



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Komunikacija živali
Course title:	Animal Communication

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Biologija in ekologija z naravovarstvom, 2. stopnja	/	1/2	Poletni/ Zimski
Biology and Ecology with Nature Conservation, 2nd Level	/	1/2	Summer/ Winter

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
15	30				135	6

Nosilec predmeta / Lecturer:

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

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

Poznavanje eksperimentalnih metod v fiziologiji živali.

Prerequisites:

Knowledge of experimental methods in animal physiology.

Vsebina:

Content (Syllabus outline):

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, komunikacija in električni signali)

Optimizacija prenosa informacije

- Optimizacija komunikacije
- Količina 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

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).
- Electrolcption (properties of electric fields, generation of bio-electric fields, coupling of electric signals to the medium, reception of 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:

- Bradbury, J. W., Vehrencamp, S. (2011). Principles of Animal Communication, 2nd ed. Sinauer Associates Inc., Publisher.
- Rubenstein, D.R., Alcock, J., (2018). Animal behavior. 11th ed. Oxford University Press.
- Halliday, T. (1998). The Senses and Communication. Springer.
- Hill, P. S.M. (2008). Vibrational communication in animals. Cambridge ; London : Harvard University Press.
- d'Etorre P., Hughes, D. P. (2008). Sociobiology of communication : an interdisciplinary perspective. Oxford, New York : Oxford University Press.

Cilji in kompetence:

Objectives and competences:

- Predstaviti temeljne lastnosti signalov različnih modalitet
- Pojasniti vpliv medija na lastnosti signalov
- Razložiti prilagoditve receptorjev za optimalno zaznavanje adekvatnih signalov
- Definirati parametre informacije in pojasniti mehanizme za optimizacijo prenosa informacije
- Razložiti komunikacijske procese v različnih kontekstih vedenja
- Sposobnost razumevanja pomena komunikacije
- Sposobnost uporabe temeljnega znanja o komunikaciji v kontekstu biološke kontrole, uporabe novih tehnologij in informatike

- To explain basic properties of signals of different modalities
- To elucidate the influence of transmission media on signal properties
- To explain sensory adaptations for optimal reception of adequate signals
- To define information parameters and to explain mechanisms for optimizing information transfer
- To explain communication processes in different behavioural contexts
- Ability to understand the role of communication
- Ability to use basic knowledge on communication in the context of biological control, the use of new technologies and information sciences

Predvideni študijski rezultati:

Znanje in razumevanje:

- Vloga medija na oddajanje in sprejemanje signalov
- Nadgradnja razumevanja temeljnih fizioloških procesov, povezanih z komunikacijo
- Spoznavanje temeljnih procesov in evolucije komunikacije z definicijami parametrov informacije
- Razumevanje razvoja in optimizacije komunikacije
- Vedenje in vloga komunikacije

Intended learning outcomes:

Knowledge and understanding:

- The role of medium on signal production and reception
- Upgrading of understanding basic physiological processes in relation to communication
- Learning of basic processes and evolution of communication with definitions of information parameters
- Understanding of evolution and optimization of communication
- Behaviour and the role of communication

Metode poučevanja in učenja:

Predavanja
Seminar
Vaje

Learning and teaching methods:

Lectures
Seminar
Laboratory exercises

Načini ocenjevanja:

Način (pisni izpit, ustno izpraševanje, naloge, projekt)
Seminarska naloga
Pisni izpit

Delež (v %) /

Weight (in %)

Assessment:

Type (examination, oral, coursework, project):
Seminar essay
Written exam

Način (pisni izpit, ustno izpraševanje, naloge, projekt)		Type (examination, oral, coursework, project):
Seminarska naloga	50	Seminar essay
Pisni izpit	50	Written exam

Reference nosilca / Lecturer's references:

DEVETAK, Dušan, NOVAK, Tone, JANŽEKOVIČ, Franc. Effect of substrate density on behaviour of antlion larvae (Neuroptera: Myrmeleontidae). *Acta oecologica*. [Print ed.], 2012, vol. 43, str. 1-7. [COBISS.SI-ID19210248]

DEVETAK, Dušan. Substrate particle size-preference of wormlion *Vermileo vermileo* (Diptera: Vermileonidae) larvae and their interaction with antlions. *Eur. j. entomol.*, 2008, issue 4, vol. 105, str. 631-635, ilustr. [COBISS.SI-ID16213768]

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*. [Print ed.], 2008, vol. 111, iss. 1, str. 2-8, ilustr. [COBISS.SI-ID 15674632]

DEVETAK, Dušan, MENCINGER VRAČKO, Bojana, DEVETAK, Miha, MARHL, Marko, ŠPERNJAK, Andreja. Sand as a medium for transmission of vibratory signals of prey in antlions *Euroleon nostras* (Neuroptera: Myrmeleontidae). *Physiol. entomol.*, Sep. 2007, vol. 32, no. 3, str. 268-274, ilustr. <http://www.ingentaconnect.com/content/bsc/pent>. [COBISS.SI-ID 15465736]