



Universitatea din București

Facultatea de Fizică

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MASTER PROGRAM

**Physics of advanced materials and
nanostructures**

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 2018-2019

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			ECTS Sem. I	2-nd semester			ECTS Sem. II	Observations
			C	L/S	V		C	L/S	V		
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 DI1-DI5)	2	2	E	5					To be selected from package Op.I11-Op.I12
5.	Op. 405	Elective I2x (in DI1-DI5)	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 DI1-DI5)					2	2	E	5	To be selected from package Op.I31 - Op.I33
10.	Op. 410	Elective I4x (in DI1-DI5)					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 DI1-DI5

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 2019-2020
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			ECTS Sem 3	4-th semester			ECTS Sem.4	Observations	
			C	L/S	V		C	L/S	V			
12.	Ob 501	Interaction of laser radiation with matter	2	2	E	6						
13.	Ob. 502	Physics of liquid crystals and polymers. Applications	2	2	E	6						
14.	Op. 503	Elective II1-x (in DII1....DII4)	2	2	E	5					To be selected from Op.II11 - Op.II12	
15.	Op 504	Elective II2-x (in DII1....DII4)	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 DII1....DII4)					2	2	E	5		To be selected from Op.II31 și Op.II32
19.	Op. 506	Elective II4-x (in DII1....DII4)					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 Lucian ION