



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche
ACADEMIC YEAR	2016/2017
MASTER'S DEGREE (MSC)	PHARMACEUTICAL CHEMISTRY AND TECHNOLOGIES
INTEGRATED COURSE	MATHEMATICS AND PHYSICS - INTEGRATED COURSE
CODE	13167
MODULES	Yes
NUMBER OF MODULES	2
SCIENTIFIC SECTOR(S)	FIS/07
HEAD PROFESSOR(S)	BARTOLOTTA ANTONIO Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	BARTOLOTTA ANTONIO Professore Ordinario Univ. di PALERMO
CREDITS	16
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	1
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	BARTOLOTTA ANTONIO Wednesday 09:00 10:00 via Archirafi 38.E' necessario chiedere appuntamento almeno due giorni prima via e-mail (antonio.bartolotta@unipa.it) Thursday 09:00 10:00 via Archirafi 38.E' necessario chiedere appuntamento almeno due giorni prima via e-mail (antonio.bartolotta@unipa.it)

DOCENTE: Prof. ANTONIO BARTOLOTTA

PREREQUISITES	mathematical knowledge of the programs of high school
LEARNING OUTCOMES	Gaining the basic mathematical tools; describe the natural phenomena on the basis of physical laws. Capacity to apply the tools of infinitesimal and integral calculus; capacity to use the physical laws to describe natural phenomena. Be able to comment critically and autonomously natural phenomena with mathematical tools and physics laws. Capacity to present the results of experiments with functions and graphics. Capacity to continue studies using the basic training received in the course.
ASSESSMENT METHODS	Multiple choice questions and oral exam. "In itinere" test. The exam consists of a written test and an interview which is accessed after passing the written test. The written test consists of 13 multiple choice exercises with different levels of difficulty; the minimum score to access the interview is 18/30; the time available is 90 minutes. Interview: the candidate will have to answer at least three questions, on all parts of the program, with reference to the recommended texts. It is faculty of the student to start the examination with a topic chosen by the student himself. The final evaluation will be made appropriately balancing the result of the written test and of the interview.
TEACHING METHODS	lectures and classroom exercises

MODULE PHYSICS

Prof. ANTONIO BARTOLOTTA

SUGGESTED BIBLIOGRAPHY

Serway, Jewett: Principi di Fisica (quinta edizione). Edises
A.Bartolotta: Meccanica dei fluidi. Edises
Serway: Guida allo studente e alla risoluzione dei problemi di Principi di Fisica. Edises
Walker: Fondamenti di Fisica. Addison Wesley
D.Halliday, R.Resnick, J.Walker: Fondamenti di fisica. (vol. unico) Ambrosiana

AMBIT	50320-Discipline Matematiche, Fisiche, Informatiche e Statistiche
INDIVIDUAL STUDY (Hrs)	140
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

Deep knowledge of the basic physical laws, fundamental interactions and the law of energy conservation

SYLLABUS

Hrs	Frontal teaching
4	Basic and derived physical quantities. The international system of units
12	Speed, acceleration, forces. Laws of motion. Kinetic and potential energy. Conservative forces. Conservation of mechanical energy. Momentum, angular momentum, impulse, torque. Rotation.
8	Hydrostatic laws. Hydrodynamics of perfect and real fluids. Surface tension.
10	Thermodynamics. Temperature and heat transfer. Internal energy and the first law of thermodynamics. Heat engines, second law of thermodynamics, entropy.
14	Columb law. Electric field, potential, capacitance of a capacitor, dielectrics, Ohm laws. Magnetic field, Lawrence force.
4	Waves. Electromagnetic spectrum, photons.
Hrs	Practice
8	Guide to the resolution of exercises and problems

MODULE MATHEMATICS

Prof. ANTONIO BARTOLOTTA

SUGGESTED BIBLIOGRAPHY

C.Sbordone, F.Sbordone: Matematica per le scienze della vita. Edises
M.Ritelli, M.Bergamin, A.Trifone: Fondamenti di Matematica. Zanichelli
G.Zwirner: Istituzioni di matematiche (parte prima). Ed. CEDAM, Padova
ESERCIZI:
A.Bartolotta, S.Calabrese: Esercizi di matematica svolti. Edises

AMBIT	50320-Discipline Matematiche, Fisiche, Informatiche e Statistiche
INDIVIDUAL STUDY (Hrs)	140
COURSE ACTIVITY (Hrs)	60

EDUCATIONAL OBJECTIVES OF THE MODULE

Understand the meaning and purpose of infinitesimal and integral calculus, and know how to use these tools.

SYLLABUS

Hrs	Frontal teaching
8	Basic functions: Logarithm, exponential, trigonometric. Equation of the line. Parabola, circle, ellipse, hyperbola.
6	Limits. Continuous functions.
14	Derivative of real functions. Rules of derivation. Study of a function: domain, extremes, asymptotes, concavity, inflection points.
4	Numerical sequences and series. Power series. Taylor polynomial
10	Primitive functions. Integral calculus. Integration by parts. Integration by substitution
8	Ordinary differential equations first order with separable variables. Simple examples of differential equations second order. Functions of two variables, partial derivatives.
Hrs	Practice
10	Guide to the resolution of exercises and problems