



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Rastlinska biotehnologija in okolje
Course title:	Plant Biotechnology and the Environment

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program Ekologija z naravovarstvom Ecology with Nature Conservation, 1. stopnja		2. ali 3.; 2nd or 3rd	3. ali 5.; 3rd or 5th
Undergraduate university programme Ecology with Nature Conservation, 1st degree			

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
15	15		15		135	6

Nosilec predmeta / Lecturer:

Jeziki / Languages:

Predavanja / Lectures:	slovenski / Slovene
Vaje / Tutorial:	slovenski / Slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:

Prerequisites:

Vsebina:

Predmet je pregledna predstavitev rastlinske biotehnologije s poudarkom na vplivih na okolje in človeško družbo. Podane so osnove različnih biotehnoloških metod s področij rastlinskih tkivnih kultur in genetskega inženirstva rastlin. Predmet omogoča osnovno razumevanje vpliva rastlinske biotehnologije na kmetijstvo, prehrano, medicino, industrijo in upravljanje z okoljem. Polemizira sporne vidike biotehnologije v zvezi z vplivi na okolje in človeško družbo.

Content (Syllabus outline):

The subject is an introductory course focusing on the impact of biotechnology on environments and human society. It introduces different biotechnological techniques, grouped in plant tissue culture, and plant genetic engineering. The subject enables basic understanding of impact of plant biotechnology on agriculture, food, medicine, industry, and environmental management. Controversial aspects of biotechnology are discussed in relation to their impact on environments and social community.

Temeljni literatura in viri / Readings:

Bohanec, B.: 1992: Tehnike rastlinskih tkivnih kultur. Biotehniška fakulteta, Ljubljana.
 Chawla H.S. 2009. Introduction To Plant Biotechnology. Oxford & IBH Publishing Company Pvt. Limited
 Chawla, H. S., 2003: Plant Biotechnology: practical approach. Science Publishers, Enfield
 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: Encyclopaedia of applied plant sciences. Elsevier, Academic press, Amsterdam
 Thieman W. J. in Palladino M. A., 2013. Introduction to Biotechnology, Pearson.education, Inc, publishing as Benjamin Cummings, San Francisco
 George E.F. 1993. Plant propagation by tissue culture: Part 1: The technology, Part 2: In practice. Exegenetics Limited, Edington.
 George E. F., Hall M. A. in De Klerk, G.J. (Eds.) 2008. Plant Propagation by Tissue Culture. Vol 1 and Vol 2. Exegetics, Basingstoke, UK
 Trigiano R.N. in Gray D.J. 2011. Plant tissue culture concepts and laboratory. CRC Press, Boca Raton.
 Kleyn J., Scoggins H. in Bridgen M. 2013. Plants from Test Tubes: An Introduction to Micropropagation. Timber Press
 Izbrani članki iz znanstvenih revij / Selected papers from scientific journals

Cilji in kompetence:

Predstaviti rastlinsko biotehnologijo Predstaviti vpliv rastlinske biotehnologije na okolje in človeško družbo.
 Predstaviti različne biotehnološke metode s področij rastlinskih tkivnih kultur in genetskega inženirstva rastlin.
 Predstaviti vpliv rastlinske biotehnologije na kmetijstvo, prehrano, medicino, industrijo in upravljanje z okoljem.
 Predstaviti nasprotujoče si vidike biotehnologije, zlasti v zvezi z vplivi na okolje in človeško družbo.

Objectives and competences:

Introduces plant biotechnology. Introduces the impact of plant biotechnology on environments and human society.
 Introduces different biotechnological techniques grouped in plant tissue culture and plant genetic engineering.
 Introduces the impact of biotechnology on agriculture, food, medicine, industry, and environmental management.
 Introduces controversial aspects of biotechnology, especially in the relation with environments and human society.

Predstaviti detekcijske in kvantifikacijske metode za spremljanje genetsko spremenjenih organizmov v surovinah in prehrabnih izdelkih.

Introduce detection of and quantification methods in genetically modified organism monitoring in raw materials and food products.

Predvideni študijski rezultati:

Znanje in razumevanje:

Poznavanje osnov in uporabe rastlinskih tkivnih kultur.
Biologija gojenja rastlinskih celic.
Pregled genskega inženirstva rastlin.
Zgradba rastlinskih genov in razlike z ostalimi evkariotskimi in prokariotskimi geni
Kloniranje genov.
Genetsko spreminjanje rastlin.
Možnosti uporabe rastlinske biotehnologije.
Možni vplivi rastlinske biotehnologije na življenje posameznika.
Možni vplivi biotehnologije na okolje.
Etični, pravni, ekonomski in socialni vidiki rastlinske biotehnologije.

Prenesljive/ključne spretnosti in drugi atributi:

Osnovne spretnosti, pomembne za praktično eksperimentalno delo: opazovanje, merjenje, ravnanje z rastlinskim materialom, kemikalijami, steklovino, osnovnimi aparaturami, zbiranje rezultatov, načrtovanje poskusov, vrednotenje rezultatov, poročanje. Sodelovalno delo, projektno delo. Poznavanje nekaterih laboratorijskih metod in tehnik dela.
Varno delo v laboratoriju.

Intended learning outcomes:

Knowledge and understanding:

Basic principles and application of plant tissue culture.
Biology of cultured plant cells.
An overview of genetic engineering of plants
The structure of plant genes and differences with respect to other eukaryotic and prokaryotic genes.
Cloning of a gene.
Genetic modifications of plants.
Abilities of using biotechnology.
Potential impacts of biotechnology on individual's life.
Potential impacts of biotechnology on environments.
Ethical, legacy, economics and social issues of plant biotechnology.

Transferable/Key Skills and other attributes:

Basic 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.
Collaborative learning, project work.
Knowledge of selected laboratory methods and techniques.
Safe working practice in laboratory.

Metode poučevanja in učenja:

- Predavanja s študijami primerov
- Laboratorijske vaje
- Seminar

Learning and teaching methods:

- Lectures with case studies
- Laboratory exercises
- Seminar

Načini ocenjevanja:

Izpit, seminarska naloga s predstavitevijo in zagovorom, poročilo iz laboratorijskega dela

Delež (v %) /
Weight (in %)

50/50/0

Assessment:

Exam, seminar work with presentation, laboratory report,

Reference nosilca / Lecturer's references:

AMBROŽIČ-DOLINŠEK, Jana, KOVAČ, Maja, ŽEL, Jana, CAMLOH, Marjana. Pyrethrum (*Tanacetum cinerariifolium*) from the northern Adriatic as a potential source of natural insecticide. *Ann. Ser. hist. nat.*, 2007, letn. 17, št. 1, str. 39-46.

AMBROŽIČ-DOLINŠEK, Jana, CAMLOH, Marjana, ŽEL, Jana, KOVAČ, Maja, RAVNIKAR, Maja, CARRARO, Luigi, PETROVIČ, Nataša. Phytoplasma infection may affect morphology, regeneration and pyrethrin content in pyrethrum shoot culture. *Sci. hortic.* [Print ed.], 2008, vol. 116, no. 2, str. 213-218.

AMBROŽIČ-DOLINŠEK, Jana, RAVNIKAR, Maja, ŽEL, Jana, DEMŠAR, Tina, CAMLOH, Marjana, CANKAR, Katarina, DREO, Tanja. Tissue culture of *Pyrethrum* (*Tanacetum cinerariifolium*) and associated microbial contamination = Tkivna kultura bolhača (*Tanacetum cinerariifolium*) in z njo povezana okužba z mikroorganizmi. *Acta biol. slov.* [Tiskana izd.], 2010, vol. 53, št. 1, str. 63-68.

CAMLOH, Marjana, AMBROŽIČ-DOLINŠEK, Jana. In vitro regeneration systems of *Platyserium*. V: FERNÁNDEZ, Helena (ur.), KUMAR, Ashwani (ur.), REVILLA, Maria Ángeles (ur.). *Working with ferns : issues and applications*. New York [etc.]: Springer, cop. 2011, str. 111-125.