



General information	
Academic subject	Genetics
Degree course	Biological Sciences
Academic Year	II
European Credit Transfer and Accumulation System (ECTS)	10
Language	Italian
Academic calendar (starting and ending date)	October 2021-January 2022
Attendance	Mandatory

Professor/ Lecturer	
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Virtual headquarters	Microsoft Teams platform, code 317gzvm
Tutoring (time and day)	Every day, after appointment fixed via email

Syllabus	
Learning Objectives	The course aims to provide a solid cultural foundation in the field of basic genetics.
Course prerequisites	Basic knowledge of Chemistry, Cytology and Mathematics
Contents	<p>INTRODUCTION (Mitosis, meiosis, cell cycle with reference to the variations of chromosome number and quantity of DNA).</p> <p>CYTOLOGICAL AND MOLECULAR MECHANISMS OF GENETIC INFORMATION TRANSMISSION [concept of genotype and phenotype, Mendel's laws, atypical Mendelian relations, Complementation test, Chromosomal basis of heredity and determination of sex, Statistical analysis of genetic data: the chi square test, Analysis of family trees, Mapping of eukaryotic genes in humans and Drosophila, Linkage, genetic distance and interference, Mapping of genes in Neurospora crassa: analysis of ordered tetrads, Physical maps, Genetics of bacteria (conjugation, transformation and transduction) and bacteriophages (complementation and intragenic recombination), molecular markers, genetic material and its function. Notes on DNA replication and structure, transcription and translation. Lac operon and its regulation. Metabolic pathways. Complementation and deletion maps. Population genetics.</p> <p>CYTOGENETICS AND BACKGROUND OF HUMAN GENETICS (Chromosomal mutations of number and structure and their impact on gametogenesis, the chromosomal non-disjunction).</p> <p>MECHANISMS THAT GENERATE VARIABILITY IN EUKARYOTES (Definition of mutation, spontaneous and induced mutations, chemical and physical mutagens, notes on the transposable elements, mutagenesis test: CIB test and Ames test, identification of mutations).</p>
Books and bibliography	Genetics, P.J. Russell, Pearson editor; Principles of Genetics, Snustad-Simmons, Wiley editor; Introduction to Genetic Analysis, Griffiths-Wessler-Carroll-Doebley, Macmillan Education editor; Genetics: A conceptual approach, Pierce, Macmillan Education editor; (*) Eserciziario di Genetica, Ghisotti-Ferrari, Piccin Editore



Additional materials	Any text indicated is fine for exam preparation. The text with an asterisk (*) is for numerical practice only.
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Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
250	72	15	163
ECTS			
10	9	1	
Teaching strategy			
Lectures with the use of PowerPoint; numerical exercises carried out by students on the blackboards under the guidance of the teacher in the classroom. The course is not delivered in e-learning mode.			
Expected learning outcomes			
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ Acquisition of theoretical and operational skills with reference to basic genetics, in order to learn the molecular aspects, the mechanisms of inheritance and the evolutionary aspects. These skills will be acquired thanks to the attendance of theoretical lessons, individual study and verification of their understanding through two ongoing tests and oral exam. 		
Applying knowledge and understanding on:	<ul style="list-style-type: none"> ○ the preliminary written test, which foresees the performance of exercises on the classroom topics, will help in the evaluation of knowledge and comprehension skills. 		
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ acquisition of autonomy in areas related to the evaluation and interpretation of experimental data for the study of Genetics. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ assessment of the basic correctness of the lexicon used. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ acquisition of the ability to deepen and read the evolution of the discipline with a critical spirit, through the consultation of texts and databases. 		

Assessment and feedback	
Methods of assessment	Oral with pre-assessment of the student's ability to carry out genetic exercises through on-going tests (not mandatory).). In case of failure to such tests, or in case of insufficient evaluation, the assessment of the aforementioned skills will take place following a preliminary written test, followed by an oral test.
Evaluation criteria	<ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ the student must demonstrate that he has acquired the basic knowledge of Genetics and that he is able to elaborate it through links between different topics of the subject. • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ the preliminary written test, which foresees the performance of exercises on the classroom topics, will help in the evaluation of knowledge and



	<p>comprehension skills</p> <ul style="list-style-type: none">• <i>Autonomy of judgment</i><ul style="list-style-type: none">○ it will be assessed by verifying the ability to self-evaluate the correctness of the exercises carried out and the answers provided to the questions asked during the examination.• <i>Communicating knowledge and understanding</i><ul style="list-style-type: none">○ evaluation of the most suitable terminologies to illustrate the mechanisms of natural and experimental genetic phenomena• <i>Communication skills</i><ul style="list-style-type: none">○ assessment of the basic correctness of the lexicon used• <i>Capacities to continue learning</i><ul style="list-style-type: none">○ assessment of the attitude to carry out in-depth analyses, through consultation of scientific literature and databases, regarding the topics developed within the course.
Criteria for assessment and attribution of the final mark	The exam will verify the understanding of the rationale for carrying out the Genetics exercises, and will ascertain the learning of all the molecular and non-molecular aspects related to Genetics. The evaluation will be performed by a score out of thirties; the test will be passed with a mark equal to or greater than 18.
Additional information	