



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

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| 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 |
|------------------------|--------------------|------------------|-----------------------|-------------------------|----------------------------------|------|
| 7 | 8 | 30 | | | 135 | 6 |

Nosilec predmeta / Lecturer:

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|------------------------|---------------------------|--|
| Jeziki / Languages: | Predavanja / Lectures: | <input type="text" value="Slovenski/Slovenian"/> |
| | Vaje / Tutorial: | <input type="text" value="Slovenski/Slovenian"/> |

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

Jih ni.

Prerequisites:

None.

Vsebina:

Content (Syllabus outline):

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| <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:

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| <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) - |
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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 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

Prenesljive/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
- Seminarji
- Laboratorijske vaje

Learning and teaching methods:

- Lectures
- Seminars
- Laboratory exercises

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

| | | |
|-----------------------------------|-----|--------------------------------|
| Opravljena seminarska z zagovorom | 100 | Completed seminar with defense |
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Reference nosilca / Lecturer's references:

- ŽIBERNA, Igor, PIPENBAHER, Nataša, DONŠA, Daša, ŠKORNIK, Sonja, KALIGARIČ, Mitja, KAJFEŽ-BOGATAJ, Lučka, ČREPINŠEK, Zalika, GRUJIĆ, Jaša Veno, IVAJNŠIČ, Danijel. The impact of climate change on urban thermal environment dynamics. *Atmosphere*. 2021, vol. 12, iss. 9, str. 1-15, ilustr. ISSN 2073-4433. https://www.mdpi.com/journal/atmosphere/special_issues/hazards_urbanization_climate, <https://repositorij.uni-lj.si/IzpisGradiva.php?id=136109>, <https://dk.um.si/IzpisGradiva.php?id=81564>, DOI: [10.3390/atmos12091159](https://doi.org/10.3390/atmos12091159). [COBISS.SI-ID [75887619](https://www.cobiss.si/record/75887619)]
- DENGLER, Jürgen, PIPENBAHER, Nataša, ŠKORNIK, Sonja, et al. GrassPlot - a database of multi-scale plant diversity in Palaearctic grasslands. *Phytocoenologia*. [Print ed.]. 2018, vol. 48, iss. 3, str. 331-347, ilustr. ISSN 0340-269X. DOI: [10.1127/phyto/2018/0267](https://doi.org/10.1127/phyto/2018/0267). [COBISS.SI-ID [24005128](https://www.cobiss.si/record/24005128)]
- ŠKORNIK, Sonja, PIPENBAHER, Nataša. Primerjava funkcionalnih potez dominantnih in podrejenih rastlinskih vrst v suhih travniških asociacije Scabioso hladnikianae-Caricetum humilis v Sloveniji = Relationship in plant functional traits between dominant and subordinate plant species in dry grassland association Scabioso hladnikianae-Caricetum humilis in Slovenia. *Hladnikia*. [Tiskana izd.]. apr. 2018, [št.] 41, str. 26-41, ilustr. ISSN 1318-2293. <http://www.dlib.si/details/URN:NBN:SI:doc-7SA40YPY>. [COBISS.SI-ID [4713295](https://www.cobiss.si/record/4713295)]
- 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, BOTIČ, 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