



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

**Predmet:** Sistematika in filogenija višjih rastlin  
**Course title:** Systematics and phylogeny of higher plants

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni program 1. stopnja Ekologija z naravovarstvom/EKNA		1	2
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**Vrsta predmeta / Course type**

Obvezni/Obligatory

**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
45			30	30	105	7

**Nosilec predmeta / Lecturer:**

Mitja KALIGARIČ

**Jeziki /  
Languages:**

**Predavanja /  
Lectures:** Slovenski/slovene  
**Vaje / Tutorial:** Slovenski/slovene

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

Jih ni.

**Prerequisites:**

None.

**Vsebina:**

Pod »višje rastline« razumemo semenke (Spermatophyta), razdeljene na skupine Coniferophytina, Cycadophytina (golosemenke) in Magnoliophytina (kritosemenke). Pri kritosemenkah ohranjamo tradicionalno delitev na dvokaličnice in enokaličnice. Vendar pa obravnavamo tudi najnovejšo razdelitev po molekularnih kriterijih. Pri golosemenkah je poudarek na filogeniji in evoluciji, predvsem primerjalno s praprotnicami. Sledi pregled taksonomskih skupin in njihove morfologije, reprodukcije in – na kratko – ekologije. Izpostavljeni so trendi razvoja kritosemenk. Pri kritosemenkah je na začetku poudarek na evolucijsko izvirnih znakih, nato pa sledi pregled sistema po redovih in družinah. Podan je filogenetski položaj redov, morfologija družin ter pregled pomembnejših rodov in vrst.

**Content (Syllabus outline):**

As »higher plants« seed plants (spermatophytes, Spermatophyta) are understood, which contain three groups: Coniferophytina, Cycadophytina (gymnosperms) and Magnoliophytina (angiosperms). Among angiosperms the traditional division to dicotyledons and monocotyledons is kept. However, also a modern molecular classification is presented and discussed. Among gymnosperms phylogeny and evolution are emphasized, predominately in comparison with pteridophytes. Then follow a survey of their morphology, reproduction and briefly the ecology. The evolutionary trends of angiosperms are discussed. At the beginning of angiosperms, their evolutionary primitive characters are emphasized, than follows the survey of orders, families. The phylogenetic position of the orders is given, as well as the morphology of the families and most important genera and species.

**Temeljni literatura in viri / Readings:**

Bresinsky A., Koerner, C., Kadereit JW, Neihaus, G., Sonnwald, U., 2013: Strassburger's Plant Sciences. Sprionger Verlag, New York.  
 Graf, J., 1975: Tafelwerk zur Pflanzensystematik. J. F. Lehmanns Verlag, München.  
 Heywood, V., 1995: Cvetnice. Kritosemenke sveta. DZS, Ljubljana.  
 Martinčič, A. (ed.), 2007: Mala flora Slovenije. Tehniška založba, Ljubljana.  
 Raven, P. H., Evert, R. F., Eichhorn S. E., 1917: Biology of Plants. W. H. Freeman and company Worth Publishers. 8th ed.  
 Sitte, P., Weiler, E. W., Kadereit, J. W., Bresinsky, A., Körner, C., 2014: Lehrbuch der Botanik. 35. Auflage. Spektrum Akademischer verlag Heidelberg, Berlin. 37th edition.  
 Bavcon, J., Ravnjak, B., Bavcon, D.: 2017: Cvetne formule rastlinskih družin. Botanični vrt Univerze v Ljubljani.

**Cilji in kompetence:**

- Podati pregled nad sistemom semenk.
- Razložiti evolucijo in filogenijo semenk.
- Pojasniti različne oblike razmnoževanja v povezavi z evolucijo in morfologijo.
- Utemeljiti sorodstvene odnose med rodovi, družinami in redovi.
- Primerno predstaviti najbolj značilne predstavnike.
- Primerno predstaviti floro Slovenije.
- Primerno predstaviti pogoste, gospodarsko uporabne, endemične ter na druge načine za človeka pomembne rastlinske vrste.

**Objectives and competences:**

- To give the overview on the taxonomic system of seed plants.
- To explain the evolution of seed plants.
- To explain different reproduction cycles, based on evolution and morphology.
- To ground the relationships between the genera, families and orders.
- To present the most representative species.
- To present the flora of Slovenia.
- To present the most common, economically useful, endemic, or otherwise for man important plant species.

**Predvideni študijski rezultati:**

## Znanje in razumevanje:

- Evolucija in filogenija semenk.
- Sistematska delitev semenk: osnovni redovi in družine, pregled pestrosti s poudarkom na Sloveniji in Evropi
- Osnovna morfologija in razmnoževanje semenk.
- Vedenje o najpogostejših, endemičnih in uporabnih rastlinah

## Prenesljive/ključne spretnosti in drugi atributi:

- Prepoznavanje vseh lesnih vrst Slovenije.
- Določanje po dihonomnem ključu.
- Sposobnost prepoznavanja višjih taksonov.
- Sposobnost prepoznavanja družin in nekaterih rodov.

**Intended learning outcomes:**

## Knowledge and understanding:

- Evolution and phylogeny of seed plants.
- Taxonomic system of seed plants: basic orders and families, overview on plant richness, especially in Slovenia and Europe
- Basic morphology and reproduction cycles of seed plants.
- Knowledge about most common, endemic and useful plant species.

## Transferable/Key Skills and other attributes:

- Recognition of all the woody species of Slovenia.
- Determination with dichotomic keys.
- Capability of recognition of higher taxa.
- Capability of recognition of families and selected genera.

**Metode poučevanja in učenja:**

- Predavanja
- Laboratorijske vaje
- Terenske vaje
- Individualno določanje po dihonomnem ključu Izdelava herbarija min. 100 rastlinskih vrst

**Learning and teaching methods:**

- Lectures
- Laboratory excersises
- Field excersises
- Individual determination with dichotomic keys
- Preparation of herbarium with min. 100 plant species

Delež (v %) /

Weight (in %)

**Načini ocenjevanja:****Assessment:**

• Kolokvij iz vaj (pogoj za pristop k izpitu): prepoznavanje lesnih vrst in določanje po ključu za določanje rastlin	50	• Examination of exercises (precondition for examination): recognitin of woody species and determination of plants by determination key
• Izdelava herbarija; 100 vrst (pogoj za pristop k izpitu)	0	• Herbarium; 100 species (precondition for examination)
• Pisni izpit	50	• Written examination

**Reference nosilca / Lecturer's references:**

PAUŠIČ, Igor, IVAJNSIČ, 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 journal of botany, ISSN 0365-0588, 2017, vol. 76, iss. 2, str. 111-119, ilustr. <https://www.degruyter.com/view/j/botcro.ahead-of-print/botcro-2017-0001/botcro-2017-0001.xml?format=INT>, doi: [10.1515/botcro-2017-0001](https://doi.org/10.1515/botcro-2017-0001). [COBISS.SI-ID [23132168](https://www.cobiss.si/id/23132168)]

ŠKORNIK, Sonja, MEZNARIČ, Marija, KALIGARIČ, Mitja. Factors affecting composition of gravel bar vegetation in middle reach of a lowland river. *Polish journal of ecology*, ISSN 1505-2249, 2017, vol. 65, iss. 2, str. 194-210, ilustr., doi: [10.3161/15052249PJE2017.65.2.003](https://doi.org/10.3161/15052249PJE2017.65.2.003). [COBISS.SI-ID [23558664](https://www.cobiss.si/id/23558664)]

KALIGARIČ, Mitja, BRECL, Jožica, ŠKORNIK, Sonja. High potential of sub-Mediterranean dry grasslands for sheep epizoochory. *Open life sciences : formerly Central European journal of biology*, 2016, vol. 11, iss. 1, str. 177-184, doi: [10.1515/biol-2016-0023](https://doi.org/10.1515/biol-2016-0023). [COBISS.SI-ID [22605576](https://www.cobiss.si/id/22605576)]

BATALHA, Marco Antônio, PIPENBAHER, Nataša, BAKAN, Branko, KALIGARIČ, Mitja, ŠKORNIK, Sonja. Assessing community assembly along a successional gradient in the North Adriatic Karst with functional and phylogenetic distances. *Oecologia : in cooperation with the International association for ecology (Intecol)*, ISSN 0029-8549, 2015, vol. 178, iss. 4, str. 1205-1214, doi: [10.1007/s00442-015-3295-5](https://doi.org/10.1007/s00442-015-3295-5). [COBISS.SI-ID [21281800](https://www.cobiss.si/id/21281800)]

ŠAJNA, Nina, KAVAR, Tatjana, ŠUŠTAR VOZLIČ, Jelka, KALIGARIČ, Mitja. Population genetics of the narrow endemic *Hladnikia pastinacifolia* Rchb. (Apiaceae) indicates survival in situ during the Pleistocene. *Acta Biologica Cracoviensia. Series Botanica*, ISSN 0001-5296, 2012, vol. 54, issue 1, str. 84-96, doi: [10.2478/v10182-012-0009-8](https://doi.org/10.2478/v10182-012-0009-8). [COBISS.SI-ID [19304712](https://www.cobiss.si/id/19304712)]

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, ilustr. <http://onlinelibrary.wiley.com.ezproxy.lib.ukm.si/doi/10.1111/j.1654-1103.2012.01451.x/pdf>, doi: [10.1111/j.1654-1103.2012.01451.x](https://doi.org/10.1111/j.1654-1103.2012.01451.x). [COBISS.SI-ID [19304968](https://www.cobiss.si/id/19304968)]

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, doi: [10.1007/s10531-013-0520-6](https://doi.org/10.1007/s10531-013-0520-6). [COBISS.SI-ID [19978504](https://www.cobiss.si/id/19978504)]