5. Curriculum of the program

UNIVERSITY OF BUCHAREST
FACULTY OF PHYSICS
Master Study Domain: Physics
Master Study Program: PHYSICS OF ADVANCED MATERIALS AND NANOSTRUCTURES *(PAMN)*
Type of studies: full-time
Duration of studies - 4 semesters/120 ECTS

CURRICULUM
Academic year 2014-2015
First year of study

C = lecture/course; L = laboratory practical activity; S = Practicals/Tutorials; E = exam; C = viva voce; V = verification; ECTS = number of European transferable credits; Ob.xxx = compulsory; Op.xxx = elective

No.	Code	**Mandatory courses**	1-st semester C L/S V	ECTS Sem. I	2-nd semester C L/S V	ECTS Sem. II	Observations
1.	Ob. 401	Advanced quantum mechanics. Quantum statistical physics	2 2 E	6			
2.	Ob. 402	Solid state physics II	2 2 E	6			
3.	Ob. 403	Preparation of nanomaterials and nanostructures	2 2 E	5			
4.	Op. 404	Elective I1x (in D_{I1}-D_{I5})	2 2 E	5			To be selected from package Op.I11-Op.I12
5.	Op. 405	Elective I2x (in D_{I1}-D_{I5})	2 2 E	5			To be selected from package Op.I21-Op.I23
6.	Ob. 406	Magnetism and spintronics			2 2 E	6	
7.	Ob. 407	Physics and technology of organic materials for electronics and optoelectronics			2 2 E	6	
8.	Ob. 408	Characterisation techniques for nanomaterials			2 2 E	5	
9.	Op. 409	Elective I3x (in D_{I1}-D_{I5})			2 2 E	5	To be selected from package Op.I31 - Op.I33
10.	Op 410	Elective I4x (in D_{I1}-D_{I5})			2 2 E	5	To be selected from package Op.I41 și Op.I42
11.	Ob. 411	Small research project and symposium	3 C	3	3 C	3	
	Total hours per week/ *Total Credits*		**23 5E, 1C**	***30***	**23 5E, 1C**	***30***	

Electives D_{I1}-D_{I5}

DI1-DI5	**Crt. No.**	**Code**	**Name**	**Observations**
DI1-DI5	1	Op.I11	- Introduction to quantum theory of many-body systems	
		Op.I12	- Special topics in mathematical physics	
	2	Op.I21	- Introduction to physics of mesoscopic systems	
		Op.I22	- Linear response theory	
		Op.I23	- Transport phenomena in disordered materials	
	3	Op.I31	- Modeling techniques for electronics and optoelectronics devices	
		Op.I32	- Crystal growth techniques	
		Op.I33	- Nanostructures for electronics, optoelectronics, sensors and bio-electrochemistry	
	4	Op.I41	- Measurement techniques for optical and transport coefficients of semiconductors	
		Op.I42	- Physics and technology of thin solid films	

Academic year 2015-2016
Second year of study

C = lecture/course; L = laboratory practical activity; S = Practicals/Tutorials; E = exam; C = viva voce; V = verification; ECTS = number of European transferable credits; Ob.xxx = compulsory; Op.xxx = elective; DF.xx = optional

Crt. No.	Code	**Mandatory courses**	3-rd semester C L/S V	ECTS Sem 3	4-th semester C L/S V	ECTS Sem.4	Observations
12.	Ob 501	Interaction of laser radiation with matter	2 2 E	6			
13.	Ob. 502	Physics of liquid crystals and polymers. Aplications	2 2 E	6			
14.	Op. 503	Elective II1-x (in D_{II1}....D_{II4})	2 2 E	5			To be selected from Op.II11 - Op.II12
15.	Op 504	Elective II2-x (in D_{II1}....D_{II4})	2 2 E	5			To be selected from Op.II21 și Op.II22
16.	DF 1	Optional course 1	2 1 C	3			To be selected from DF.II1 – DF.II3
17.	DF 2	Optional course 2	2 1 C	3			To be selected from DF.II1 – DF.II3
18.	Op. 505	Elective II3-x (in D_{II1}....D_{II4})			2 2 E	5	To be selected from Op.II31 și Op.II32
19.	Op. 506	Elective II4-x (in D_{II1}....D_{II4})			2 2 E	5	To be selected from Op.II41 și Op.II42
20.	Ob. 507	Small research project and symposium	7 C	8	5 C	5	
21.	Ob. 508	Preparation of dissertation thesis			10	15	
	Total hours per week/ *Total credits*		**23 4E, 1C +6 2C**	***30 +6***	**23 2E, 1C**	***30***	

Electives D_{II_1}-D_{II_4}

DII1-DII4	**Crt. No.**	**Code**	**Name**	**Observations**
DII1-DII4	1	Op.II11 Op.II.12	- Nonlinear optical phenomena - Physics of dielectrics	
	2	Op.II21 Op.II22	- Optoelectronic properties of liquid crystals and polymer thin films. Technological applications. - Interface phenomena in polymer structures. Applications to nanotechnology.	
	3	Op.II31 Op.II32	- Computational methods in theory of electronic structure of materials - Advanced numerical methods in physics of many-body systems	
	4	Op.II41 Op.II42	- Special electronic and optoelectronic devices - Physics of semiconductor devices	

Optional courses DF

Crt. No.	**Code**	**Name**	**Observations**
1.	DF.II1	- Phase transitions in condensed matter	
2	DF.II2	- Advanced methods for parallel computing	
3	DF.II3	- Virtual instrumentation and data acquisition	

DEAN — Professor Ștefan ANTOHE

Master program coordinator — Assoc. Prof. Lucian ION

Head of Department — Professor Doina GĂZDARU