



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Izbrana poglavja iz komunikacije živali
Course title:	Selected Topics in Animal Communication

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Doktorski študij Ekološke znanosti, 3. stopnja		1. ali 2.; 1st or 2nd	1. 2. ali 3. ; 1st, 2nd or 3rd
Doctoral Study Ecological Sciences, 3rd degree			

Vrsta predmeta / Course type

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
5	5				140	5

Nosilec predmeta / Lecturer:

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

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

Poznavanje ekofiziologije živali na ravni univerzitetnega programa ter eksperimentalnih metod v fiziologiji na ravni drugostopenjskega študija

Prerequisites:

Knowledge of animal ecophysiology and at graduate level, and of experimental methods in physiology at master level

Vsebina:

Obravnavana so izbrana poglavja iz naslednjih sklopov.
 Oddajanje, prenos in sprejemanje informacije
 – Zvok (lastnosti, oddajanje, širjenje, sprejemanje)
 – Svetloba (lastnosti, oddajanje in prenos ter sprejemanje svetlobnih signalov)
 – Kemični signali (splošne lastnosti, oddajanje, širjenje in sprejemanje kemičnih signalov)
 – Elektrolepcija (lastnosti električnega polja, ustvarjanje bio-električnih polj, električna polja in medij, zaznavanje električnih signalov,

Content (Syllabus outline):

Selected topics in the following chapters are discussed.
 Production, transmission and reception of signals
 – Sound (properties, production, propagation, reception)
 – Light (properties, production, transmission and reception of light signals)
 – Chemical signals (general features, production, transmission and reception of chemical signals).
 – Electrolception (properties of electric fields, generation of bio-electric fields, coupling of electric signals to the medium, reception of

komunikacija in električni signali)
Optimizacija prenosa informacije
– Optimizacija komunikacije
– Kolicina informacije
– Vrednost informacije
– Kodiranje
– Evolucija signalov
– Cena in pritiski razvoja signalov
– Pravila oblikovanja signalov

Teorija igre in strategije signaliziranja
– Evolucijska teorija igre
– Poštenost signaliziranja
– Reševanje konfliktov
– Igre teritorialnega signaliziranja
– Signaliziranje v času parjenja
– Socialna integracija
– Signali okolja
– Avtokomunikacija

electric signals, communication and electric signals)
Optimizing information transfer
– Optimizing communication
– The amount of information
– The value of information
– Coding
– Signal evolution
– Costs and constraints on signal evolution
– Signal design rules

Game theory and signalling strategies
– Evolutionary game theory
– Signal honesty
– Conflict resolution
– Territorial signalling games
– Mating games and signalling
– Social integration
– Environmental signals
– Autocommunication

Temeljni literatura in viri / Readings:

- Alcock, J., (2009). Animal behavior: an evolutionary approach. 9th ed. Freeman, Sunderland.
- Bradbury, J. W., S. L. Vehrencamp, (2011). Principles of Animal Communication, 2nd ed. Sinauer Associates Inc., Publishers, Sunderland, Massachusetts.
- Cocroft, R.B., Gogala, M., Hill, P.S.M., Wessel, A. (eds.) (2014). Studying vibrational communication, Animal signals and communication 3, Springer, Heidelberg.

Cilji in kompetence:

– Podrobno predstaviti lastnosti signalov različnih modalitet
– Podrobno pojasniti vpliv medija na lastnosti signalov
– Podrobno razložiti prilagoditve receptorjev za optimalno zaznavanje adekvatnih signalov
– Podrobno definirati parametre informacije in pojasniti mehanizme za optimizacijo prenosa informacije
– Podrobno razložiti komunikacijske procese v različnih kontekstih vedenja

Objectives and competences:

– To explain properties of signals of different modalities in detail
– To elucidate in detail the influence of transmission media on signal properties
– To explain in detail sensory adaptations for optimal reception of adequate signals
– To define in detail information parameters and to explain mechanisms for optimizing information transfer
– To explain in detail communication processes in different behavioural contexts

Predvideni študijski rezultati:

Znanje in razumevanje:

– Vloga medija na oddajanje in sprejemanje signalov
– Podrobno razumevanje fizioloških procesov, povezanih z komunikacijo
– Podrobno poznavanje procesov in evolucije komunikacije z definicijami parametrov

Intended learning outcomes:

Knowledge and understanding:

– The role of medium on signal production and reception
– Advanced understanding physiological processes in relation to communication
– Advanced learning of processes and evolution of communication with definitions of information

informacije
 – Podrobno razumevanje razvoja in optimizacije komunikacije
 – Podrobno poznavanje vedenja in vloge komunikacije

Prenesljive/ključne spretnosti in drugi atributi:
 – Sposobnost podrobnega razumevanja pomena komunikacije
 – Sposobnost podrobne uporabe znanja o komunikaciji v kontekstu biološke kontrole, uporabe novih tehnologij in informatike

parameters
 – Advanced understanding of evolution and optimization of communication
 – Advanced learning of behaviour and the role of communication

Transferable/Key Skills and other attributes:
 – Ability to understand in detail the role of communication
 – Ability to use in detail knowledge on communication in the context of biological control, the use of new technologies and information sciences

Metode poučevanja in učenja:

Learning and teaching methods:

– Predavanja
 – Laboratorijske vaje – individualno eksperimentalno delo

– Lectures
 – Laboratory excersises – individual experimental practice

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

– Kolokvij iz vaj		– Partial exam of experimental practice
– Seminarska naloga	30%	– Seminar essay
– Pisni izpit	30%	– Written exam
	40%	

Reference nosilca / Lecturer's references:

- DEVETAK, Dušan. Sand-borne vibrations in prey detection and orientation of antlions. V: COCROFT, Reginald Bifield (ur.), et al. *Studying vibrational communication*, (Animal signals and communication, ISSN 2197-7305, vol. 3). Berlin: Springer, 2014, str. 319-330, ilustr., doi: [10.1007/978-3-662-43607-3_16](https://doi.org/10.1007/978-3-662-43607-3_16). [COBISS.SI-ID [20779528](#)]
- MENCINGER VRAČKO, Bojana, DEVETAK, Dušan. Orientation of the pit-building antlion larva *Euroleon* (Neuroptera, Myrmeleontidae) to the direction of substrate vibrations caused by prey. *Zoology*, ISSN 0944-2006. [Print ed.], 2008, vol. 111, iss. 1, str. 2-8, ilustr. [COBISS.SI-ID [15674632](#)], [JCR, SNIP, WoS do 6. 5. 2014: št. citatov (TC): 5, čistih citatov (CI): 3, normirano št. čistih citatov (NC): 2, Scopus do 15. 4. 2014: št. citatov (TC): 6, čistih citatov (CI): 4, normirano št. čistih citatov (NC): 3]
- DEVETAK, Dušan. Effects of larval antlions *Euroleon nostras* (Neuroptera, Myrmeleontidae) and their pits on the escape-time of ants. *Physiological entomology*, ISSN 0307-6962, 2005, 30, str. 82-86, graf. prikazi. [COBISS.SI-ID [13844488](#)], [JCR, SNIP, WoS do 6. 5. 2014: št. citatov (TC): 8, čistih citatov (CI): 4, normirano št. čistih citatov (NC): 4, Scopus do 15. 4. 2014: št. citatov (TC): 8, čistih citatov (CI): 4, normirano št. čistih citatov (NC): 4]