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 ali5. ali 6.
Ecology with nature protection, 1.st degree		2nd or 3rd	3rd or 4th or 5th or 6th

Vrsta predmeta / Course type	Izbirni/Elective
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:	Nataša PIPENBAHER

Jeziki / Languages:	**Predavanja / Lectures:**	**Slovenski/Slovenian**
	Vaje / Tutorial:	**Slovenski/Slovenian**

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
Jih ni.	None.

Vsebina:	**Content (Syllabus outline):**

- 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)	- 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)

Temeljni literatura in viri / Readings:

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

Predvideni študijski rezultati:	**Intended learning outcomes:**
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 **Prenesljive/ključne spretnosti in drugi atributi:** • Študentje poznajo molekularne metode v botaniki	**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:	**Learning and teaching methods:**
• Predavanja • Seminarji • Laboratorijske vaje	• Lectures • Seminars • Laboratory exercises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Opravljena seminarska z zagovorom	100	Completed seminar with defense

Reference nosilca / Lecturer's references:

- DONŠA, Daša, GRUJIĆ, Jaša Veno, PIPENBAHER, Nataša, IVAJNŠIČ, Danijel. The Lyme borreliosis spatial footprint in the 21st century: a key study of Slovenia. *International journal of environmental research and public health*. [Online ed.]. 2021, vol. 18, iss. 22, str. 1-11UNUK, 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 derivates. *Acta botanica Croatica : an international joural of botany*, ISSN 0365-0588, 2017, vol. 76, iss. 2, str. 111-119
- 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 epithelilal (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