



MODELLO SCHEDA INSEGNAMENTO

Corso di L/LM/LMCU	Biotechnology
Denominazione insegnamento:	Physics with laboratory
Numero di Crediti:	8
Semestre:	second
Docente Titolare:	Paola Romano
Dottorandi/assegnisti di ricerca che svolgono attività didattica a supporto del corso:	
Orario di ricevimento:	monday-thursday 14-16
Indirizzo:	Via Port'Arsa 11

PRESENTATION OF THE COURSE:

The course is divided into two parts. The first part (about 6 CFUs) is dedicated to the study of the Material Point Mechanics (Kinematics and Dynamics), following the historical path. The laws of dynamics are extended to the system of material points with rigid bodies. The first electrostatic elements and stationary electric current are also introduced, with reference to nonstational cases and electromagnetism. The basic principles of thermodynamics are studied, with particular attention to physical characteristics. The second part of the course (about 2 CFUs), which takes place parallel to the first one, is devoted to simple experiments of Mechanics, taken only as a starting point to apply the basic notions of the measurement of physical quantities, measuring instruments and error theory. Particular emphasis is given to graphic representation and statistical processing of experimental results.

THE FORMATIVE OBJECTIVES

Understand the meaning of physical law. Acquire the basic principles and basic methodologies of classical physics. Introduce to quantitative analysis of physical phenomena. The objective is to be able to set up simple physics problems by mastering unit conversion, I and II degree equations and the basic elements of differential calculus. Acquire the basics of physical quantities measurements. Obtain the basics of statistical analysis of experimental data

REQUIRED PREREQUISITES

It is recommended to pass the Mathematics exam.

FREQUENCY OF LESSONS

Frequencies are required in laboratory exercises.

CONTENTS OF THE COURSE

Measurement units and physical dimensions. Time equation and trajectory. Material point kinematics. Dimensions that characterize the motion: position, speed, acceleration. Straight motion and flat motions. Vector sizes. Inertial reference systems. The laws of the material point dynamics. The forces: gravitational force; Elastic force; Friction force. Work of a force. Energy. Conservative forces. Conservation of mechanical energy. Conservation of momentum. Electric force. Electric field. Potential. Stationary electric current. Electromagnetic field. The temperature and heat. Perfect gas. Thermodynamic transformations. The principles of thermodynamics. Measures of fundamental and derived physical quantities. Graphic representation and statistical processing of experimental data.

NB During the course, laboratory exercises focus mainly on Mechanics, with its statistical data processing.

DIDACTIC METHODS

Frontal Didactics and Laboratory Exercises

REFERENCE TEXTS

- Serway, Jewett - Principi di Fisica, EdiSES
- Halliday, Resnick, Walker - Fondamenti di Fisica, Ambrosiana
- P. Mazzoldi, M. Nigro, C. Voci - Elementi di Fisica, EdiSES
- Filatrella, Romano - Elaborazione statistica dei dati sperimentali, EdiSES

PROFIT EXAMINATION

Verification of learning and examination mode

- in itinere test, may
- in itinere test, june
- Final exam: Written + oral

EXAMS CALENDAR

go to the link

EXAMS REGISTRATION

go to the link

Syllabus

Topics	Hours	Texts	Lesson type
Measurement units and physical dimensions. Time equation and trajectory. Material point kinematics. Dimensions that characterize the motion: position, speed, acceleration. One and two dimensions motion.	8	<ul style="list-style-type: none"> • Serway, Jewett - Principi di Fisica, EdiSES • Serway, Jewett - Principi di Fisica, EdiSES • Halliday, Resnick, Walker - Fondamenti di Fisica, Ambrosiana • P. Mazzoldi, M. Nigro, C. Voci - Elementi di Fisica, EdiSES 	frontal
Vectors. Inertial reference systems. The laws of the material point dynamics. The forces: gravitational force; Elastic force; Friction force.	12	<ul style="list-style-type: none"> • Serway, Jewett - Principi di Fisica, EdiSES • Halliday, Resnick, Walker - Fondamenti di Fisica, Ambrosiana • P. Mazzoldi, M. Nigro, C. Voci - Elementi di Fisica, EdiSES 	frontal
Work of a force. Energy. Conservative forces. Conservation of mechanical energy. Conservation of momentum.	12	<ul style="list-style-type: none"> • Serway, Jewett - Principi di Fisica, EdiSES • Serway, Jewett - Principi di Fisica, EdiSES • Halliday, Resnick, Walker - Fondamenti di Fisica, Ambrosiana • P. Mazzoldi, M. Nigro, C. Voci - Elementi di Fisica, EdiSES 	frontal
Electric force. Electric field. Potential. Stationary electric current. Electromagnetic field.	8	<ul style="list-style-type: none"> • Serway, Jewett - Principi di Fisica, EdiSES • Halliday, Resnick, Walker - Fondamenti di Fisica, Ambrosiana • P. Mazzoldi, M. Nigro, C. Voci - Elementi di Fisica, EdiSES 	frontal
The temperature and heat. Perfect gas. Thermodynamic transformations. The principles of thermodynamics.	8	<ul style="list-style-type: none"> • Serway, Jewett - Principi di Fisica, EdiSES • Halliday, Resnick, Walker - Fondamenti di Fisica, Ambrosiana • P. Mazzoldi, M. Nigro, C. Voci - Elementi di Fisica, EdiSES • Serway, Jewett - Principi di Fisica, EdiSES 	frontal

		<ul style="list-style-type: none"> • Halliday, Resnick, Walker - Fondamenti di Fisica, Ambrosiana • P. Mazzoldi, M. Nigro, C. Voci - Elementi di Fisica, EdiSES 	
Measures of fundamental and derived physical quantities. Graphic representation and statistical processing of experimental data.	16	<ul style="list-style-type: none"> • Filatrella, Romano - Elaborazione statistica dei dati sperimentali, EdiSES 	Laboratory Exercises