



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

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 | | 120 | 6 |

Nosilec predmeta / Lecturer:

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

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

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 genetsko 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]