Univerza v Mariboru
University of Maribor

Fakulteta za naravoslovje in matematiko / Faculty of Natural Sciences and Mathematics

OPIS PREDMETA / SUBJECT SPECIFICATION	
Predmet:	**Izbrana poglavja iz rastlinskih tkivnih kultur**
Subject Title:	**Selected Topics in Plant Tissue Cultures**

Študijski program Study programme	Študijska smer Study field	Letnik Year	Semester Semester
Doktorski študij Ekološke znanosti / Doctoral Study Ecological Sciences		Izbirni 1 ali 2 ali 3	**2 ali 3 ali 4 ali 5**

Univerzitetna koda predmeta / University subject code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Lab. work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
5	5				140	**5**

Nosilec predmeta / Lecturer: Jana AMBROŽIČ DOLINŠEK

Jeziki / Languages:	**Predavanja / Lecture:**	slovenski / Slovenian
	Vaje / Tutorial:	slovenski / Slovenian

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisites:**
Poznavanje botanike in ekologije na ravni univerzitetnega programa ter citologije in histologije na ravni drugostopenjskega programa	Knowledge of botany and ecology at graduate level and citology and histology at master level

Vsebina:	**Contents (Syllabus outline):**
Obravnavana so izbrana poglavja iz naslednjih sklopov. Načini in uporaba rastlinskih tkivnih kultur v znanosti in v tržne namene ter biologija gojenja rastlinskih celic. Predmet v prvem delu obravnava tehnične pogoje za vzgojo rastlinskih tkivnih kultur. V drugem delu obravnava postopke mikropropagacije, somatske embriogeneze, vzgojo brezvirusnih rastlin, krioprezervacijo ter pridobivanje sekundarnih metabolitov.	Selected topics in the following chapters are discussed. Principles and application of plant tissue culture in research and in commercial production and the biology of cultured plant cells. The course in the first part introduces technical requirements for plant tissue cultures. In the second part present different techniques as micropropagation, somatic embryogenesis, virus-free plant breeding, criopreservation, and acquisition of secondary metabolites.

Temeljni študijski viri / Textbooks:

- Bohanec, B., 1992: Tehnike rastlinskih tkivnih kultur. Biotehniška fakulteta, Ljubljana.
- Chawla, H. S., 2003: Plant biotechnology: practical approach. Science Publishers, Enfield.
- Evans D. E., J. O. D. Coleman, A. Kearns, 2003: Plant cell culture. BIOS Scientific Publishers, New York.
- Gamborg, O. L., 1995: Plant, cell, tissue and organ culture: fundamental methods. Springer, Berlin.
- George, E. F., 1993: Plant propagation by tissue culture: Part 1: The technology, Part 2: In practice. Exegenetics Limited, Edington.
- Herman, E. B., 2000: Regeneration and micropropagation: tehniques, systems, and media. Agritech Consultants, New York.
- Pierik, R. L. M., 1997: In vitro culture of higher plants. Kluwer Academic Publishers. Dordrecht.
- Raspor, P. (ur.), 1996: Biotehnologija, Osnovna znanja. BIA, Ljubljana
- Thomas, B. (ur.), 2003: Encycopledia of applied plant sciences. Elsevier, Academic press, Amsterdam.
- Trigiano, R. N., 2000: Plant tissue culture concepts and laboratory. CRC Press, Boca Raton.
- Izbrani članki iz znanstvenih revij.

Cilji:

- Podrobno razumeti tehnične pogoje za vzgojo tkivnih kultur rastlin
- Podrobno razumeti pomen aseptičnega dela
- Pridobivanje izkušenj v najzahtevnejših laboratorijskih delih
- Podroben pregled metod in strategije rastlinskih tkivnih kultur, uporabnih v znanosti in v komercialne namene

Objectives:

- Advanced understanding the technical requirements of tissue culture cultivation
- Advanced understanding the nature of aseptic work
- Top-level practical research experience in laboratory procedures
- Advanced overview through the range of techniques used in plant tissue culture research and commercial production

Predvideni študijski rezultati:

Znanje in razumevanje:
Vrhunsko znanje in zaumevanje pri temah:

- Tehnični pogoji za vzgojo rastlin v tkivni kulturi
- Priprava vcepkov in gojišč
- Sestavine gojišč
- Rastlinski hormoni
- Organogeneza, embriogeneza
- Značilnosti gojenja rastlin v tkivni kulturi
- Tipi tkivnih kultur
- Tržna mikropropagacija
- Pridobivanje sekundarnih metabolitov
- Krioprezervacija

Prenesljive/ključne spretnosti in drugi atributi:

- Zmožnost izbire najustreznejšega gojišča, metode mikropropagacije in ex situ strategije varstva za določen vcepek in rastlinsko vrsto
- Sodelovalno delo, projektno delo
- Spretnosti, pomembne za praktično eksperimentalno delo: opazovanje, merjenje, ravnanje z rastlinskim materialom, kemikalijami, steklovino, osnovnimi aparaturami, zbiranje rezultatov, načrtovanje poskusov, vrednotenje rezultatov, poročanje
- Obvladanje izbranih laboratorijskih metod dela
- Varno delo v laboratoriju

Intended learning outcomes:

Knowledge and Understanding:
Top-level knowledge and understanding:

- Technical requirements of tissue culture cultivation
- Tissue and media preparation
- Media components
- Plant hormones
- Organogenesis, embryogenesis
- Tissue culture cultivation features
- Different tissue culture types
- Commercial micropropagation
- Secondary metabolites production
- Cryopresevation

Transferable/Key Skills and other attributes:

- Ability of determination of appropriate growth medium, micropropagation procedure and strategy for ex situ conservation for particular explant and plant species
- Collaborative learning, project work
- Skills important for practical experimental work: observations, measurements, manipulation with plant material, chemicals, glass wares and other equipments, collecting data, designing experiments, analyzing data, reporting
- Qualification for work with selected laboratory methods
- Safe working practice in laboratory

Metode poučevanja in učenja:

Learning and teaching methods:

• Predavanja in študije primerov • Strokovna ekskurzija • Seminar • Laboratorijske vaje	• Lectures and case studies • Excursion • Seminar • Laboratory exercises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
• Laboratorijski dnevnik • Projekt in njegova predstavitev • Ustni ali pisni izpit	20 % 40 % 40 %	• Diary of experimental work • Project and its presentation • Oral or written exam

Materialni pogoji za izvedbo predmeta :	***Material conditions for subject realization***
• *Multimedijska predavalnica* • *Laboratorij za fiziologijo rastlin opremljen z določeno laboratorijsko opremo: sušilnik, kuhalnik, plin, voda, pH-meter, tehtnica, avtoklav, laminarij, spektrofotometer, mikroskop, rastna komora, steklovina in orodje*	• *Lecture hall for multimedia presentations* • *Plant physiology laboratory equipped with selected laboratory equipment: cooker, gas, water, pH-meter, balance, dryer, autoclave, microscope, glass-wares and other equipments*

Obveznosti študentov:	***Students' commitments:***
(pisni, ustni izpit, naloge, projekti)	*(written, oral examination, coursework, projects):*
• Laboratorijski dnevnik • Projekt in njegova predstavitev • Ustni ali pisni izpit	• Diary of experimental work • Project and its presentation • Oral or written exam