COURSE SYLLABUS

University	**Alexandru Ioan Cuza University of Iaşi**	**Course title**	
Faculty	**Physics**	**Methods of structural and biostructural analysis**	
Department	**Physics**		
Domain	**Physics**	**Course category** (FC/SC/CC[1]): **SC**	**Term** (1-4): **1**
Level	**Postgraduate (MA)** **1. Biophysics and Medical Physics;** **2. Plasma Physics, Spectroscopy and Selforganization.**	**Course type** (Co/El/F[2]): **Co**	

I. Course structure

Number of hours/week				Credits	Total class hours/ semester	Total hours of individual activity	Examination type (C/Ex/CE[3])	Teaching language
Course	Seminar	Lab.	Project	**6**	**56**	**124**	**Ex**	**English**
2		**2**						

II. Instructors

	Academic degree[4]	Scientific degree	Name and surname	Faculty position (tenure/ associate - organization)
Course	Professor	PhD	Viorel MELNIG	tenure
Seminar				
Laboratory	Research asistant	PhD	Laura OBREJA	associate - organization

III. Prerequisites

Elements of Biostructure, Molecular Physics, General Biophysics

IV. Course objectives

The ability of applying the knowledges concerning the way of achieving and analyse of polymer and biopolymer samples structures as: the biopolymers purification, the primary structure characterization of biopolymers, the characterization of the secondary biopolymers structure, meso- and nano-phase analyse through X-rays techniques, experimental determination of 3D biomolecules structure, 3D design techniques of biomolecules. The capacity to prospect, process and analyse information from variety of bibliographic sources and report research elaboration. The ability to generate new ideation concerning experimentally assays of analysis. Team skill worked for solving experimental and technological problems. Critical formulations ability considering the current stage from area, and looms new research directions. Personal and group's projects successfully capacity for initiated and administered; determination and sedulous in the realization of the tasks and of the responsibility.

V. Course content

Course	Molecular and biomolecular architecture. General concern about the structural and biostructural analysis possibilities. Molecular modelling possibilities. The samples preparation. Separation and purification methods. Biomolecules primary structure assessment methods. Mass spectrometry applied to biomolecules. Structure and biostructure X-rays diffraction analyse. IR structure analyse. Structure analyse through NMR techniques.
Seminar	

[1] FC – fundamental course, SC – specialty course, CC – complementary course
[2] Co – compulsory, El – elective, F – facultative
[3] C – colloquium, Ex – exam, CE – colloquium AND exam
[4] Professor / Associate professor / Lecturer / Assistant professor / Teaching assistant

Laboratory	Revision (introduction) regarding composition and properties of biomolecules: Structure and the properties of the proteins; Fibrous and globular proteins - specific properties; Primary structure determination by MALDI-TOF method; Analysis possibilities by large-angle X-ray diffraction; Secondary structure determination by small-angle diffraction; Secondary structure determination by IR spectroscopy; Possibilities of structural investigation by RMN techniques.

VI. Minimal required references

Renee R. Alexander &, *Basic Biochemical Methods*, John Wiley & Sons, 1985.
W. Schrepp; Harald Pasch. Maldi-Tof Mass *Spectrometry of Synthetic Polymers* (Springer Laboratory). Berlin: Springer-Verlag.
Blow, D. *Outline of Crystallography for Biologists*. Oxford: Oxford Univ. Press 2002
Wuthrich, K. *NMR of Proteins and Nucleic Acids*, Wiley-Interscience, New York, USA 1986.
A. R. Leach, *Molecular Modelling: Principles and Applications*, 2001.

VII. Didactic methods

magisterial lecture; debate; problematization; frontal experiment; conducted revelation

VIII. Assessment

Pre-conditions	course attendance, active participation to class activities; minimum eleven laboratories attendance.	
Exam dates	**1st Assessment**	November
	2nd Assessment	January – February

	Assessment means and methods	**Percentage of the final grade**
Exam/Colloquium	written exam	45%
Seminar		
Laboratory	laboratory colloquium; project	20% 35%