



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2019/2020		
BACHELOR'S DEGREE (BSC)	BIOTECHNOLOGIES		
INTEGRATED COURSE	BIOLOGY - INTEGRATED COURSE		
CODE	01586		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	BIO/05, BIO/13		
HEAD PROFESSOR(S)	VIZZINI AITI	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	FONTANA SIMONA	Professore Associato	Univ. di PALERMO
	VIZZINI AITI	Professore Associato	Univ. di PALERMO
CREDITS	9		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<p>FONTANA SIMONA Thursday 15:30 16:30 Dipartimento di Biomedicina, Neuroscienze e Diagnostica avanzata, Sezione di Biologia e Genetica - Via Divisi, 83. A causa di possibili altri impegni istituzionali o riunioni di lavoro potrebbe non essere possibile ricevere gli studenti nel giorno e alle ore indicate. Per questo è preferibile comunque fissare un appuntamento via e-mail.</p> <p>VIZZINI AITI Monday 09:00 13:00 Dipartimento Scienze e tecnologie Biologiche, Chimiche Farmaceutiche Via Archirafi, 18 Palermo.</p>		

DOCENTE: Prof.ssa AITI VIZZINI

PREREQUISITES	Fundamentals of Biology, General and Organic Chemistry
LEARNING OUTCOMES	<p>Knowledge and understanding: Know and understand the basic concepts of cellular and molecular biology. Know and understand the origin and evolution of organisms. Recognition of the main animal species in relation to their use in biotechnology.</p> <p>Ability to apply knowledge and understanding: Apply the acquired knowledge to understand the impact of applicative research at the genetic level on animal biodiversity and to carry out the diagnostic recognition of cells, tissues and organs and animal organisms through microscopic observations or images and diagrams.</p> <p>Autonomy of judgment: Ability to analyze and summarize the formation of critical thinking on the topics studied and to evaluate the modifications induced by the environment on animal organisms.</p> <p>Communication ability: Expressing the importance of knowledge of the basic concepts of cellular and molecular biology and of the processes that affect animal biodiversity.</p> <p>Learning ability: Be able to integrate the knowledge of systematic zoology with those of molecular and phylogenetic zoology, the knowledge of cell biology with histology and animal anatomy to study animal biotechnology issues at cellular, tissue and organismic level.</p>
ASSESSMENT METHODS	<p>At the end of each teaching unit presented in class, the lecturer will propose a discussion in the classroom on the topics covered in order to verify the students' comprehension of the above, also making use of questions related to those that will be proposed to the final exam.</p> <p>The verification method of the final exam is formulated on the basis of written and / or oral tests.</p> <p>The written tests are represented by three in itinere tests and a final test of ninety minutes on topics included in the program, referring to the recommended basic texts and the teaching material. The written tests consist of a minimum of thirty questions. The recognition of patterns and figures aims to evaluate the knowledge acquired during the laboratory activity. The questions accompanied by closed and open answers tend to verify the abilities and knowledge related to the disciplinary field of the course through the choice of the answers considered exact among those offered to each question, while the open answers tend to verify the mastery of the topics, the language properties and the ability to apply knowledge and skills.</p> <p>The written test is considered passed with the assessment of 18/30 when the student is in possession of the minimum basic knowledge of the main subjects of teaching and technical language and of the minimum ability to autonomously apply the acquired knowledge. The evaluation of 30/30 applies when the exam shows full knowledge of the program topics. The oral test consists of an interview that tends to verify the processing abilities and the possession of an adequate exhibition capacity of the students who have passed the written test. The 30/30 grade with honors is awarded when students demonstrate rigor and clarity in the exposition, ability to summarize and excellent knowledge. The score of the final exam is expressed in thirtieths</p>
TEACHING METHODS	Frontal lessons and exercises.

MODULE ANIMAL BIOLOGY

Prof.ssa AITI VIZZINI

SUGGESTED BIBLIOGRAPHY

Hickman et al. Zoologia Mc GrawHill ed.

AMBIT	50081-Discipline biotecnologiche con finalità specifiche: biologiche e industriali
INDIVIDUAL STUDY (Hrs)	98
COURSE ACTIVITY (Hrs)	52

EDUCATIONAL OBJECTIVES OF THE MODULE

The course aims to provide an integrated view evolutionary and biological of the animal world as a guideline in the study and in biotechnological applications. The contents of the module are designed to offer the basic understanding of the main biological processes and mechanisms of evolution through the analysis of animal biodiversity contextualized at level of gene, population and species. The elements and the essential tools for the analysis and phylogenetic cladistics at various levels of biological complexity will be provided. Finally this course presents the zoological systematics in a phylogenetic key. The teaching of zoological systematics will be supported by laboratory lessons.

SYLLABUS

Hrs	Frontal teaching
2	Origin of life. Biodiversity and biological evolution.
4	Theories of evolution. Population genetic. Mutation, genetic drift, gene flow, polymorphism, heterozygote advantage.
4	Species and Speciation. Microevolution and Macroevolution: Natural Selection.
2	Systematic: Numerical, classical, Evolutionary, cladistics.
2	The Taxa: Taxon monophyletic, paraphyletic, polyphyletic. Homologies and analogies. Orthologous genes. Phenotypic characters: Plesiomorfie, Apomorfie, Sinapomorfie.
4	Reproduction: indirect and direct development, the training plans of the major phyla.
12	Structure and function: support, protection and movement; homeostasis; body fluids and breathing; digestion and nutrition; nervous system and sense organs; endocrine system and systematic of Protozoa, Porifera, Cnidaria, Ctenophora, Platyhelminthes, Nematodes, Molluscs, Annelids, Arthropods (Myriapoda, Chelicerata, shellfish, hexapods).
10	Structure and function: support, protection and movement; homeostasis; body fluids and breathing; digestion and nutrition; nervous system and sense organs; endocrine system and systematic of Deuterostomia: Echinoderms, Urochordata, Cephalochordata and Vertebrates (Fish, Amphibians, Reptiles, Birds, Mammals).
Hrs	Workshops
12	Laboratory exercises aimed at acquiring basic knowledge related to the morphology and taxonomy of the main classes of invertebrates.

MODULE CELL BIOLOGY

Prof.ssa SIMONA FONTANA

SUGGESTED BIBLIOGRAPHY

B. Alberts ed altri autori: "L'essenziale di biologia molecolare della cellula". Zanichelli. G. Karp: "Biologia cellulare e molecolare". Edises. De Leo-Fasano-Ginelli: "Biologia e Genetica". Edises

AMBIT	10643-Attività formative affini o integrative
INDIVIDUAL STUDY (Hrs)	51
COURSE ACTIVITY (Hrs)	24

EDUCATIONAL OBJECTIVES OF THE MODULE

The Cell Biology Course will introduce students to key concepts concerning the basic knowledge of cellular and molecular processes regulating prokaryotic and eukaryotic cell activities. At the end of the course each student will have to display to well know: structure and Function of biological macromolecules; plasma membrane structure and function (transport and signal transduction mechanisms); Mechanisms of DNA replication, transcription, translation; structure of genes and chromosomes, cell cycle control and cell division.

SYLLABUS

Hrs	Frontal teaching
1	Characteristics and classification of living organisms; prokaryotic cell, eukaryotic cell and virus (notes). Biological macromolecules
2	chemical physical properties of water and its interactions with biological macromolecules. Carbohydrates: monosaccharides, disaccharides, and polysaccharides (glycogen and starch). Lipids: fatty acids, glycerides, phospholipids and cholesterol.
2	Proteins: aminoacids and peptide bond. Primary, secondary, tertiary and quaternary structure.
2	Nucleic acids: nucleosides and nucleotides; DNA and RNA structures.
1	Plasma membrane structure and function
2	Membrane transport mechanisms: simple diffusion, osmosis, facilitated diffusion (passive transport); active transport.
2	Signal transduction mechanisms: receptor/ligand interaction; Ion Channel Receptors; G-protein-linked receptors; Enzyme-linked receptors.
3	DNA Replication in prokaryotes and eukaryotes
3	Transcription in prokaryotes and eukaryotes and RNA polymerases properties. Eukaryotic mRNA Processing. Alternative splicing.
3	The Genetic Code. Translation in prokaryotes and eukaryotes. Intracellular trafficking (notes).
3	Chromatin and eukaryotic chromosomes structure. Cell cycle control. Mitosis and meiosis.