Univerza v Mariboru

Fakulteta za naravoslovje in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS	
Predmet:	EVOLUCIJA
Course title:	EVOLUTION

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Biologija, 1. stopnja		**3.**	**6.**
Biology, 1st degree		**3rd**	**6.**

Vrsta predmeta / Course type Obvezni / Obligatory

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30					**60**	**3**

Nosilec predmeta / Lecturer: Peter KOZEL

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

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

Jih ni.

Prerequisits:

None.

Vsebina:

I. Evolucija kot znanost
- položaj evolucije v kontekstu naravoslovnih, družbenih in humanističnih znanosti;
- zgodovinski razvoj evolucijske misli;
- sodobni pogledi na proces evolucije;

II. Izvor živega
- prebiotska evolucija;
- teorije o nastanku živega;
- veliki evolucijski prehodi;
- kraljestva in domene živega;

III. Orodja evolucijskega biologa
- paleontološki izkazi (fosili, posledice delovanja);

Content (Syllabus outline):

I. Evolution as science
- evolution in the context of sciences, social sciences and humanities;
- history of evolutionary thinking;
- recent views on evolution;

II. Emergence of life
- prebiotic evolution;
- theories on development of life;
- major evolutionary transitions;
- kingdoms and domains of life;

III. Tools of evolutionary biologist
- paleontology (fosils, traces of biological activities);

- datacija najdb;
- primerjalne študije (anatomske, histološke, embriološke, biokemijske, genetske);
- genske analize;
- kladistične analize;

IV. Izvori genske pestrosti

- razmerje med genomom, genotipom in fenotipom;
- mutacije;
- genske rekombinacije;
- horizontalni genski transfer;
- epigenetsko dedovanje;
- populacijska genetika;

V. Selekcija

- dejavniki selekcije;
- prijemališča selekcije;
- strategije preživetja;
- primeri adaptacij na okolje;
- koevolucija;

VI. Speciacija in razvoj višjih taksonov

- opredelitev koncepta vrste (biološka, morfološka, kronološka);
- reproduktivna izolacija;
- speciacija (alopatrična, simpatrična, parapatrična);
- razvoj višjih taksonov;
- izumrtje taksona;

VII. Humana evolucija

- izvor in evolucija primatov;
- evolucija primatskih znakov;
- povezava med biološko in kulturno evolucijo;
- filogenija in sistematika recentnih družin primatov;
- filogenija, sistematika in biogeografija predhodnikov in sodobnikov rodu Homo (Ardipithecus, Paranthropus, Australopithecus, itd.);
- filogenija, sistematika in biogeografija rodu Homo;
- izvor, filogenija, sistematika in biogeografija vrste *Homo sapiens*;
- razvoj človeških kultur;
- najdbe v Sloveniji;
- evolucijske perspektive vrste *H. sapiens.*

- datation;
- comparative studies (anatomy, histology, embriology, biochemy, genetics);
- gen analyses;
- kladistic analyses

IV. Sources of genetical variability

- relations between genome, genotype and phenotype;
- mutations;
- genetic recombinations;
- horizontal gene transfer;
- epigenetic inheritance;
- population genetics

V. Selection

- factors of selection;
- targets of selection;
- survival strategies;
- adaptations;
- coevolution;

VI. Speciation and evolution of higher taxa

- species concept (biological, morphological, chronological);
- reproductive isolation;
- speciation (alopatric, simpatric, parapatric);
- development of higher taxa;
- extinction of taxa;

VII. Human evolution

- evolution of primates;
- evolution of traits in primates;
- connections between biological and cultural evolution;
- phylogeny, systematics and biogeography of recent primate families;
- phylogeny, systematics and biogeography of human precedesors and side branches of the human evolutionary line (Ardipithecus, Paranthropus, Australopithecus, Paranthropus, etc.);
- phylogeny, systematics and biogeography of the genus Homo;
- phylogeny, systematics and biogeography of the species *Homo sapiens*;
- evolution of culture;
- Slovenian findings;

evolutionary perspectives of *H. sapiens.*

Temeljni literatura in viri / Readings:

Hopcroft, R. L. (Ed.). (2018). *The Oxford Handbook of Evolution, Biology, and Society*. Oxford University Press.

Evolution. Futuyma, Douglas J. (2017) Evolution. 4th ali 3th edition/ izdaja. Sunderland (Mass.) : Sinauer Associates,

Priporočeni viri

BAJD, Barbara (ur.). *Where did we come from? : current views on human evolution*. Ljubljana: Faculty of Education, 2010. 170 str., ilustr. ISBN 978-961-253-055-6.
Jablonka, E.in Lamb, M.J., 2009. Štiri razsežnosti evolucije. Genetska, epigenetska, vedênjska in simbolna raznolikost v zgodovini življenja. Zavod RS za šolstvo.
Mayr, E., Diamond, J. M., Simoniti, I., Weber, A., Wilkins, J. S., 2008. Filozofija evolucije. Fakulteta za družbene vede. Univerza v Ljubljani.
McGrew, W. C. 2011. Kulturni šimpanz. Razmišljanja o kulturni primatologiji. Studia Humanitatis. Ljubljana 2011.
Izbrani članki iz primarnih revij (Nature, Science, itd.)

Cilji in kompetence:

Po opravljenem kurzu bo študent-ka:
- razumel mehanizme biotske evolucije;
- razumel pomen strategij preživetja;
- sposoben utemeljiti izvor in razvoj živega na osnovi spoznanj naravoslovnih znanosti;
- prepoznati evolucijske procese v kontekstu drugih bioloških disciplin.
- posedoval znanja, ki mu bodo omogočala sodelovanje v razpravah, ki bodo vključevala evolucijo;
- sposoben utemeljiti biotsko in kulturno evolucijo;
- sposoben umestiti človeka v biološki sistem;
- sposoben opredeliti človeka kot biotsko in kulturno bitje.

Objectives and competences:

After the course a student should:
- understand mechanisms of biotic evolution;
- understand importance of survival strategies;
- be able to explain emergence and development of live on the scientific basis;
- recognize evolutionary processes in the context of other biological disciplines;
- possess knowledge for participation in discussions related to evolutionary topics;
- be able to ground biotic and cultural evolution;
- be able to place humans in a biological system;
- be able to define humans as a biological and cultural species;

Predvideni študijski rezultati:

Znanje in razumevanje:
- evolucije kot znanosti;
- procesov, ki so omogočili izvor in razvoj živega;
- uporabe orodij evolucijskega biologa;
- izvorov pestrosti
- mehanizmov selekcije;
- speciacije in razvoja višjih taksonov;
- humane evolucije.

Intended learning outcomes:

Knowledge and understanding of:
- evolution as a scientific discipline;
- processes, which allowed emergence of life;
- tools of evolutionary biologist;
- sources of variability:
- mechanisms of selection;
- speciation and development of higher taksa;
- human evolution.

Metode poučevanja in učenja:

Predavanja
Samostojno kritično preučevanje literature

Learning and teaching methods:

Lectures
Individual critical reading of the written sources.

Načini ocenjevanja:	Delež (v %) / Weight (in %)	**Assessment:**
Pisni izpit	**100 %**	Written exam

Reference nosilca / Lecturer's references:

KOZEL, Peter, DELIĆ, Teo, NOVAK, Tone. *Nemaspela borkoae* sp. nov. (Opiliones: Nemastomatidae), the second species of the genus from the Dinaric Karst. European Journal of Taxonomy. 2020, vol. 717, str. 90-107, ilustr. ISSN 2118-9773. DOI: 10.5852/ejt.2020.717.1103.

KOZEL, Peter, PIPAN, Tanja, MAMMOLA, Stefano, CULVER, David C., NOVAK, Tone. Distributional dynamics of a specialized subterranean community oppose the classical understanding of the preferred subterranean habitats. Invertebrate biology. Sep. 2019, vol. 138, iss. 3, str. 1-14. ISSN 1077-8306. DOI: 10.1111/ivb.12254.

PIPAN, Tanja, CULVER, David C., PAPI, Federica, KOZEL, Peter. Partitioning diversity in subterranean invertebrates: the epikarst fauna of Slovenia. PloS one. May 2, 2018, vol. 13, iss. 5, str. 1-19, ilustr. ISSN 1932-6203. http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0195991, DOI: 10.1371/journal.pone.0195991.

KOZEL, Peter, PIPAN, Tanja. Specialized aquatic subterranean communities are probably most species-rich in the thickest epikarst. Limnologica. 2020, vol. 81, str. 1-9. ISSN 0075-9511. DOI: 10.1016/j.limno.2020.125756.

NOVAK, Tone, SLANA NOVAK, Ljuba, KOZEL, Peter, SCHAIDER, Miriam, KOMPOSCH, Christian, LIPOVŠEK DELAKORDA, Saška, PODLESNIK, Jan, PAUŠIČ, Igor, RASPOTNIG, Günther. Hidden diversity within the *Nemastoma bidentatum* Roewer, 1914 complex (Opiliones: Nemastomatidae). Part I, Morphological evidence. European Journal of Taxonomy. 2021, vol. 777, str. 1-67, ilustr. ISSN 2118-9773. DOI: 10.5852/ejt.2021.777.1561.