General Information	BACELOR DEGREE IN BIOTECHONOLOGIES
Title of the subject	Genetics and Biometrics
Degree Course (class)	Industrial and Agro-Food Biotechnology (L-2)
ECTS credits	5
Compulsory attendance	Yes
Language	Italian
Academic year	2020/2021

Subject Teacher		
Name and Surname	Luigi Viggiano	
email address	Luigi.viggiano@uniba.it	
Place and time of reception	by appointment via email	
ECTS credits details	Discipline sector (SSD)	Area
	BIO/18	---

Study plan schedule	Year of study plan	Semester
	I	II

Time management	Lessons	Laboratory	Exercises	Total
CFU	5			5
Total hours	125			125
In-class study hours	40			40
Out-of-class study hours	85			85

Syllabus	
Prerequisites / Requirements	
Basics of cytology and cell biology	
Expected learning outcomes (according to Dublin descriptors)	
Knowledge and understanding	Acquire the basic elements of genetics to understand the rules and mechanisms of the transmission of hereditary traits through chromosomes in meiosis and mitosis in the context of the animal and plant growth cycle. Acquire the ability to solve genetic problems.
Applying knowledge	Ability to analyze specific biological phenomena and processes. Acquire information on the general principles by which genes are transmitted from one individual to another.
Making informed judgments and choices	Acquisition of autonomy in solving genetic problems.
Communicating knowledge	Acquisition of skills and tools suitable for communication through the vocabulary of the discipline and bibliographic studies.
Capacities to continue learning	Acquisition of skills that favor the in-depth study and constant

	updating of genetics topics through the consultation of bibliographic material.
Study Program	
Content	The cell cycle. Mitosis and meiosis. The genomes of eukaryotes. Eukaryotic heterochromatin nuclear chromosomes and bands. The polytene chromosomes. The structure of chromosomes. Principles of the analysis of the segregation of genes in relation to Mendel's laws. Relations between genes and chromosomes. Autosomal genes and sex-linked genes. Concepts of dominance and codominance. The genetics of blood groups. Mendelian genetics in humans: analysis of family trees and autosomal and sex-linked characters. Independent and testcross assortment of a dihybrid. Backcrossing of a dihybrid. Calculation of phenotypic and genotypic ratios for independently assorted genes. A diagnostic test for alleles (complementation test). Gene interactions as the cause of atypical dihybrid relationships, duplicate recessive epistasis. Concepts of penetrance and expressiveness. Locus-linkage and allele-linkage. Genetic maps, a method that predicts the outcome of a testcross involving associated genes starting from the recombination frequencies. - The chi-square test. Example of inheritance of associated genes in humans. Three-point crossover, tri-hybrid testcross mapping. Chromosomal mutations of number and structure. Translocations, deletions, inversions, duplications. Genomic mutations and their consequence on evolution The genetics of bacteria. Cultures of microorganisms. Nomenclature of bacterial genetics. Selection systems are needed for the identification of bacterial mutants. Systems of exchange of genetic material in bacteria.
Bibliography and textbooks	Genetica. Pierce, Zanichelli Genetica Principi di analisi formale Griffiths, Zanichelli
Notes to textbooks	The PowerPoint of the lessons and exercises are made available to students.
Teaching methods	Distance learning with the use of PowerPoint and the graphic tablet
Assessment methods (oral, written, ongoing assessment)	Students must demonstrate that they can develop rigorous thinking regarding the scientific processes illustrated during the course. They have to be able to formulate hypotheses and experimental questions and thus to the production of new knowledge in the future.
Evaluation criteria (describe criteria for each of the above expected outcomes)	
Further information	

General Information	BACELOR DEGREE IN BIOTECHONOLOGIES
Title of the subject	Genetics and Biometry
Degree Course (class)	Industrial and Agro-Food Biotechnologies (L-2)
ECTS credits	1
Compulsory attendance	Yes
Language	Italian
Academic year	2020/2021

Subject Teacher		
Name and Surname	Giovanna Linguiti	
email address	giovanna.linguiti@uniba.it	
Place and time of reception	Room 44, Biology Department, third floor. Meeting appointment by email	
ECTS credits details	Discipline sector (SSD)	Area
	BIO/18	---

Study plan schedule	Year of study plan	Semester
	I	II

Time management	Lessons	Laboratory	Exercises	Total
CFU			1	1
Total hours			25	25
In-class study hours			12	12
Out-of-class study hours			13	13

Syllabus	
Prerequisites / Requirements	
Basic Knowledge on citology and cellular biology	
Expected learning outcomes (according to Dublin descriptors)	
Knowledge and understanding	Acquire the basic elements of genetics to understand the rules and mechanisms of the transmission of hereditary traits
Applying knowledge	Ability to analyze specific biological phenomena and processes. Acquire information both on the genetic processes involving the individual and on the general principles of inheritance
Making informed judgments and choices	Acquire autonomy in solving problems about genetic analysis
Communicating knowledge	Acquire skills and tools suitable for communication through the scientific language and bibliographic studies.
Capacities to continue learning	Acquire skills to promote the deepening and constant updating of genetic issues through the consultation of the bibliographic material.
Study Program	
Content	The cell cycle. Mitosis and meiosis. DNA replication. Counting

	of chromosomes, chromatids and total DNA content over the course of the cell cycle. The genomes of eukaryotes. Eukaryotic nuclear chromosomes, heterochromatin and bands. The polytene chromosomes. The structure of chromosomes. Mendel's laws. Relations between genes and chromosomes. Autosomal genes and sex linked genes. Dominance and codominance. The genetics of blood groups. Mendelian genetics in humans: genetic family trees and autosomal and sex-linked characters. Independent assortment, dihybrid testcross. Calculation of phenotypic and genotypic ratios for independently assorted genes. Locus - linkage and allele - linkage. Association mapping. The chi-squared test. Example of associated genes in humans. Three-point cross, tri-hybrid testcross mapping. Complementation test. Duplicate recessive epistasis. Penetrance and expressivity. The genetic code and point mutations: genotype-phenotype relationships. Bacterial genetics. Microorganisms culture. Identification of bacterial mutants. Genetic exchanges among bacteria. Neurospora biology and genetics. Chromosomal mutations. Translocations, deletions, inversions, duplications.
Bibliography and textbooks	Genetica. Pierce, Zanichelli Genetica Principi di analisi formale Griffiths, Zanichelli
Notes to textbooks	The PowerPoint of the lessons are made available to the students
Teaching methods	Exercises with the use of PowerPoint and blackboard.
Assessment methods (oral, written, ongoing assessment)	Written and oral exam
Evaluation criteria (describe criteria for each of the above expected outcomes)	Students have to demonstrate that they can develop rigorous thinking regarding the scientific processes illustrated during the course, in order to formulate hypotheses and experimental questions and thus to the production of new knowledge in the future.
Further information	