

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Od okolja do nevronske mreže
Course title:	From Environment to Neuronal Networks

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Senzorske tehnologije, 3. stopnja	/	1	1
Sensor Technologies, 3 rd cycle	/	1	1

Vrsta predmeta / Course type Izbirni / Elective

Univerzitetna koda predmeta / University course code: ST3-546

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
15	15			15	105	5

**Navedena porazdelitev ur velja, če je vpisanih vsaj 15 študentov. Drugače se obseg izvedbe kontaktnih ur sorazmerno zmanjša in prenese v samostojno delo. / This distribution of hours is valid if at least 15 students are enrolled. Otherwise the contact hours are linearly reduced and transferred to individual work.*

Nosilec predmeta / Lecturer: Doc. dr. Meta Virant-Doberlet

Jeziki /	Predavanja / Lectures:	Slovenski ali angleški / Slovene or English
Languages:	Vaje / Tutorial:	Slovenski ali angleški / Slovene or English

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

Zaključen študij druge stopnje ustrezne (naravoslovne ali tehniške) smeri ali zaključen študij drugih smeri z dokazanim poznavanjem osnov področja predmeta (pisna dokazila, pogovor).

Prerequisites:

Completed second level studies in natural sciences or engineering or completed second level studies in other fields with proven knowledge of fundamentals in the field of this course (certificates, interview).

Vsebina:

Tematike, vključene v učni načrt:

- sporazumevanje in vedenje žuželk,
- povezava ter odnos med okoljem in sporazumevanjem,
- senzorični mehanizmi in receptorji,
- primeri procesiranja senzorične informacije iz okolja v nevronske mreže v centralnem živčnem sistemu, ki so podlaga za vedenje žuželk.

Content (Syllabus outline):

Topics included in the course syllabus:

- insect communication and behaviour,
- connection and relation between environment and communication,
- sensory systems and receptors,
- case studies on processing of sensory information obtained from environment in the central nervous system neuronal networks underlying insect behaviour.

Temeljni literatura in viri / Readings:

- Hedwig B. (ed.) (2014): Insect Hearing and Acoustic Communication. Springer Verlag.
- Pollack G.S., Mason A.C., Popper A.N. & Fay R.R. (eds.) (2014): Insect Hearing. Springer Verlag.

Izbrani znanstveni članki v revijah / Relevant Scientific papers in journals:

- Animal Behaviour.
- Journal of Comparative Neurology.
- Journal of Comparative Physiology.
- Scientific Reports.

Cilji in kompetence:

Cilji:

- razumevanje kompleksnega pristopa k raziskavam komunikacije žuželk, ki je idealen model za študij nevronskih mrež,
- razumevanje pomena povezave med specifičnim okoljem in vedenjem živali v njem,
- usposobljenost za raziskovalno delo na nivoju, da bo študent konkurenčen tako v Sloveniji kot v tujini.

Kompetence:

- sposobnost komunikacije z raziskovalci na področju robotike, nevronskih mrež, prepoznavanja govora, neuroetologije, agronomije.

Objectives and competences:

Objectives:

- understanding a complex approach to studies of insect communication which is an ideal model to investigate neuronal networks,
- understanding the significance of relation between the specific environment and animal behaviour,
- qualify the students for an independent research at the level they will be competitive not only in Slovenia, but also abroad.

Competences:

- ability to interact with researchers in the fields of robotics, neuronal networks, speech recognition, neuroethology, agriculture.

Predvideni študijski rezultati:

Znanje in razumevanje:

- poznavanje osnovnih principov komunikacije žuželk,
- razumevanje odnosov na relaciji: okolje-senzorični sistem-nevronska mreža-vedenje.

Intended learning outcomes:

Knowledge and understanding of:

- knowledge of fundamental principles of communication,
- understanding the relations: environment-sensory system-neuronal network-behaviour.

Metode poučevanja in učenja:

Interaktivna predavanja, seminar, konzultacije.

Learning and teaching methods:

Interactive lectures, seminar, consultations.

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Pisni izpit.

50 %

Written exam.

Seminarska naloga in njen zagovor.

50 %

Seminar.

Reference nosilca / Lecturer's references:

- Korinšek G., Derlink M., Virant-Doberlet M., Tuma T. (2016) An autonomous system of detecting and attracting leafhopper males using species- and sex-specific substrate borne vibrational signals. Computers and Electronics in Agriculture 123: 29-39.
- Polajnar J., Eriksson A., Virant-Doberlet M., Mazzoni V. (2016) Mating disruption of a grapevine pest using mechanical vibrations: from laboratory to the field. Journal of Pest Science 89: 909-921.
- Polajnar P., Eriksson A., Lucchi A., Anfora G., Virant-Doberlet M., Mazzoni V. (2015) Manipulating behaviour with substrate-borne vibrations – potential for pest control. Pest Management Science 71: 15-23.

- Kuhelj A., de Groot M., Blejec A., Virant-Doberlet M. (2015): The effect of timing of female vibrational reply on male signalling and searching behaviour in the leafhopper *Aphrodes makarovi*. PLoS ONE 10, e0139020.
- Čokl A., Žunič A., Virant-Doberlet M. (2017) Stink bug communication network and environment. In Stink Bugs: Biorational Control Based on Communication Processes (eds. Čokl A. & Borges M.). CRC Press, pp. 165-179.