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
Enovit magistrski študijski program Predmetni učitelj, 2. stopnja		**2. ali 3.; 2nd or 3rd**	**3. ali 4. ali 5. ali 6.; 3rd or 4th or 5th or 6th**
Undergraduate university programme Biology, 2rd degree			

Vrsta predmeta / Course type	Izbirni/Elective
Univerzitetna koda predmeta / University course code:	

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Lab. vaje Laboratory work	Terenske vaje Field work	Samost. delo Individ. work	ECTS
15			**30**		**135**	**6**

Nosilec predmeta / Lecturer:	Nataša Pipenbaher

Jeziki / Languages:	**Predavanja / Lectures:**	slovenski / slovene
	Vaje / Tutorial:	slovenski / slovene

Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:	**Prerequisits:**
- Opravljen izpit iz splošne botanike. - Opravljen izpit iz biokemije	- Exam in General Botany - Exam in Biochemistry

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	- 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

- 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)	- 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:

- 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
- Dermastia, M., 2010: Pogled v rastline. Ljubljana: Nacionalni inštitut za biologijo.
- Freeland, J.R., 2005: Molecular Ecology. John Wiley & Sons, USA.
- Futuyma, D.J., 2009: Evolution, second edition. Sunderland, USA.
- Heldt, H.W 1998: Plant Biochemistry and Molecular Biology, Oxford University Press.
- Hellis, D.M., C. Moritz., B.K. Mable,1996: Molecular systematic. Sunderland, USA.
- Mauseth, J.D., 2003: Botany; an introduction to plant biology. Jones and Barlett Publisher, USA.
- Raven, P.H., R.F. Evert, 2005: Biology of plant. W. H. Freeman and Company Publisher, New York.
- Simpson, M.G., 2006: Plant systematic. Elsevier, USA.
- Stuessy, T.F., 2009: Plant taxonomy. Columbia university press, New York.

Cilji in kompetence:	**Objectives and competences:**
Cilj izbrane vsebine je pridobitev dodatnih znanj iz molekularne botanike.	The aim of the selected contents is gain of advance knowledge about molecular botany.

Predvideni študijski rezultati:	**Intended learning outcomes:**
Znanja in razumevanja, ki ga bodo študentje pridobili: - Vedenje o molekularnih metoda v botaniki - Pomen delovanja rastlin na molekularnem nivoju - Poglobili bodo razumevanje pomena genskih mutacij za rastline - Pridobljeno znanja bodo lahko aplicirali na naravovarstveno problematiko Poznavanje gensko in biokemijsko strukturo rastlin ter molekularne odzive rastlin na abiotske in biotske dejavnike **Prenesljive/ključne spretnosti in drugi atributi:**	Knowledge and understanding that students will get: - Understanding of molecular method in botany - The function of plants on molecular level - Knowledge that they will get they could use for Nature conservation - Understanding of genetic and biochemical structure of plant Capability of understanding of molecular response on biotic and abiotic factors

	Transferable/Key Skills and other attributes:

Metode poučevanja in učenja:	**Learning and teaching methods:**
• Predavanja • Laboratorijske vaje	• Lectures • Laboratory exercises

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
- Kolokvij iz vaj - Pisni izpit Pozitivno opravljen kolokvij iz laboratorijskih vaj je pogoj za pristop k izpitu.	50 50	- Exam of laboratory exercises - Written examination Positive result of the exercise examination is a prerequisite for the written exame.

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 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
- MASON, Norman W. H., PIPENBAHER, Nataša, ŠKORNIK, Sonja, KALIGARIČ, Mitja. Does complementarity in leaf phenology and inclination promote co-existence in a species-rich meadow? : evidence from functional groups. *Journal of vegetation science*, ISSN 1100-9233. [Print ed.], Jan. 2013, vol. 24, iss. 1, str. 94-100
- 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
- PIPENBAHER, Nataša, ŠKORNIK, Sonja, CARVALHO, Gustavo Henrique de, BATALHA, Marco Antônio. Phylogenetic and functional relationships in pastures and meadows from the

North Adriatic Karst. *Plant ecology*, ISSN 1385-0237, 2013, vol. 214, iss. 4, str. 501-519