Univerza v Mariboru
University of Maribor

Fakulteta za naravoslovje in matematiko
Faculty of Natural Sciences and Mathematics

| OPIS PREDMETA / SUBJECT SPECIFICATION | |
|---|---|
| **Predmet:** | **Genetika evkariotov** |
| **Subject Title:** | **Genetics of Eukaryotes** |

| Študijski program<br>Study programme | Študijska smer<br>Study field | Letnik<br>Year | Semester<br>Semester |
|---|---|---|---|
| Biologija/Biology | Biologija/Biology | 3 | **5** |

**Univerzitetna koda predmeta / University subject code:**

| Predavanja<br>Lectures | Seminar<br>Seminar | Sem. vaje<br>Tutorial | Lab. vaje<br>Lab. work | Teren. vaje<br>Field work | Samost. delo<br>Individ. work | ECTS |
|---|---|---|---|---|---|---|
| 30 | | | 30 | | 120 | **6** |

**Nosilec predmeta / Lecturer:** Mateja ŠIŠKO

| **Jeziki / Languages:** | **Predavanja / Lecture:** | slovenski / Slovenian |
|---|---|---|
| | **Vaje / Tutorial:** | slovenski / Slovenian |

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

**Prerequisites:**

**Vsebina:**

Predmet obsega vsa ključna poglavja genetike (ekariontov):

- 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.

**Contents (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 -

- 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.

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 študijski viri / Textbooks:**


- Atherly, A. G., J. R. Girton, F. F. McDonald, 1999: The science of genetics. Saunders College Publishing, Harcourt Brace College Publishers.
- Brooker R. J., 1999: Genetics – Analysis and principles. Benjamin/Cummings, an imprint of Addison Wesley Longman, Inc.
- 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.
- Falconer, D. S. 1982. Introduction to quantitative genetics (Second edition). Longman Group Limited, Longman House, Burnt Mill, Harlow, Essex, UK.
- Haetwell, L., L. Hood, M. L. Goldberg, L.M. Silver, R. C. Veres, A. Reynolds, 2003: Genetics: From genes to genomes, (2nd Edition). McGraw-Hill Science/Engineering/Math.
- Mather, K., J. L. Jinks, 1977: Introduction to quantitative genetics, Chapman and Hall, London.


**Cilji:**

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:**

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

**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

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|---|---|
| segregacije v potomstvih. | within progenies. |

| **Metode poučevanja in učenja:** | **Learning and teaching methods:** |
|---|---|
| • Predavanja<br>• Laboratorijske vaje<br>• Terenske vaje | • Lectures<br>• Laboratory practicals<br>• Field practicals |

| **Načini ocenjevanja:** | Delež (v %) / Weight (in %) | **Assessment:** |
|---|---|---|
| • projekt<br>• pisni izpit | 50<br>50 | • project<br>• written exam |

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| ***Materialni pogoji za izvedbo predmeta :*** | ***Material conditions for subject realization*** |
|---|---|
| • *Multimedijska predavalnica*<br>• *Laboratorij z mikroskopi*<br>• *Eksperimentalni vrt*<br>• *Rastlinjak* | • *Multimedia lecture hall*<br>• *Laboratory with microscopes*<br>• *Experimental field (garden)*<br>• *Greenhouse* |

| ***Obveznosti študentov:*** | ***Students' commitments:*** |
|---|---|
| *(pisni, ustni izpit, naloge, projekti)* | *(written, oral examination, coursework, projects):* |
| • Uspešno zaključen majhen projekt (poročilo)<br>• Pisni izpit | • A successfully completed small project (a report)<br>• Written exam |