



## GENETICS II

<b>Enrollment year</b>	2019/2020
<b>Academic year</b>	2021/2022
<b>Regulations</b>	DM270
<b>Academic discipline</b>	BIO/18 (GENETICS)
<b>Department</b>	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
<b>Course</b>	BIOLOGICAL SCIENCES
<b>Curriculum</b>	PERCORSO COMUNE
<b>Year of study</b>	3°
<b>Period</b>	2nd semester (01/03/2022 - 14/06/2022)
<b>ECTS</b>	6
<b>Lesson hours</b>	48 lesson hours
<b>Language</b>	Italian
<b>Activity type</b>	ORAL TEST
<b>Teacher</b>	RAIMONDI ELENA MARIA CLOTILDE (titolare) - 6 ECTS
<b>Prerequisites</b>	Basic knowledge of Genetics and Molecular Biology.
<b>Learning outcomes</b>	Structure and organization of the genome of higher eukaryotes. Epigenetic regulation of gene expression. Introduction to molecular cytogenetics.
<b>Course contents</b>	Structure and organisation of the genome of bacteria and bacterial viruses. Structure and organisation of the eukaryotic genome. The prokaryotic gene and the operon concept. Evolution of the concept of gene. The C value and its paradox. Single copy and repeated DNA sequences. Functions of repeated DNA. Gene families, moderately repeated DNA, low copy repeats (LCR sequences and CNV), highly repeated DNA sequences, satellite DNA, interspersed repeated DNA sequences. Transposable elements. Eukaryotic transposons. Transposable elements, LCR sequences and genome evolution. The

nucleosome. Chromatin in its functional state. Genetic maps. Physical maps. Construction of physical maps in man: pedigree analysis, somatic cell hybridisation, radiation hybrids, in situ hybridisation. Regulation of gene expression in eukaryotes: epigenetic regulation of gene expression. Polytenic chromosomes and puffing. Lamp-brush chromosomes. Gene dosage compensation and sex determination. Genomic imprinting. Dissection of the eukaryotic chromosome: centromere, telomere and replication origins. The epigenetic nature of centromere function. Reconstruction of the eukaryotic chromosome: mammalian artificial chromosomes. Gene therapy. Stem cells. Cloning of organisms.

**Teaching methods**

Lectures

**Reccomended or required readings**

Reference books:  
 PRINCIPI DI GENETICA - Peter D. Snustad, Michael J. Simmons - Curato da: Gaudio L., Polito C. – Edises (4a edizione)  
 GENETICA (Principi di analisi formale) – Antony J.F. Griffiths, Susan R. Wessler, Sean B. Carrol, John Doebley – Zanichelli (7° edizione)  
 EREDITÀ. PRINCIPI E PROBLEMATICHE DELLA GENETICA UMANA - Cummings MR - EdISES, 2009  
 BIOLOGIA MOLECOLARE DELLA CELLULA - Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P: Quinta edizione (2008) - Zanichelli. ISBN 978-88-08-06451-6  
 IL GENE - Lewin, Krebs, Goldstein, Kilpatrick -Zanichelli Ed. - Seconda edizione compatta, 2011  
 Students also will be delivered scientific reviews on specific topics and all the slides of the course.

**Assessment methods**

The exam is oral and consists of query on the entire program.

**Further information**

The exam is oral and consists of query on the entire program.

**Sustainable development goals - Agenda 2030**

[The goals](#)