



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

### UČNI NAČRT PREDMETA / COURSE SYLLABUS

<b>Predmet:</b>	Fiziologija rastlin
<b>Course title:</b>	Plant Physiology

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Enoviti (5 letni) magistrski študijski program Predmetni učitelj		3	6
Unified (5 years) master's study program 'The subject teacher'		3	6

Vrsta predmeta / Course type:

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Sem. vaje Tutorial	Lab. vaje Laboratory work	Teren. vaje Field work	Samost. delo Individ. work	ECTS
30			30		90	5

Nosilec predmeta / Lecturer:

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

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

**Vsebina:**  
Predmet obravnava fiziološke procese v rastlinah, rast in razvoj ter prilagojenost rastlin na okolje. Poudarek je na medsebojni povezanosti zgradbe in delovanja rastlin od nivoja molekul do nivoja cele rastline. Predmet v prvem delu obravnava vodne razmere v rastlini, mehanizme sprejema, prenosa in premeščanja vode, ionov in

**Content (Syllabus outline):**  
The course introduces the physiological processes of plants, growth, development and plant adaptations to the environment influences. First part covers water relations (balance) in plants, uptake, transport and translocation mechanisms of water, ions and solutes, mineral nutrition, membrane properties and processes.

raztopin, mineralno prehrano ter lastnosti membran in membranske procese.  
V drugem delu obravnava energetske pretvorbe, metabolizem ogljika, fotosintezo, premeščanje asimilatov, dihanje ter sekundarni metabolizem rastlin.  
V tretjem delu obravnava rast in razvoj rastlin, biosintezo celične stene, hormonalno regulacijo, zaznavanje in odzivanje na dražljaje iz okolja.

Second part covers energy conversions in plants, photosynthesis, carbon metabolism, assimilates translocation and respiration.  
Third part covers plant growth and development, cell wall biosynthesis, hormonal regulation, sensing and responding to the environmental stimuli.

### Temeljni literatura in viri / Readings:

Hopkins WG, Hüner NPA, 2009. Introduction to Plant Physiology, 4th Edition  
Taiz L, Zeiger E, Møller IM, Murphy A, 2018. Plant Physiology and Development (International Edition) 6th Edition, Oxford University Press (Imprint: Sinauer Assoc.)  
<http://6e.plantphys.net/>  
Taiz L, Zeiger E, 2015, 2010, Plant Physiology, 5th, 4th Edition, Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts. <http://5e.plantphys.net/>  
EditionBresinsky, A., Körner, C., Kadereit, J.W., Neuhaus, G., Sonnewald, U. 2013. Strasburger's Plant Sciences, Including Prokaryotes and Fungi. Springer-Verlag, Berlin, Heidelberg.  
Kutschera U. 2002. Prinzipien der Pflanzenphysiologie. Spectrum Akademischer Verlag, Heidelberg, Berlin.  
Vodnik D. 2012. Osnove fiziologije rastlin. Oddelek za agronomijo, Biotehniška fakulteta Ljubljana.

### Cilji in kompetence:

- Seznaniti študente s fiziološkimi procesi, metabolizmom, vodnimi razmerami, prehrano in transportom v rastlinah, rastjo in razvojem ter prilagojenostjo rastlin na okolje.
- Usposobiti študente za prepoznavanje procesov in mehanizmov, ki vodijo v prilagajanje rastlin na spremembe v okolju.
- Seznaniti študente z biotskimi in abiotskimi dejavniki, ki vplivajo na rastline.
- Usposobiti študente za prepoznavanje in razumevanje fizioloških procesov in mehanizmov na vseh ravneh organizacije rastlinskega telesa, na celičnem, morfološkem, biokemijskem, molekularnem nivoju.
- Praktično usposobiti študente za raziskovalno delo z rastlinskim materialom.

### Objectives and competences:

- To acquaint students with physiological processes, metabolism, water relations, nutrition and transport in plants, growth and development, and adaptation of plants to the environment.
- To train students to identify processes and mechanisms that lead to adaptation of plants to changes in the environment.
- To acquaint students with biotic and abiotic factors that affect plants.
- To train students to identify and understand physiological processes and mechanisms at all levels of the plant body organization, on cellular, morphological, biochemical, and molecular level.
- Practically prepare students for research work with plant material.

### Predvideni študijski rezultati:

### Intended learning outcomes:

<p><b>Znanje in razumevanje:</b></p> <ul style="list-style-type: none"> <li>- Razume in ovrednoti osnovne fiziološke procese, pomembne za rastline</li> <li>- Razume in ovrednoti fiziološke procese in mehanizme, ki vodijo v prilagajanje rastlin v spreminjajočem okolju.</li> <li>- Prepozna biotske in abiotske dejavnike, ki vplivajo na rastline.</li> <li>- Osvoji spretnosti pomembne za praktično eksperimentalno delo: opazovanje, merjenje, ravnanje z rastlinskim materialom, kemikalijami, steklovino, osnovnimi aparaturami, zbiranjem rezultatov, načrtovanjem poskusov, vrednotenjem rezultatov, poročanjem.</li> <li>- Osvoji izbrane laboratorijske metode ter se usposobi za delo z rastlinskim materialom.</li> <li>- Se usposobi za varno delo v laboratoriju.</li> </ul>
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<p><b>Knowledge and understanding:</b></p> <ul style="list-style-type: none"> <li>- Understand and evaluate basic physiological processes relevant to plants</li> <li>- Understand and evaluate physiological processes and mechanisms that lead to adaptation of plants in a changing environment.</li> <li>- Recognizes the biotic and abiotic factors that influence plants.</li> <li>- Acquire skills important for practical experimental work: observation, measurement, handling of plant material, chemicals, glassware, basic apparatus, collection of results, planning of experiments, evaluation of results, reporting.</li> <li>- Acquire selected laboratory methods and become familiar for working with plant material.</li> <li>- To be trained for safe work in the laboratory.</li> </ul>
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**Metode poučevanja in učenja:**

<ul style="list-style-type: none"> <li>- Predavanja</li> <li>- Laboratorijske vaje</li> </ul>
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**Learning and teaching methods:**

<ul style="list-style-type: none"> <li>- Lectures</li> <li>- Laboratory exercises</li> </ul>
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	Delež (v %) / Weight (in %)	Assessment:
<p><b>Načini ocenjevanja:</b></p> <p>Način (pisni izpit, ustno izpraševanje, naloge, projekt):</p> <ul style="list-style-type: none"> <li>- Pisni izpit</li> <li>- Kolokvij iz vaj</li> <li>- Poročilo z laboratorijskih vaj</li> </ul> <p>Pozitivno opravljen kolokvij in poročilo z vaj sta pogoj za pristop k izpitu.</p>	<p>50 37,5 12,5</p>	<p>Type (examination, oral, coursework, project):</p> <ul style="list-style-type: none"> <li>- Written exam</li> <li>- Laboratory exercises exam</li> <li>- Laboratory exercises report</li> </ul> <p>The positive exercise examination and laboratory report are a prerequisite for the written examination.</p>

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

CIRINGER, Terezija, MARTÍN, Carmen, ŠAJNA, Nina, KALIGARIČ, Mitja, AMBROŽIČ-DOLINŠEK, Jana. Cryopreservation of an endangered *Hladnikia pastinacifolia* Rchb. by shoot tip encapsulation-dehydration and encapsulation-vitrification. *In vitro cellular & developmental biology, Plant*, ISSN 1054-5476. [Print ed.], 2018, str. 1-11, ilustr., doi: [10.1007/s11627-018-9917-y](https://doi.org/10.1007/s11627-018-9917-y). [COBISS.SI-ID [23995656](https://www.cobiss.si/id/23995656)]

MECHORA, Špela, ŽERDONER ČALASAN, Anže, FELICIJAN, Mateja, URBANEK KRAJNC, Andreja, AMBROŽIČ-DOLINŠEK, Jana. The impact of selenium treatment on some physiological and antioxidant properties of *Apium repens*. *Aquatic botany*, ISSN 0304-3770. [Print ed.], 2017, vol. 138, str. 16-23, doi: [10.1016/j.aquabot.2016.12.002](https://doi.org/10.1016/j.aquabot.2016.12.002). [COBISS.SI-ID [22874888](https://www.cobiss.si/id/22874888)]

AMBROŽIČ-DOLINŠEK, Jana, CIRINGER, Terezija, KALIGARIČ, Mitja. Micropropagation of the narrow endemic *Hladnikia pastinacifolia* (Apiaceae). *Acta botanica Croatica : an international journal of botany*, ISSN 0365-0588, 2016, vol. 75, iss. 2, str. 244-252, ilustr., doi: [10.1515/botcro-2016-0028](https://doi.org/10.1515/botcro-2016-0028). [COBISS.SI-ID [22339592](https://www.cobiss.si/id/22339592)]