



Univerza v Mariboru

Fakulteta za naravoslovje
in matematiko

UČNI NAČRT PREDMETA / COURSE SYLLABUS

Predmet:	Genetika evkariotov
Course title:	Genetics of Eukaryotes

Študijski program in stopnja Study programme and level	Študijska smer Study field	Letnik Academic year	Semester Semester
Univerzitetni študijski program Ekologija z naravovarstvom, 1.stopnja		3.	5.
Undergraduate university programme Ecology with Nature Conservation, 1st degree		3rd	5th

Vrsta predmeta / Course type

Univerzitetna koda predmeta / University course code:

Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30		30			90	5

Nosilec predmeta / Lecturer:

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

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

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Vsebina:

Predmet obsega vsa ključna poglavja genetike evkariontov:

Molekulska genetika evkariontov – molekularna struktura in replikacija genetskega materiala, molekularne lastnosti in funkcije genov.

Citogenetika in fizikalne osnove dednosti evkariontov – struktura in funkcija kromosomov, celična delitev, gametogeneza, oploditev.

Kvalitativna genetika evkariontov – nevezani geni, Mendlova pravila, dednost kvalitativnih lastnosti, genske interakcije, poliploidija (evploidija, anevploidija), statistično testiranje segregacijskih razmerij, vezani geni, crossing – over, genetske mape, genetika spola.

Populacijska genetika evkariontov – struktura populacij, populacijsko ravnotežje, migracije, mutacije, selekcija, inbreeding, incest.

Kvantitativna genetika evkariontov – srednje vrednosti in variance posameznih generacij, izračunavanje heritabilnosti.

Izobraževalni proces (še posebej eksperimentiranje) bo upošteval vse veljavne moralno – etične omejitve.

Content (Syllabus outline):

The subject includes all essential parts of genetics (of eukaryotes):

Molecular genetics of eukaryotes – molecular structure and replication of the genetic material, molecular properties and function of genes.

Cytogenetics and physical basis of heredity of eukaryotes chromosome structure and function, cell division, gametogenesis, fertilisation.

Mendelian genetics – inheritance of qualitative traits, Mendelian rules, genetic linkage, polyploidy (euploidy, aneuploidy), statistical testing of segregation ratios, genetic linkage, crossing – over, genetic maps, genetics of sex.

Population genetics of eukaryotes – structure of populations, population equilibrium, migrations, mutations, selection, inbreeding.

Quantitative genetics of eukaryotes – generation mean values and variances, estimation of heritability.

Teaching approach, especially practical experimentation, will consider all existing moral and ethical rules.

Temeljni literatura in viri / Readings:

Obvezna literatura:

- Brooker R. J. 2012. Genetics – analysis and principles. Fourth Edition. The McGraw-Hill Companies, Inc. New York.
- Šiško M. 2022. Zbirka računskih nalog iz genetike. Fakulteta za kmetijstvo in biosistemske vede, Maribor.
- Griffiths AJF, Wessler SR, Lewontin RC, Gelbart WM, Suzuki DT, Miller JH. 2005. Introduction to genetic analysis. W.H. Freeman and Company, New York.
- Pierce B A. 2005. Genetics. A conceptual approach. Second Edition. W. H. Freeman and Company, New York.
- Stansfield DS. 1991. Theory and problems of genetics. Schaums outline series. McGraw-Will, inc.

Cilji in kompetence:**Objectives and competences:**

- Poznavanje in razumevanje molekulske genetike, citogenetike, kvalitativne genetike, populacijske genetike in kvantitativne genetike evkariontov .
 -Zmožnost poznavanja in razumevanja genetike za reševanje problemov povezanih s prenosom lastnosti na potomstvo.
 -Zmožnost interpretiranja podatkov na osnovi laboratorijskih opazovanj in meritev glede na njihovo pomembnost in njihovega povezovanja z ustrezno teorijo.

- Knowing and understanding of molecular genetics, cytogenetics, Mendelian genetics, population genetics of eukaryotes, and quantitative genetics of eukaryotes.
 -The students will be able to use knowledge for solving problems about transferring traits from parents to offspring.
 -The students will be able to interpret data obtained on laboratory observations and measurements and their connection with appropriate theory.

Predvideni študijski rezultati:

Znanje in razumevanje:
 Študent bo poznal in razumel:
 -osnove molekulske genetike evkariontov,
 -osnove citogenetike in fizikalne osnove dednosti evkariontov,
 -dednost kvalitativnih lastnosti,
 -osnovo populacijske genetike evkariontov in
 - bo sposoben izračunati srednje vrednosti in variance posameznih generacij, izračunati heritabilnost.

Intended learning outcomes:

Student will be able to understand:
 -basis of molecular genetics of eukaryotes,
 - basis of cytogenetics and physical basis of heredity of eukaryotes ,
 - Mendelian genetics – inheritance of qualitative traits,
 -basis of population genetics of eukaryotes, and
 Will be able to calculate generation mean values and variances, estimation of heritability.

Metode poučevanja in učenja:

Predavanja
 Laboratorijske vaje

Learning and teaching methods:

Lectures
 Laboratory practicals

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

Reference nosilca / Lecturer's references:

1. ŠIŠKO, Metka. Identification of hypothetical duplicate accessions of plums (*Prunus domestica*L.) within the Slovene Plant Gene Bank Collection using molecular markers. *Agricultura*, ISSN 1580-8432. [Print ed.], December 2016, vol. 13, št. 1-2, str. 57-64, ilustr., doi: [10.1515/agricultura-2017-0007](https://doi.org/10.1515/agricultura-2017-0007). [COBISS.SI-ID [4310060](#)]
2. ŠIŠKO, Metka, IVANČIČ, Anton, ŠUŠEK, Andrej. Determination of raspberry cultivar authenticity based on multiplexed microsatellite fingerprinting. *International journal of fruit science*. [Print ed.]. 2021, vol. 21, no. 1, str. 1018-1029, graf. prikazi. ISSN 1553-8362. <https://www.tandfonline.com/doi/pdf/10.1080/15538362.2021.1975011>, DOI: [10.1080/15538362.2021.1975011](https://doi.org/10.1080/15538362.2021.1975011). [COBISS.SI-ID [77527043](#)], [JCR, SNIP, WoS, Scopus]
3. ŠIŠKO, Metka, VRŠIČ, Stanko, IVANČIČ, Anton, PULKO, Borut, PERKO, Andrej, ŠUŠEK, Andrej. Origin of Slovenian wild grown grapevines and their genetic relationships. *Mitteilungen Klosterneuburg Rebe und Wein, Obstbau und Früchteverwertung*. 2021, vol. 71, nr. 4, str. 287-299, graf. prikazi. ISSN 0007-5922. <https://www.weinobst.at/service/publikationen.html>. [COBISS.SI-ID [87944195](#)], [JCR, SNIP]
4. ŠIŠKO, Metka, IVANUŠ, Anja, IVANČIČ, Anton. Determination of Sambucus interspecific hybrid structure using molecular markers. *Agricultura*. [Print ed.]. December 2019, vol. 16, no. 1-2, str. 1-10, graf. prikazi. ISSN 1580-8432. DOI: [10.18690/agricultura.16.1-2.1-10.2019](https://doi.org/10.18690/agricultura.16.1-2.1-10.2019). [COBISS.SI-ID [40315651](#)]