



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze della Terra e del Mare		
ACADEMIC YEAR	2017/2018		
BACHELOR'S DEGREE (BSC)	NATURAL AND ENVIRONMENTAL SCIENCES		
INTEGRATED COURSE	GENETICS AND MICROBIOLOGY - INTEGRATED COURSE		
CODE	18030		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/18, BIO/19		
HEAD PROFESSOR(S)	QUATRINI PAOLA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	CORONA DAVIDE	Professore Associato	Univ. di PALERMO
	QUATRINI PAOLA	Professore Associato	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	CORONA DAVIDE		
	Monday	09:00 12:00	Dipartimento STEBICEF Viale delle Scienze - Edificio 16
	Tuesday	09:00 12:00	Sede del Consorzio Universitario, corso Vittorio Emanuele, 92, 93100 Caltanissetta
	QUATRINI PAOLA		
	Thursday	10:00 12:00	Studio Docente Viale delle scienze ed 16. tel 09123897320. Chiamare per conferma.

DOCENTE: Prof.ssa PAOLA QUATRINI

PREREQUISITES	Basic knowledge of Biology and organic chemistry
LEARNING OUTCOMES	<p>Knowledge and understanding: Acquisition of integrated cultural skills in formal and molecular genetics; acquisition of advanced scientific knowledge about biochemical, molecular, functional and evolutionary characteristics of genes and genomes. Acquisition of basic knowledge on the morphology, structure, organization and gene expression of prokaryotic and eukaryotic microorganisms. Knowledge of the role of microorganisms in nature</p> <p>Applying knowledge and understanding: The students of the course through the theoretical and experimental acquisition of basic and advanced concepts of Genetics and Microbiology can apply their knowledge to further refine their studies in Master courses or utilize this knowledge directly in a workplace:</p> <p>Lifelong learning skills: Ability to consult databases, to critically analyze the scientific literature.</p> <p>Making judgments: Ability to critically read a scientific paper evaluating the validity of the results described in relation to the methodological approach used, to have personal opinions on the topics discussed.</p> <p>Communication: Critical capacity and expertise in reporting and dissemination of scientific knowledge with particular attention to the use of appropriate technical terminology.</p>
ASSESSMENT METHODS	<p>Learning is evaluated by a final oral exam. During that oral exam the students will have to answer at least three questions on arguments developed during the course, demonstrating that they possess a suitable knowledge and interpretative competence of general and specific content, ability of connection and elaboration of the contents, and a clear presentation. The evaluation of the exam is expressed in fractions of 30. The final evaluation will be formulated on the basis of the following considerations:</p> <p>1) Sufficient knowledge of the covered topics and limited capacity of elaboration and presentation of the subjects of the discipline (Vote 18-21).</p> <p>2) Good knowledge of the topics discussed and good processing skills and exposition of the subjects of the discipline (vote 22-24)</p> <p>3) Extensive knowledge of the topics dealt with and deeper knowledge of elaboration and presentation of the subjects of the discipline (vote 25-27)</p> <p>4) Excellent knowledge of the topics discussed, excellent processing skills And exposition of the subjects of the discipline (vote 28-30)</p> <p>5) Excellent knowledge of the topics discussed, excellent ability of elaboration and exposition of the subjects of the discipline (vote 30 and LODE).</p>
TEACHING METHODS	Lectures and practical experiences (in class-room and laboratory)

MODULE GENETICS <i>Prof. DAVIDE CORONA</i>	
SUGGESTED BIBLIOGRAPHY	
Snustad e Simmons – Principi di Genetica, Ed. Edises Peter J. Russel - iGENETICS A Molecular Approach - Ed Pearson	
AMBIT	10703-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	51
COURSE ACTIVITY (Hrs)	24
EDUCATIONAL OBJECTIVES OF THE MODULE	
The General and Molecular Genetics module aims at providing the student with basic knowledge on the inheritance of genetic traits and on the molecular mechanisms responsible for transmitting the genetic information in prokaryotic and eukaryotic organisms.	

SYLLABUS

Hrs	Frontal teaching
12	Principles of genetic transmission . Segregation of alleles and independent assortment . multiple , dominant alleles . Atypical Mendelian ratios and variability of gene expression . Inheritance associated with sex . Mendelian genetics in humans : family trees , association maps . physical basis of association : crossing-over and recombination . frequency of recombination and gene order . genetic maps , cytogenetic maps and physical maps . The Genome projects , organization of databases , and supporting tools .
12	The flow of genetic information , and organization of the genome : Complementation , cistron and gene concept . General aspects of replication . Protein synthesis and the genetic code . Structure of prokaryotic and eukaryotic chromosomes . Structure and organization of the eukaryotic genome . Multigene families : origin and evolution. Evolutionary Genetic elements . Extranuclear inheritance : structure and expression of the mitochondrial DNA and chloroplast .

MODULE MICROBIOLOGY

Prof.ssa PAOLA QUATRINI

SUGGESTED BIBLIOGRAPHY

-Biologia dei microrganismi, a cura di G.Deho' e E. Galli, Casa Editrice Ambrosiana
 -Madigan M.T., Martinko J.M.: Brock. Biologia dei Microrganismi vol.1, CEA-Casa Editrice Ambrosiana, Milano..
 - articoli sugli argomenti svolti, materiale informatico proposto durante il corso.

AMBIT	10703-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	98
COURSE ACTIVITY (Hrs)	52

EDUCATIONAL OBJECTIVES OF THE MODULE

The course provides theoretical and practical information on the structure, physiology and genetics of microorganisms and on their role in the environment

SYLLABUS

Hrs	Frontal teaching
2	Introduction: the role of microbes in the environment; Short history of microbiology and microbial ecology.
4	General characteristics of prokaryotic and eukaryotic microbes. Bacteria And Archaea. Microbial taxonomy. Organization, structure and physiology of the prokaryotic cell.
4	Microbes and environment Environmental factors that influence the growth of microorganisms (temperature, pH, salinity, light, oxygen).
4	The prokaryotic cell Structure and function of the bacterial cell wall and membranes. Gram positive and Gram negative bacteria Surface and inclusion structures. Flagella and Pili: structure and function. Capsule and EPS. S Layer . Endospore: structure and stages of spore formation.
6	Microbial metabolism. Energy and carbon sources. General principles of metabolism: anabolism and catabolism. Fermentation (lactic and alcoholic). Aerobic and anaerobic respiration.Chemolithotrophy
4	Secondary metabolism, biologically active metabolites. Mechanism of action of antibiotics. Antibiotic resistance. Streptomyces
8	Host microbes interactions. The microbiota concept. Plant microbes interactions: rhizobia and mycorrhizas
4	The role of microbes in the biogeochemical cycles of C and N
4	General characteristics of DNA and RNA viruses. Morphology of bacterial viruses. Lytic and lysogenic cycle in bacteriophages. RNA and DNA animal viruses: morphology and growth cycle. retrovirus
Hrs	Practice
4	Cultivation of microbes. Methods of sterilization, culture media, selective media, pure culture isolation.Growth curves
4	Gram stain. microbiological essay
4	PCR analysis and elements of bioinformatics for bacterial taxonomy and phylogeny