UNIVERSITÀ DEGLI STUDI DI BARI ALDO MORO

DIPARTIMENTO JONICO IN "SISTEMI GIURIDICI ED ECONOMICI DEL MEDITERRANEO: SOCIETÀ, AMBIENTE, CULTURE"

General information		
Academic subject	***Physics***	
Degree course	*Scienze e Gestione delle attività Marittime (SGAM)*	
Academic Year	*1*	
European Credit Transfer and Accumulation System (ECTS)		9
Language	*Italian*	
Academic calendar (starting and ending date)	*Second semester (March to June)*	
Attendance	*Facultative*	

Professor/ Lecturer	
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Telephone	
Department and address	*Physics department (Via G. Amendola, 173, 70125, Bari, BA)*
Virtual headquarters	*Teams channel code: cmxde4v*
Tutoring (time and day)	In presence (Physics dep., room R38) or virtually in Teams, Friday 16:00-17:00 or arranging with teacher via mail for a different timeslot.

Syllabus	
Learning Objectives	The course refers to the teaching of Physics for learning the aspects of the discipline mandatory to achieve the overall educational objectives of the course of study. The learning objectives are the acquisition of the aspects of the discipline listed in the contents. Particular attention is paid to the discussion, interpretation and the critical deepening of the results of the acquired theoretical knowledge.
Course prerequisites	• *Representation of numbers in power of ten* • *Cartesian representation of a graph* • *Equation of line and parabola* • *Natural and decimal logarithm and properties* • *Angle measurement in radiant* • *Surface and volume of remarkable geometric figures (triangle, rectangle, circle, cube, sphere)* • *First and second degree equation solution*

Contents	***Introduction*** *Physics and scientific methos. Measurements in physics. International System of measurement units. Derived quantities. Dimensional analysis.* ***Scalar and vectorial quantity*** *Reference systems. Basics of trigonometry. Scalar and vectorial quantity. Classification and representation of a vector. Sum and difference of vectors. Scalar and vectorial products of vectors.* ***Cinematics*** *Introduction. Cinematic variables: position, velocity and acceleration. Mono-dimensional motions: uniform velocity, uniform acceleration and vertical. Bi-dimensional motions: circular and parabolic.* ***Dynamic*** *Definition of force. The three principles of dynamic. Measurement unit of the force. Examples of forces: universal gravity law, weight force, binding reaction, wire tension, sliding friction, centripetal force, elastic force. Momentum and momentum theorem. Inclined plane with and without sliding force.* ***Work and energy*** *Work of a force. Power. Kinetic energy and kinetic energy theorem. Potential energy: gravitational and elastic. Conservative and non-conservative forces. Total energy and its conservation. Work of a non-conservative force.* ***Fluid static*** *Matter states of aggregation. Pressure. Pascal principle and hydraulic press. Stevino law, communicating vessels and pressure gauges. Archimede principle.* ***Temperature and heat*** *Introduction to the thermodynamic. Thermal equilibrium and temperature. Heat and calorimetry. Phase transitions. Heat transfer. Thermal expansion.* ***Principles of thermodynamic*** *Thermodynamic transformations. Thermodynamic work. First principle of thermodynamic. Gas laws. Cyclical transformations. Second principle of thermodynamic. Entropy.* ***Electrostatic*** *Electricity. Atom structure and electric charge. Conductor and insulating. Coulomb law. Electrostatic field. Gauss law. Electric field from single charge, uniform plane distribution and parallel plates. Electrical potential energy and electrical potential.* ***Electrical current*** *Conductor in equilibrium. Capacitance. Electrical current. Ohm laws. Resistors and capacitors in series and parallel. Joule effect.* ***Magnetism*** *Magnetic effects. Magnetic field. Earth magnetic field. Lorentz force. Motion of a charge in a magnetic field. Magnetic force on a current-carrying conductor.* ***Electromagnetism*** *Magnetic field from currents. Force between current-carrying conductors. Magnetic field in matter. Electromagnetic induction and Lenz law. Maxwell equations. Electromagnetic wave.*

	Wave and their propagation *Wave classification. Parameters of a wave. Sonar and Doppler effect. Basics of geometrical optics: reflections and refractions. Light dispersion.*
Books and bibliography	• *Teacher slides* • *Halliday, Resnick - "Fondamenti di Fisica" – Settima edizione – Casa Editrice Ambrosiana*
Additional materials	*Slides prepared by teacher can be used as a reference for the exam preparation and will be shared with students on an online platform.*

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
72	*56*	*16*	*153*
ECTS			
9	*7*	*2*	

Teaching strategy	
	The course is developed through lectures related to the aspects of the relevant and indispensable discipline for the achievement of the specific educational objectives of the teaching. Lectures are supported by seminars and by exercises and, where possible, an interaction with students through group discussion on the e- learning platform or in the classroom. During the lessons various tools are used to improve lessons, e.g. presentations in power points, diagrams, and everything else deemed useful for improving the effectiveness of the didactics.
Expected learning outcomes	
Knowledge and understanding on:	Acquisition of the methodology needed to know and understand the physics phenomenologies explained during the course.
Applying knowledge and understanding on:	Acquisition of the physics methodology needed for the application of the common analysis tools provided during the course to different physics problem.

Soft skills	• *Making informed judgments and choices*
	  ○ Acquisition and development of the critical study skills of physics pnenomena
	• *Communicating knowledge and understanding*
	  ○ Acquisition of the capability to communicate and discuss physics theses and scientific studies examined critically
	• *Capacities to continue learning*
	  ○ Acquisition of the methodology necessary for the critical study of physics phenomena, of the most significant literature on the topics covered by study and the most innovative discoveries

Assessment and feedback	
Methods of assessment	• *Intermediate written exams* • *Written and/or oral final exam*

Evaluation criteria	• *Knowledge and understanding*
	  ○ Test acquisition of basics knowledge
	  ○ Comprehension of proposed examples
	• *Applying knowledge and understanding*
	  ○ Identification of useful laws for problem solving
	  ○ Proper usage of mathematical tools for problem solving
	• *Autonomy of judgment*
	  ○ Ability to perform search of information in literature and the web, critically evaluating the reliability of the sources
	• *Communicating knowledge and understanding*
	  ○ Use of the correct and appropriate language treating a physics thesis
	• *Capacities to continue learning*
	  ○ Capability to debate about new discoveries

Criteria for assessment and attribution of the final mark	*Final mark is given in fraction of 30. Above 18/30 the exam is considered as successfully passed.*
Additional information	