



Univerza v Mariboru

Fakulteta za naravoslovje  
in matematiko

**UČNI NAČRT PREDMETA / COURSE SYLLABUS**

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

<b>Študijski program in stopnja</b> Study programme and level	<b>Študijska smer</b> Study field	<b>Letnik</b> Academic year	<b>Semester</b> Semester
<b>Univerzitetni študijski program</b> <b>Ekologija z naravovarstvom, 1.</b> <b>stopnja</b>		<b>3.; 3rd</b>	<b>6.; 6th</b>
<b>Undergraduate university</b> <b>programme Ecology with</b> <b>Nature Conservation, 1st</b> <b>degree</b>			

**Vrsta predmeta / Course type**

**Univerzitetna koda predmeta / University course code:**

<b>Predavanja</b> Lectures	<b>Seminar</b> Seminar	<b>Vaje</b> Tutorial	<b>Lab. vaje</b> Laboratory work	<b>Terenske vaje</b> Field work	<b>Samost. delo</b> Individ. work	<b>ECTS</b>
<b>45</b>			<b>30</b>		<b>105</b>	<b>6</b>

**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, ki vključujejo rast in razvoj rastlin ter prilagojenost rastlin na vplive iz okolja. 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 raztopin, mineralno prehrano ter lastnosti membran in membranske procese.

V drugem delu obravnava energetske pretvorbe v rastlini, metabolizem ogljika, fotosintezo, premeščanje asimilatov, dihanje, metabolizem dušika in žvepla ter sekundarni metabolizem.

V tretjem delu obravnava rast in razvoj rastlin, biosintezo celične stene, hormonalno regulacijo, vplive zunanjih dejavnikov na rast in razvoj, zaznavanje in odzivanje na dražljaje iz okolja, cvetenje, embriogenezo, nastanek semen in plodov, kalitev semen, staranje in se zaključí z gibanji rastlin.

**Content (Syllabus outline):**

The course introduces the physiological processes of plants, growth, development and plant adaptations to the environment influences.

Emphasis is on the relationship between structure and function from the molecular to the whole-plant level.

First part covers water relations (balance) in plants, uptake, transport and translocation mechanisms of water, ions and solutes, mineral nutrition, membrane properties and processes.

Second part covers energy conversions in plants, photosynthesis, carbon metabolism, assimilates translocation, respiration, nitrogen and sulfur metabolism, and secondary metabolism.

Third part covers plant growth and development, cell wall biosynthesis, hormonal regulation, influences of external factors on growth and development, sensing and responding to the environmental stimuli, flowering, embryogenesis, seed and fruit development, seed germination, senescence and plant movements.

**Temeljni literatura in viri / Readings:**

Vodnik D. 2012. Osnove fiziologije rastlin. Oddelek za agromijo, Biotehniška fakulteta Ljubljana.

Taiz L., Zeiger E. 2010. Plant Physiology. Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts.

Taiz L., Zeiger E. 2002. Plant Physiology. Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts.

Bresinsky, A., Körner, C., Kadereit, J.W., Neuhaus, G., Sonnewald, U. 2013. Strasburger's Plant Sciences, Including Prokaryotes and Fungi. Springer-Verlag, Berlin, Heidelberg.

Mohr H., Schopfer P. 1995. Plant physiology, Springer-Verlag Berlin, Heidelberg.

Sitte P., Weiler E.W., Kadereit J.W., Bresinsky A., Körner C. 2002. Lehrbuch der Botanik für Hochschulen. Begründet von Strasburger E., Noll F., Schenck H., Schimper. Spectrum Akademischer Verlag Heidelberg, Berlin.

Kutschera U. 2002. Prinzipien der Pflanzenphysiologie. Spectrum Akademischer Verlag, Heidelberg, Berlin.

Kutschera U. 1998. Grundpraktikum zur Pflanzenphysiologie. UTB Quelle & Meyer Verlag,.

**Cilji in kompetence:**

- Prepoznavanje in razumevanje fizioloških procesov v rastlinah, ki vključujejo metabolizem rastlin, vodne razmere, prehrano in transport rastlin, rast in razvoj rastlin ter prilagojenost rastlin na okolje.
- Prepoznavanje in razumevanje fizioloških procesov in mehanizmov, ki vodijo v prilagajanje rastlin na spremembe v okolju.
- Prepoznavanje biotskih in abiotskih dejavnikov in mehanizmov, ki vplivajo na rastline.
- Prepoznavanje in razumevanje fizioloških procesov in mehanizmov na vseh ravneh organizacije rastlinskega telesa, ki vključuje znanje citologije, morfologije, biokemije, biofizike, molekularne biologije in genetike.
- Prepoznavanje rastlinske fiziologije kot eksperimentalne vede.

**Objectives and competences:**

- Identification and understanding of the physiological processes of plants, which includes plants metabolism, water relations, nutrition and transport in plants, growth and development of plants, and adjustment of plants to environment.
- Identification and understanding plant physiological processes leading to adjustment of plants exposed to changes in environment.
- Identification of the biotic and abiotic factors and mechanisms that influenced plants.
- Identification and understanding physiological mechanisms and processes, on all organization levels and includes knowledge of cytology, morphology, biochemistry, biophysics, molecular biology and genetics.
- Recognition of the plant physiology as experimental science.

**Predvideni študijski rezultati:****Znanje in razumevanje:**

- Osnovni fiziološki procesi in pojavi, pomembni za rastline
- Fiziološki procesi in mehanizmi, ki vodijo v prilagajanje rastlin izpostavljenih spremembam v okolju.
- Biotski in abiotski dejavniki, ki vplivajo na rastline.

**Prenosljive/ključne spretnosti in drugi atributi:**

Osnovne spretnosti pomembne za praktično eksperimentalno delo: opazovanje, merjenje, ravnanje z rastlinskim materialom, kemikalijami, steklovino, osnovnimi aparaturami, zbiranje rezultatov, načrtovanje poskusov, vrednotenje rezultatov, poročanje.

- Seznanjanje z izbranimi laboratorijskimi metodami dela.
- Varno delo v laboratoriju.

**Intended learning outcomes:****Knowledge and understanding:**

- Basic physiological mechanisms and phenomena relevant for plants
- The physiological processes that result in adjustment of plants exposed to changes in their environment.
- The biotic and abiotic factors that influenced plants.

**Transferable/Key Skills and other attributes:**

- Basic skills important for practical experimental work: observations, measurements, manipulation with plant material, chemicals, glass wares and other equipments, collecting data, designing experiments, analyzing data, reporting.
- Qualification for work with selected laboratory methods.
- Safe working practice in laboratory.

**Metode poučevanja in učenja:****Learning and teaching methods:**

Predavanja Laboratorijske vaje	Lectures Laboratory exercises.
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Delež (v %) /

**Načini ocenjevanja:**

Weight (in %)

**Assessment:**

Izpit, poročilo iz laboratorijskih vaj, pisni kolokvij iz vaj.	50/12,5/37,5	Examination, laboratory report, written examination of exercises.
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**Reference nosilca / Lecturer's references:**

- AMBROŽIČ-DOLINŠEK, Jana, KOVAČ, Maja, ŽEL, Jana, CAMLOH, Marjana. Pyrethrum (*Tanacetum cinerariifolium*) from the northern Adriatic as a potential source of natural insecticide. *Ann. Ser. hist. nat.*, 2007, letn. 17, št. 1, str. 39-46.
- AMBROŽIČ-DOLINŠEK, Jana, CAMLOH, Marjana, ŽEL, Jana, KOVAČ, Maja, RAVNIKAR, Maja, CARRARO, Luigi, PETROVIČ, Nataša. Phytoplasma infection may affect morphology, regeneration and pyrethrin content in pyrethrum shoot culture. *Sci. hortic.* [Print ed.], 2008, vol. 116, no. 2, str. 213-218.
- AMBROŽIČ-DOLINŠEK, Jana, RAVNIKAR, Maja, ŽEL, Jana, DEMŠAR, Tina, CAMLOH, Marjana, CANKAR, Katarina, DREO, Tanja. Tissue culture of Pyrethrum (*Tanacetum cinerariifolium*) and associated microbial contamination = Tkivna kultura bolhača (*Tanacetum cinerariifolium*) in z njo povezana okužba z mikroorganizmi. *Acta biol. slov.* [Tiskana izd.], 2010, vol. 53, št. 1, str. 63-68.
- CAMLOH, Marjana, AMBROŽIČ-DOLINŠEK, Jana. In vitro regeneration systems of *Platyserium*. V: FERNÁNDEZ, Helena (ur.), KUMAR, Ashwani (ur.), REVILLA, Maria Ángeles (ur.). *Working with ferns : issues and applications*. New York [etc.]: Springer, cop. 2011, str. 111-125.