



UNICUSANO

Università degli Studi Niccolò Cusano - Telematica Roma

Teaching	HUMAN BIOLOGY
Level and course of study	Bachelor's Degree in Sports Science (Bachelor's degree – class L-22)
Academic discipline (SSD)	BIO-13 – Applied Biology
Course year	1
Academic year	2024-2025
Total number of credits	6 CFU
Prerequisites	
Teacher	Cristina Fantini AREA: Applied Biology NICKNAME: EMAIL: cristina.fantini@unicusano.it ;
Presentation	The Human Biology course, constituting the basis for the understanding of the fundamental cellular mechanisms, aims to illustrate the main concepts of the biology of living beings with particular reference to man and to deepen concepts, cellular mechanisms; In particular, it examines the structure of macromolecules and biodiversity focusing on the study of genetic information and its expression in cell development, reproduction and metabolism.
Learning objectives	The educational objectives of the Human Biology course are: <ul style="list-style-type: none">• Know the biological concepts of organization, simplicity/complexity, homeostasis.• Understand the origins of living diversity, evolution, cellular structures and functions.• To know the meaning of genetic information and its expression in metabolism, development, reproduction.• Define the different levels of structure of macromolecules and know their essential elements.

<p>Expected learning outcomes</p>	<p>In summary, the expected learning outcomes are:</p> <p>KNOWLEDGE AND UNDERSTANDING: the student will have acquired the knowledge and understanding of the fundamental principles of cell biology.</p> <p>APPLYING KNOWLEDGE AND UNDERSTANDING: the student will be able to identify and understand the various aspects of human biology applied to motor sciences through the application of the knowledge acquired during the course.</p> <p>MAKING JUDGEMENTS: THE STUDENT WILL BE ABLE TO IDENTIFY AND ANALYZE THE PROBLEMS RELATED TO HUMAN BIOLOGY APPLIED TO MOTOR SCIENCES.</p> <p>COMMUNICATION SKILLS: the student will have acquired an appropriate technical language that will allow him to clearly express the technical knowledge acquired in the context of the proposed and analyzed topics.</p> <p>LEARNING SKILLS: the student must be able to adequately use the knowledge acquired for the study, analysis and application of the various aspects and problems related to human biology applied to motor sciences.</p>
<p>Course structure</p>	<p>The Human Biology course includes 6 CFU, which correspond to a study load of at least 149 hours by the student, and is developed through pre-recorded audio-video lessons, slides, handouts and other supporting teaching resources. The study materials, which are available on the platform, contain all the elements necessary to deal with the study of the subject. In addition, for an even more brilliant preparation, it is advisable to combine the study of the handouts with the consultation of the texts recommended by the professors (available in the University Library).</p> <p>The study load includes at least the following components:</p> <ul style="list-style-type: none"> • 125 hours of teaching for the viewing and study of pre-recorded lessons (7 hours of study for 1 hour of video-recorded lessons, of which 2 hours to listen to the lesson and 5 hours of self-study to assimilate the contents of the lesson, for a total of 18 hours of video-recorded lessons); • 24 hours of interactive teaching on the forum (virtual classroom) aimed at carrying out exercises and exercises proposed by the teachers, called e-activities. These are exercises on specific parts of the program that prepare the student to take the final exam. <p>There are also self-assessment tests, asynchronous - which accompany the pre-recorded lessons and allow students to ascertain the understanding and degree of knowledge of the contents of each of the lessons - and final self-assessment exercises, asynchronous - which correspond to exam tracks - which allow the student to verify the level of preparation achieved. This activity, which makes use of the tools provided in the platform, is also interactive and requires additional hours of study at the student's discretion.</p> <p>Finally, teaching makes use of synchronous tools such as web-conference reception and chats available on the platform in order to allow real-time interaction with enrolled students.</p> <p>The student is advised to spread the study of the subject evenly over a period of 14 weeks, dedicating at least 20 hours per week to study.</p>
<p>Contenuti del corso</p>	<p>HUMAN BIOLOGY (6CFU)</p> <p>1. MODULE I - INTRODUCTION TO BIOLOGY</p> <p>L1: Introduction to biology: Levels of observation: holism and reductionism. Biological systems: relationships and interactions. Cellular organization. Dimensional scales. Organization of matter.</p> <p>L2: Energy and its transformations, Energy flows in living things.</p> <p>L3: Recalls of inorganic chemistry (part 1): Atom and bonds; Isotopes; Periodic table; reactions.</p> <p>L4: Recalls of inorganic chemistry (Part 2): Electronegativity; bond types; the hydrogen bond; covalent bonding; ionic bonding; dative bonding.</p> <p>L5: Recalls of organic chemistry. Functional groups. Large biological molecules: carbohydrates, lipids.</p>

Proteins: primary, secondary, tertiary and quaternary structure; introduction to nucleic acids.

L6: Water and its properties; water and solutions: acids, bases and salts; pH.

2. MODULE II - CELL AND TRANSPORT

L7: Characteristics of the living

L8: Prokaryotes and eukaryotes: the five kingdoms;

L9: Viruses and prions.

L10: Endosymbiont theory. Composition of the cell.

L11: Cell type and its variability. Cytoplasm and organelles.

L12: Cell membrane and passage of substances..

3. MODULE III - MOVEMENT AND ENERGY

L13: Cytoskeleton and structures of movement: part 1

L14: Cytoskeleton and structures of movement: part 2

L15: Cellular junctions

L16: Nuclear envelope

L17: Energetic organelles

L18: Photosynthesis

4. MODULE IV- DNA AND ITS FUNCTIONS

L19: Nucleic acids: DNA and RNA

L20: DNA: organization and functions

L21: Allosynthetic function of DNA: transcription.

L22: Genetic code.

L23: Allosynthetic function of DNA: translation

L24: Autosynthetic function of DNA: duplication

5. MODULE V- GENETICS AND HEREDITY

L25: Riproduzione cellulare: ciclo cellulare.

L26: Mitosi

L27: Meiosi

L28: Principi di genetica

L29: Leggi di Mendel (1° parte) e principi di genetica classica.

L30: Leggi di Mendel (2° parte): assortimento indipendente

6. MODULO VI- DARWIN E L'EVOLUZIONE

L31: Sex-linked inheritance: X-linked.

L32: Mutations.

L33: Notions of human genetics.

L34: Darwin: evolution and the environment.

L35: Natural selection and artificial selection.

L36: Evolution and biological variability

Materiali di studio	<p>36 Pre-recorded video lectures by the lecturer</p> <p>- Supporting teaching materials by the lecturer (handouts, slides, etc.) (in Italian)</p> <p>Recommended texts</p> <ol style="list-style-type: none"> 1. -Molecular Biology of the Cell - 7th edition -Edizione Inglese di Bruce Alberts; oppure 2. -Essential Cell Biology—6th International Student Edition-di Bruce Alberts, Rebecca Heald, Karen Hopkin, Alexander Johnson,
Modalità di verifica dell'apprendimento	<p>The exam will usually consist of either taking a written test or an oral test (a mode of testing that can be conducted at the Rome headquarters) aimed at ascertaining the knowledge acquired.</p> <p>The written test involves 30 multiple-choice questions to which a score of 1 point is given for each correct answer. The test is considered passed with a minimum score of 18.</p> <p>The oral test consists of an interview designed to ascertain the student's level of preparation. The latter normally consists of 4 questions covering the entire syllabus of the teaching, each question having equal dignity and therefore a maximum grade of 7.5.</p> <p>In both modes of examination, special attention in the evaluation of the answers is given to the student's ability to rework, apply and present the material on the platform with propriety of language.</p> <p>In the final assessment, fruitful participation in the forums (virtual classrooms) and proper performance of the proposed e-activities will also be taken into account.</p>
Criteri per l'assegnazione dell'elaborato finale	<p>Assignment of the final paper will be on the basis of an interview with the professor in which the student will express his or her specific interests in relation to some topic he or she wishes to pursue; there are no preclusions to the request for thesis assignment, and there is no particular average for requesting it.</p>