



GENETICS AND HUMAN BIOLOGY

Enrollment year	2018/2019
Academic year	2019/2020
Regulations	DM270
Academic discipline	BIO/18 (GENETICS)
Department	DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCES
Course	NATURAL SCIENCES AND TECHNOLOGIES
Curriculum	PERCORSO COMUNE
Year of study	2°
Period	1st semester (01/10/2019 - 15/01/2020)
ECTS	9
Lesson hours	72 lesson hours
Language	Italian
Activity type	WRITTEN AND ORAL TEST
Teacher	SEMINO ORNELLA (titolare) - 9 ECTS
Prerequisites	No prerequisite.
Learning outcomes	Aim of this course is to achieve an adequate level of knowledge of (1) the mode of transmission of hereditary characters at cellular, individual and population level; (2) the structural and functional characteristics of the genetic material; (3) gene expression in prokaryotic and eukaryotic organisms; (4) molecular and phenotypic evolution; (5) human evolution based on DNA data.
Course contents	The genetic material. Structure and function of the chromosome. Mendelian genetics. The chromosome theory of heredity. Sex determination. Recombination and chromosome mapping. Replication and transcription of DNA. Translation. Genetic code. Gene mutations and chromosomal mutations. Polyploidy and speciation. Population Genetics. Extranuclear genomes. Genetic markers and their use for the reconstruction of human evolution. The emergence of evolutionary theory.

Genetic variation (in phenotypes, in protein structure, in nucleotide sequences) in natural populations. Molecular evolution. Molecular phylogenies. Phylogenetic trees. Phylogeography. Rates of molecular evolution. Molecular clock. Molecular evolution and phenotypic evolution. Speciation. Evolution of the human species on the basis of recent data at the DNA level.

Topics object of the afternoon exercise sections

- Mitosis and meiosis.
- Mendel's laws.
- Sex linked transmission.
- Analysis of pedigrees.
- Association, genetic maps.
- Molecular Genetics: transcription, translation and genetic code.
- Population genetics, Hardy-Weinberg equilibrium.
- Reconstruction of molecular phylogenetic trees (mitochondrial DNA -mtDNA- and Male Region of Y chromosome -MSY-)

Teaching methods

This course consists of lectures; however, for the part of Genetics, 6-7 exercise sessions will be also organized. These sessions will be held in the afternoon during the course period and will allow students to practice on topics of formal, population and molecular genetics. The exact schedule of the exercise sessions will be defined at the beginning of the course.

Slides and other material are uploaded on the Kiro platform.

Reccomended or required readings

- P.J. Russell – Benjamin Cummings - iGenetics. A Molecular Approach.
- D.P. Snustad e M.J. Simmons - John Wiley & Sons Inc- Principles of Genetics.

Assessment methods

There will be a single final exam for the Genetics and human biology course (there are no intermediate exams). The final exam consists of two parts. The first is a written text (6 exercises covering formal, population and molecular genetics). Students who pass the written text will sustain an oral exam over the program of the Genetic part of the course. The oral exam is usually offered a few days (2-4) after the written text.

Further information

The course programme is available online at:
<http://sciter.unipv.eu/site/home.html> following the link : Laurea in Scienze e Tecnologie per la Natura Classe L-32 delle Lauree in Scienze e Tecnologie per l'Ambiente e la Natura.

Sustainable development goals - Agenda 2030

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