COURSE TITLE
***PHYSICAL CHEMISTRY III* WITH LABORATORY**
(Bachelor in Chemistry)

MODULE 1 TITLE
PHYSICAL CHEMISTRY III
Prof. Michele Antonio Floriano (e-mail: michele.floriano@unipa.it)
Classroom site: Viale delle Scienze Edificio 17 (Building 17) D Room

MODULE PROGRAM
Credits (CFU) **= 8**
Face-to-face lectures (8 CFU, 64 hrs)

Principles of statistical thermodynamics. Partition function. Partition function and thermodynamic functions. Canonical and microcanonical ensemble. Generalized coordinates. Phase space, phase integral, lagrangian formulation.
Wave-particle dualism. Schroedinger equation. Principles of quantum mechanics, wave function, operators and expectation values. Solution od the Schroedinger equation for freeand bound particles. Harmonic oscillator. Hydrogenoid atoms.
Quantum mechanics and statistical thermodynamics.
Quantum mechanics and spectroscopy. Rotational, vibrational and electronic spectroscopy. Calculation of UV and IR spectra.
Nuclear magnetic resonance. Larmor precession. Schroedinger equation for a system of spins in a magnetic field. Orbital approximation. Secular determinant. Spin coupling.

TEXTBOOKS
- Peter W. Atkins – "Elementi di Chimica Fisica" – Zanichelli
- Peter W. Atkins – "Chimica Fisica" – Zanichelli
D.A. McQuarrie, J. D. Simon – "Chimica Fisica, un approccio molecolare"

MODULE 2 TITLE
LABORATORY OF PHYSICAL CHEMISTRY III
Prof. Bruno Pignataro (e-mail: bruno.pignataro@unipa.it)
Classroom site: Viale delle Scienze Ed. 17, Room D
Laboratory site: Viale delle Scienze Ed. 17, Physical Chemistry Lab.

MODULE PROGRAM
Credits (CFU) **= 1+3**
Face-to-face lectures (1 CFU, 8 hrs)
Laboratory (3 CFU, 45 hrs)

Hours	**Face-to-face**
1	Introduction, Scope, Calendar
1	Security in Laboratory
6	Description of experiments and techniques
Experiment Number	**Experiments in Laboratory**

1	Langmuir-Blodgett monolayers of fatty acids: intermolecular interactions
2	Absorption spectroscopy and kinetic laws
3	Vibronic bands by emission and absorption spectroscopies
4	Quantum Mechanics Simulations: electronic transitions
5	Nanoscale parameters of molecular aggregates by dynamic light scattering experiments
TEXTBOOKS	- Peter W. Atkins, Julio De Paula. CHIMICA FISICA. Zanichelli quarta edizione 2004. - Lecture Notes