



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
Univerzitetni študijski program Biologija, 1. stopnja		3.; 3rd	6.; 6th
Undergraduate university programme Biology, 1rd 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
30					60	3

Nosilec predmeta / Lecturer:

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

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

Vsebina:
Content (Syllabus outline):

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);
- 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

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 (fossils, traces of biological activities);
- datation;
- comparative studies (anatomy, histology, embryology, biochemistry, 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, sympatric, parapatric);
- development of higher taxa;
- extinction of taxa;

VII. Human evolution

- evolution of primates;
- evolution of traits in primates;

- 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;
- evlucijske perspektive vrste *H. sapiens*.

- 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:

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 evlucijske procese v kontekstu drugih bioloških disciplin.
- posedoval znanja, ki mu bodo omogočala sodelovanje v razpravah, ki bodo vključevala evolucijo;

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;

- sposoben utemeljiti biotsko in kulturno evolucijo;
- sposoben umestiti človeka v biološki sistem;
- sposoben opredeliti človeka kot biotsko in kulturno bitje.

- 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:

Intended learning outcomes:
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.

Prenesljive/ključne spretnosti in drugi atributi:
Knowledge and understanding:

- 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 taxa;
- human evolution.

Transferable/Key Skills and other attributes:
Metode poučevanja in učenja:
Learning and teaching methods:

Predavanja
Samostojno kritično preučevanje literature

Lectures
Individual critical reading of the written sources.

Načini ocenjevanja:

Delež (v %) /

Weight (in %) **Assessment:**

Pisni izpit	100 %	Written exam
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Reference nosilca / Lecturer's references:

ŠORGO, Andrej, USAK, Muhammet, KUBIATKO, Milan, FRANČOVIČOVA, Jana, PROKOP, Pavol, PUHEK, Miro, SKODA, Jiri, BAHAR, Mehmet. A cross-cultural study on freshmen's knowledge of genetics, evolution, and the nature of science. *Journal of Baltic science education*, ISSN 1648-3898, 2014, vol. 13, no. 1, str. 6-18. [COBISS.SI-ID [20421384](#)]

KRYŠTUFEK, Boris, ŠORGO, Andrej, JANŽEKOVIČ, Franc. Elevational distribution of small terrestrial mammals on Mt. Pohorje, Slovenia = Distribuzione altitudinale di piccoli mammiferi terrestri sul monte Pohorje, Slovenia. *Ann, Ser. hist. nat.*, 2010, vol. 20, št. 2, str. 113-122, ilustr. [COBISS.SI-ID [18189576](#)]

REBOLJ, Danijel, FISCHER, Martin, ENDY, Drew, MOORE, Thomas, ŠORGO, Andrej. Can we grow buildings? Concepts and requirements for automated nano- to meter-scale building. *Advanced engineering informatics*, Apr. 2011, vol. 25, iss. 2, str. 390-398, doi: [10.1016/j.aei.2010.08.006](https://doi.org/10.1016/j.aei.2010.08.006). [COBISS.SI-ID [14394134](#)], [JCR, WoS,]

ŠORGO, Andrej, JAUŠOVEC, Norbert, JAUŠOVEC, Ksenija, PUHEK, Miro. The influence of intelligence and emotions on the acceptability of genetically modified organisms. *Electron. J. Biotechnol.*, 2012, vol. 15, no. 1, str. 1-11, doi: [10.2225/vol15-issue1-fulltext-1](https://doi.org/10.2225/vol15-issue1-fulltext-1). [COBISS.SI-ID [18875912](#)], [JCR]

ŠORGO, Andrej, AMBROŽIČ-DOLINŠEK, Jana, ŠPERNJAK, Andreja. Knowledge about and attitudes toward evolution among students in Slovenia. V: ERIDOB 2010 : programme & abstracts : 8th Conference of European Researchers in Didactics of Biology, Universidade do Minho, Braga-Portugal, 13-17 July 2010. [Braga: s. n.], 2010, str. 159. [COBISS.SI-ID 17834760]