COURSE SYLLABUS

University	**Alexandru Ioan Cuza University of Iaşi**	**Course title**	
Faculty	**Physics**	**Surface Analysis Methods**	
Department	**Physics**		
Domain	**Physics**	**Course category** (FC/SC/CC[1]): SC	**Term** (1-4): 2
Level	**Postgraduate (MA)**	**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	NEAGU Maria	tenure
Seminar	-	-	-	-
Laboratory	Lecturer	PhD	POHOATA Valentin	tenure

III. Prerequisites

Mechanic and acoustics, Electricity, Magnetism, Optics.

IV. Course objectives

Imparting knowledge concerning fundamentals on physical principles and mesurement methods used for the surfaces characterisation. Understanding the theoretical knowledge by experiments. Capacities development for establishing measurement methods.

V. Course content

Course	Surface properties. Optical microscopy. Interferometric methods. Elipsometric methods. Holographic methods. Magneto-optical methods. Atomic force microscopy. Diffraction methods. Fourier transform Infrared Absorption Spectroscopy: Attenuated total reflection (ATR) and Diffuse reflectance (DRIFTS). Auger electrons spectroscopy. Photoelectrons spectroscopy. Raman spectroscopy. Scanning electronic microscopy.
Seminar	-
Laboratory	Study of the surfaces by optical microscopy. Determination of the optical constants and the thickenss of the thin films using the ellipsometry. Determination of the magneto-optic Kerr rotation and ellipticity for the soft magnetic thin films. Linnik interferometer: the study of the surfaces and determination of the thin films thickenss. Recording of the surface magnetic hysteresis of the magnetic thin films by magneto-optical Kerr effect. The study of the surfaces by atomic force microscopy. Recording and analysis of the oscillation spectra by attenuated total reflection method. Recording and analysis of the spectra by diffuse reflectance method. Study of the surfaces by scanning electron microscopy.

VI. Minimal required references

1. J. M. Walls, R. Smith, *Surface science techniques*, Elsevier Science Ltd (1994)
2. A. Eliaşevici, *Spectroscopie atomică şi moleculară*, Editura Academiei Române, Bucureşti (1966)

[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

3. R. M. A. Azzam, N. M. Bashara, *Ellipsometry and polarized light*, North Holland Physics Publishing (1987)

VII. Didactic methods

Lecturing. Laboratory experiments.

VIII. Assessment

Pre-conditions	Active participation to class activities.	
Exam dates	**1st Assessment**	8th week
	2nd Assessment	16th week

	Assessment means and methods	**Percentage of the final grade**
Exam/Colloquium	written	50%
Seminar	-	-
Laboratory	laboratory colloquium	50%