



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Molekularne metode v botaniki
Course title:	Molecular methods in botany

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Ekologija z naravovarstvom, 1. stopnje		2. in 3.	3. ali 4 ali 5. ali 6.
Ecology with nature protection, 1.st degree		2nd or 3rd	3rd or 4th or 5th or 6th

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15		30			135	6

Nosilec predmeta / Lecturer:

Jeziki / Languages: Predavanja / Lectures:
Vaje / Tutorial:

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

Jih ni.

Prerequisites:

None.

Vsebina:

Content (Syllabus outline):

<ul style="list-style-type: none"> - Organizacija in ekspresija rastlinskega genoma. Analize genov in rekombinantne DNK tehnike pri rastlinah - Primarni in sekundarni rastlinski metaboliti. Primarni metaboliti: ogljikovi hidrati, lipidi, sprejem dušika, sinteza aminokislin in proteinov. - Sekundarni metaboliti: fenoli, alkaloidi, glikozidi - Genske mutacije rastlin (pomen, fenotipski učinki, vzroki mutacij) - Delovanje in kinetika rastlinskih encimov - Molekularni odzivi rastlin na abiotske in biotske dejavnike - Povezave med molekularno populacijsko genetiko in filogenijo - Fenotip kot rezultat interakcij med genotipom in okoljem - Genski markerji: metode vrednotenja polimorfizmov in uporaba genskih markerjev za DNA fingerprinting, vrednotenje genske raznolikosti (PCR, RFLP, AFLP, kromatografije) 	<ul style="list-style-type: none"> - Organization and expression of plant genome, Analysis of gen in recombinant DNA techniques in plants - Primary and secondary plant metabolites Primary metabolites: carbohydrate, lipids, accumulation of nitrogen, synthesis of nucleic acid and proteins - Secondary metabolites: alkaloids, phenols, glycosides - Mutations in plants (importance, phenotype expression, causes of mutation) - Activity and kinetics of plant enzyme - Molecular reaction of plant on abiotic and biotic responses - The link between molecular population genetics and phylogeny - Phenotype as the results of the interactions between the genotype and environment - Genetic markers: method of polymorphism and use of genetic markers for DNA fingerprinting, evaluation of genetic differences (PCR, AFLP, RFLP, chromatography)
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Temeljni literatura in viri / Readings:

<ul style="list-style-type: none"> - OBVEZNA LITERATURA/OBLIGATORY READINGS: - Buchanan, B.B., Gruissem W., Jones, L.R., 2000: Biochemistry and Molecular Biology of Plants.1367 pages, American Society of Plant Physiologists, 1 st edition (izbrana poglavja) - Dermastia, M., 2010: Pogled v rastline. Ljubljana: Nacionalni inštitut za biologijo. - Freeland, J.R., 2005: Molecular Ecology. John Wiley & Sons, USA. (izbrana poglavja) - Rouhan, G., Gaudeul, M., P. Besse, 2014: Methods in Molecular biology, Humana press. (izbrana poglavja) - PRIPOROČENA LITERATURA/FACULTATIVE READINGS: - Simpson, M.G., 2006: Plant systematic. Elsevier, USA. (izbrana poglavja) - Stuessy, T.F., 2009: Plant taxonomy. Columbia university press, New York. (izbrana poglavja) - Raven, P.H., R.F. Evert, 2005: Biology of plant. W. H. Freeman and Company Publisher, New York. (izbrana poglavja) - Futuyma, D.J., 2009: Evolution, second edition. Sunderland, USA. (izbrana poglavja) - Mauseth, J.D., 2003: Botany; an introduction to plant biology. Jones and Barlett Publisher, USA. (izbrana poglavja) -

Cilji in kompetence:

Objectives and competences:

- Študentje razlikujejo različne molekularne metode
- Študentje primerjajo različne genetske mutacije na rastlinah
- Študentje uporabljajo različne molekularne metode v botaniki
- Študentje povezujejo molekularno znanje z naravovarstvenim

- Students compare different molecular methods
- Students compare different gene mutations for plants
- Students use different molecular method in botany
- Students connect molecular knowledge with natural conservation

Predvideni študijski rezultati:

Znanje in razumevanje:

- Študentje uporabljajo in analizirajo različne molekularne metode v botaniki
- Študentje konstruirajo poskuse na molekularnem nivoju
- Študentje so sposobni prepoznati genske mutacije za rastline
- Študentje aplicirajo molekularno znanje na naravovarstveno problematiko

Prenosljive/ključne spretnosti in drugi atributi:

- Študentje poznajo molekularne metode v botaniki

Intended learning outcomes:

Knowledge and understanding:

- Students use and analyze various molecular method in botany
- Students construct their own experiment on molecular level
- Student are able to recognize gene mutations for plants
- Students apply molecular knowledge to nature conservation issues

Transferable/Key Skills and other attributes:

- students know molecular method in botany

Metode poučevanja in učenja:

Predavanja
Vaje

Learning and teaching methods:

Lectures
Theoretical exercises

Načini ocenjevanja:

Kolokvij
Pisni izpit
Obe obveznosti morata biti pozitivno opravljene šele nato se upoštevajo uteži

Delež (v %) /

Weight (in %) /

Assessment:

Practical examination
Written examination
Both obligations must be positively evaluated and then the weights are taken into account

Reference nosilca / Lecturer's references:

- PIPENBAHER, Nataša, MOELLER LANGE, Peter, DOLINŠEK, Jan, JAKOBSEN, Mogens, WEINGARTL, Hana, CENCIČ, Avrelija. Nitric oxide (NO) production in mammalian non-tumorigenic epithelial cells of the small intestine and macrophages induced by individual

strains of lactobacili and bifidobacteria. *International dairy journal*, ISSN 0958-6946. [Print ed.], 2009, vol. 19, iss. 3, str. 166-171

- FILIPIČ, Bratko, GRADIŠNIK, Lidija, BOTIĆ, Tanja, SLADOLJEV, Srečko, TOTH, Sandor, SOMOGYVÁRI, Ferenc, PIPENBAHER, Nataša, CENCIČ, Avrelija, KOREN, Srečko. Use of calf intestinal epithelial (CIEB) cells to measure the biological activity of human interferons. V: SCHWARZMEIER, Josef D. (ur.). *6th International Cytokine conference, Vienna (Austria), August 27-31, 2006*. Bologna: Medimond International Proceedings, 2006
- PIPENBAHER, Nataša, KALIGARIČ, Mitja, MASON, Norman W. H., ŠKORNIK, Sonja. Dry calcareous grasslands from two neighboring biogeographic regions: relationship between plant traits and rarity. *Biodiversity and conservation*, ISSN 0960-3115, 2013, vol. 22, iss. 10, str. 2207-2221
- UNUK, Tina, PIPENBAHER, Nataša, ŠKORNIK, Sonja. Trophic-level differences in functional composition of the *Nardus* grassland vegetation. *Plant Biosystems*, ISSN 1126-3504, 2018, str. 1-7, ilustr.,
- PAUŠIČ, Igor, IVAJNŠIČ, Danijel, KALIGARIČ, Mitja, PIPENBAHER, Nataša. Relation between plant species diversity and landscape variables in Central-European dry grassland fragments and their successional derivatives. *Acta botanica Croatica : an international journal of botany*, ISSN 0365-0588, 2017, vol. 76, iss. 2, str. 111-119