UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

GENERAL BIOLOGY (SURNAMES A-L)

Enrollment year	2021/2022
Academic year	2021/2022
Regulations	DM270
Academic discipline	BIO/13 (APPLIED BIOLOGY)
Department	DEPARTMENT OF INTERNAL MEDICINE AND THERAPEUTICS
Course	MEDICINE AND SURGERY
Curriculum	PERCORSO COMUNE
Year of study	1°
Period	(27/09/2021 - 14/01/2022)
ECTS	4
Lesson hours	32 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	OLIVIERI CARLA (titolare) - 4 ECTS
Prerequisites	Basic knowledge of Biology, Inorganic and Organic Chemistry and Biochemistry as gained from High School studies.
Learning outcomes	Acquisition of the concepts of Applied Biology useful for understanding the cellular mechanisms as a starting point for the study of other fields such as Anatomy, Physiology, Medical Genetics et al
Course contents	Cell: Differences between prokaryotic and eukaryotic cell. Cell organelles and their function Cell cycle and its regulation. Structure of Nucleic Acids. The DNA as genetic material. Transformation: the Griffith and Avery's experiment. Hershey and Chase's experiment. DNA replication. Telomeres and telomerase. Extra nuclear DNA: mitochondria, chloroplasts The organization of nuclear DNA. Chromatin and Chromosomes. The normal human karyotype.

	Chromosomal abnormalities: Number and Structure defects. Cell division: mitosis and meiosis. Spermatogenesis and oogenesis. Fertilization. The central dogma of Biology. RNA types and functions. Transcription. The maturation of mRNA in eukaryotes. Translation. The Genetic Code. Acquisition of three-dimensional structure of proteins. Regulation of gene expression. From the LAC operon in prokaryotes to miRNA. DNA's sequence variants: polymorphisms and mutations. Genetic control of protein structure, eg. sickle cell anemia, cystic fibrosis. The molecular basis of mutations and DNA repair mechanisms. Transposable elements. The Virus. Bacteriophages: lytic cycle and lysogenic cycle. Retroviruses and their replicative cycle. The genetics of cancer: relationship between cell cycle and cancer. Genes and cancer, protooncogenes, oncogenes, suppressor genes, mutator genes. Chemical and physical mutagens. Technologies. Cell cultures. Techniques of recombinant DNA: restriction enzymes, cloning and molecular vectors, transgenic organisms, PCR. From Sanger to Next Generation Sequencing.
Teaching methods	Lectures (Powerpoint presentations). For some topics, blackboard and youtube animation will be also used.
Reccomended or required readings	Molecole, Cellule e Organismi di Ginelli, Malcovati et al. Edises Biologia Cellulare e Molecolare di G. Karp Edises Biologia e Genetica di De Leo, Ginelli, Fasano Edises Biologia Molecolare della cellula di B. Alberts et al Zanichelli GENETICA di D. L. Hartl e E. W. Jones. Edises iGENETICA di P.J. Russel Edises
Assessment methods	Written final test exam (11-13 questions; true/false answers), including 2/3 open questions. Each answer has a precise score and the final vote will be the proportional sum of score expressed in n/30 (in ex: total score=81/90; vote 27/30). The questions will focus on the topics of lectures. The student has to demonstrate the acquisition of knowledge about the cell structure and mechanism that regulate its basic processes.
Further information	For communications and appointments with the teacher please use e-mail address: carla.olivieri@unipv.it
Sustainable development goals - Agenda 2030	$lbl_legenda_sviluppo_sostenibile