



COURSE OF STUDY Attività Motorie e Sportive

ACADEMIC YEAR 2023/2024

ACADEMIC SUBJECT Basic Science- Applied Physics

General information	
Year of the course	I Year
Academic calendar (starting and ending date)	I Term
Credits (CFU/ETCS):	5 CFU
SSD	FIS/07
Language	Italian
Mode of attendance	Not Mandatory

Professor/ Lecturer	
Name and Surname	Emanuele Biseglie
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Department and address	CUS Bari
Virtual room	Microsoft teams code bqfo7bp
Office Hours (and modalities: e.g., by appointment, on line, etc.)	To be agreed by email

Work schedule			
Hours			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
125	50		75
CFU/ETCS			
5	5		

Learning Objectives	<i>The aim of the course is to provide the student with a basic knowledge of general physics and to illustrate its applications in the biological and medical fields. At the end of the course the student will be able to understand the concepts and quantities useful to describe the pathophysiological events of the human organism. In addition, the student will acquire the skills to apply the scientific method in the description and interpretation of simple natural phenomena.</i>
Course prerequisites	No

Teaching strategie	Lectures
Expected learning outcomes in terms of	



Knowledge and understanding on:	acquisition of the theoretical and experimental foundations of Classical Physics; initiation to the understanding of the scientific method, the nature and modalities of research in Physics
Applying knowledge and understanding on:	ability to identify the essential elements of a phenomenon, in terms of order of magnitude and level of approximation necessary; ability to apply laws and theories to concrete situations aimed at solving problems.
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <i>autonomous reasoning to recognize the physical laws that regulate the behavior of observed phenomena and to solve both standard and non-standard problems.</i> • <i>Communicating knowledge and understanding</i> <i>ability to express themselves scientifically and communicate their knowledge during the examination tests.</i> • <i>Capacities to continue learning</i> <i>learning of basic notions and consolidation of logical and scientific aptitudes useful for subsequent studies</i>
Syllabus	
Content knowledge	<ul style="list-style-type: none"> • <i>Unit of measurement and physical quantities: Unit System , Physical Quantities: scalars and vectors, Vector algebra.</i> • <i>Mechanics of the material point:</i> • <i>Kinematics - Straight Motion: Straight Motion Uniform, Straight Motion Uniformly Accelerated, Harmonic, Circular: Motorcycle Circular Uniform Circular Uniformly Accelerated</i> • <i>Dynamics - First Principle of Dynamics , Second Principle of Dynamics, Third Principle of Dynamics, Momentum and Principle of Storage of the Momentum, Moment of the Quantity of motion and principle of conservation of momentum, Types of Forces: Weight Force, Elastic Force, Constrictive Reactions, Passive resistances, Centripete forces, Motion on an inclined plane, Work in fields of uniform forces, Work in fields of central forces, Potential Energy, Kinetic Energy, Conservation Principle Mechanical Energy, Principle of Energy Conservation</i> • <i>Mechanical Systems Material points: Cardinal Equations of Dynamics for systems of material points</i> • <i>Mechanics Rigid body: Cardinal Equations of Dynamics for the body rigid, Static: Cardinal Equations of Statics for the rigid body, Levers.</i> • <i>Fluid Mechanics: General liquid properties, General properties of the aeriforms, Pressure exerted on a fluid - Pascal's law, Pressure exerted by a fluid - Stevino's Law. Pressure atmospheric, pressure measurement: open tube and tube gauges closed, Blood pressure, Archimedes principle, Dynamics of Fluids, Types of motion, Flow of a current, Equation of Continuity, Theorem of work and kinetic energy for ideal fluids - Equation of Bernouilli, Viscosity, Poiseuille equation, Blood flow in the human body</i> • <i>Thermology: Temperature, thermometric scales, meters temperature</i> • <i>Thermodynamics: Thermodynamic system, Thermodynamic balance, State variables and equation of state, Transformations, Work, Heat, Heat Transfer, First Principle of Thermodynamics, Gas Perfect, Perfect Gas State Equation, Gas Transformations perfect, Perfect Gas Model, Kinetic Theory, Real Gases, Equation of State of Real Gases. Entropy. Second principle of Thermodynamics.</i> • <i>Electricity: Electrostatic, Electric Charge, Fundamental properties of Electric charge, Coulomb force, Electric field, Potential energy</i>



	<p><i>Electrostatics, Electrodynamics, Electric Current, Ohm Laws, Series and parallel resistance connections, Electrical power, Currents alternate, Effects of electric currents on the human body.</i></p> <ul style="list-style-type: none"> • <i>Magnetism; Natural Magnetic Fields, Lorentz Force</i> • <i>Electromagnetic waves: Gauss' law for the electric field, Law of Gauss for Magnetic Field, Law Ampere-Laplace, Law of Henry-Faraday, Electromagnetic wave equation waves in vacuum and matter, Energy of the electromagnetic wave, Spectrum of electromagnetic waves: Radio waves, Microwave, Infrared radiation, Visible radiation, Ultraviolet radiation, X-ray, X-ray Applications: Spectral CT Scanner, Application: Computed Axial Tomography, Application: Microdiffraction at X-ray.</i>
Texts and readings	<i>Fondamenti di Fisica: Halliday, Resnick, Walker. Casa Editrice Ambrosiana Fisica, Giancoli. Casa Editrice Ambrosiana.</i>
Notes, additional materials	
Repository	<i>Educational material available on Microsoft teams channel</i>

Assessment	
Assessment methods	<i>Oral Examination</i>
Assessment criteria	<p><i>Knowledge and understanding: to reach a sufficient level, the student must demonstrate knowledge of the main laws of physics in relation to the areas addressed during the lessons.</i></p> <p><i>Applied knowledge and understanding: To achieve a sufficient level, the student must be able to solve simple real physical problems based on the acquired knowledge.</i></p> <p><i>Autonomy of judgment: the student must demonstrate that he can follow alternative paths to standardized models.</i></p> <p><i>Communication skills: To achieve a sufficient level, the student must demonstrate sufficient mastery of the scientific terminology of reference.</i></p> <p><i>Ability to learn: at a sufficient level, the student will be able to examine, deepen and independently elaborate issues in which the use of the laws of physics is required.</i></p>
Final exam and grading criteria	<p><i>The student must demonstrate knowledge of the topics under study and have understood the issues related to them, as well as to have reached a level of knowledge to develop independently interpretative arguments</i></p> <p><i>1) Failure to pass the test: insufficient knowledge of the course contents, insufficient evaluation and reasoning skills, lack of basic knowledge.</i></p> <p><i>2) 18 to 21: sufficient or barely sufficient preparation; minimum knowledge of the institutions and of the problems tackled during the course; presence of minor gaps;</i></p> <p><i>3) 22 to 24: average preparation characterized by no particular deepening and by gaps that can be filled in the continuation of the overall training;</i></p> <p><i>4) 25 to 27: generally good preparation even if not particularly thorough; technical language and adequate expressive ability;</i></p> <p><i>5) 28 to 30: excellent or excellent preparation; precise and precise technical language and expressive ability;</i></p> <p><i>6) 30 e lode: preparation, technical language, expressive and argumentative skills of the highest level</i></p>
Further information	