



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.; 3rd	5.; 5th
Undergraduate university programme Ecology with Nature Conservation, 1st degree			

Vrsta predmeta / Course type

Obvezni/Obligatory

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			30		90	5

Nosilec predmeta / Lecturer:

Metka Šiško

Jeziki /

Predavanja / Lectures: slovenski / slovene

Languages:

Vaje / Tutorial: slovenski / slovene

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

Prerequisites:

Jih ni.

No.

Vsebina:

Predmet obsega vsa ključna poglavja genetike (evkariotov):

Molekulska genetika evkariotov - molekularna struktura in replikacija genetskega materiala, molekularne lastnosti in funkcija genov.

Citogenetika in fizikalne osnove dednosti evkariotov -struktura in funkcija kromosomov, celična delitev, gametogeneza, oploditev.

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

Populacijska genetika evkariotov -struktura populacij, populacijsko ravnotežje, migracije, mutacije, selekcija, inbreeding, incest.

Kvantitativna genetika evkariotov -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:

- Brooker R. J. 2012. Genetics – analysis and principles. Fourth Edition. The McGraw-Hill Companies, Inc. New York.
- Pierce B. A. 2005. Genetics. A conceptual approach. Second Edition. W. H. Freeman and Company, New York.
- Griffiths, A. J. F., S. R. Wessler, R. C. Lewontin, W. M. Gelbart, D. T. Suzuki, J. H. Miller, 2005: Introduction to genetic analysis. Eight Edition. W. H. Freeman and Company, New York.
- Stansfield D.W. 1991. Theory and problems of Genetics. Schaum's Outlines series, McGraw-Hill, INC., New York.

Cilji in kompetence:

Osnovni cilj te učne enote je dati celovit in sistematičen pregled: molekulske genetike, citogenetike, kvalitativne in kvantitativne genetike evkariontov. Vključeni so teoretični in praktični problemi genetike rastlin, živali in ljudi.

Objectives and competences:

The main purpose of this study unit is to give a complete and systematic overview of: molecular genetics, cytogenetics, qualitative and quantitative genetics of eukaryotes. It will include theoretical and practical hereditary problems of plants, animals and humans.

Predvideni študijski rezultati:**Znanje in razumevanje:**

Znanje in razumevanje, ki si ga študentje pridobijo obsega naslednjo problematiko: načine funkcioniranja genetskega materiala, načine dedovanja in gensko strukturo ter procese v populacijah evkariontov.

Prenesljive/ključne spretnosti in drugi atributi:

Oblikovanje generacijskega materiala za proučevanje dednosti in analiza segregacije v potomstvih.

Intended learning outcomes:**Knowledge and understanding:**

It involves the following subjects: the function of the hereditary material, the most important ways of inheritance and the structure and processes within populations of eukaryotes.

Transferable/Key Skills and other attributes:

Formation of generation material for inheritance studies, analysis of segregation within progenies.

Metode poučevanja in učenja:

Predavanja
Laboratorijske vaje

Learning and teaching methods:

Lectures
Laboratory practicals

Delež (v %) /

Načini ocenjevanja:

Weight (in %)

Assessment:

Pisni izpit

100

Written exam

Reference nosilca / Lecturer's references:

ŠIŠKO, Metka, JAVORNIK, Branka. Effectiveness of AFLP and SSR molecular markers in determination* of genetic relationship among pear (*Pyrus spp.*) genotypes. *Agricultura*, ISSN 1580-8432. [Print ed.], 2007, letn. 5, št. 1, str. 21-24. [COBISS.SI-ID2566188]

VRŠIČ, Stanko, IVANČIČ, Anton, ŠUŠEK, Andrej, ZAGRADIŠNIK, Boris, VALDHUBER, Janez, ŠIŠKO, Metka. The World's oldest living grapevine specimen and its genetic relationships. *Vitis*, ISSN 0042-7500, 2011, letn. 50, št. 4, str. 167-171. [COBISS.SI-ID3206956]

ŠIŠKO, Metka, JAVORNIK, Branka. Effectiveness of AFLP and SSR molecular markers in determination* of genetic relationship among pear (*Pyrus* spp.) genotypes. *Agricultura*, ISSN 1580-8432. [Print ed.], 2007, letn. 5, št. 1, str. 21-24. [COBISS.SI-ID2566188]