005. 272 p. 4. Avksentieva O.O. Obtaining and using callus cultures: educational and methodological complex. – Kharkiv: KhNU named after V.N. Karazin. 2020. 60 p.
Teaching and learning methods	Laboratory (5 WH)

Workload	Classroom hours: 75 h Individual study time: 45 h Total: 120 h
Assessment	The assessment consists of written credit work and preliminary graded study achievements
Grading procedure	The module grade is the sum of preliminary study achievements and the credit work grade
Basis for	Elective courses and Course project