Plan of studies

Program: Physics, specialization: Physics of Advanced Materials for Energy Processing (**PAMEP**)

Level of education: graduate studies. Profile of the studies: academic. Form: campus-based studies

No.	Name of the course	Semester	Lecture (no. of hours)	Course/ Seminars (no of hours)	Lab/ Project (no of hours)	Type of credit	ECTS points
1	2	3	4	5	6	7	8
Year I - Semester I							
1.	Signal and energy processing in nanopatterned materials	1	30			exam	3
2.	Physical properties of 1D and 2D materials and their application in low energy consuming electronic devices	1	30			exam	3
3.	Students seminars 1	1		45		graded credit	4
4.	Biophotovoltaic materials	1	30			graded credit	3
5.	Down- and up-conversion in nanomaterials doped with lanthanide ions	1	30			graded credit	3
6.	Functional nanomaterials and Photocatalysis	1	30			graded credit	3
7.	Conducting nanostructures. Methods of fabrication and analysis	1	30			exam	3
8.	Thermodynamics of Electrolyte Solutions	1	30			graded credit	3
9.	Introduction to Computational Studies of Electronic Structure of Nanosystems	1	30			graded credit	3
10.	Magnetism, magnetic materials and magnetization dynamics	1	30			exam	3
11.	Introduction to neutron scattering	1	30			exam	3
12.	Introduction to Metamaterials, Plasmonics, and Photonic Crystals	1	30			exam	3
13.	Confined effects of liquids in nanoporous matrices	1	30			graded credit	3
14.	Electric and thermoelectric transport at the nanoscale	1	30			graded credit	3
15.	Sunlight energy conversion	1	30			graded credit	3
16.	Lecture from the list of Physics Program Council	1	30			graded credit	3
17.	OHS		4				0
Semester I total (319 h)			274	45			31
Year I - Semester II							
1.	Specialized English	2		30		graded credit	2
2.	Students seminars 2	2		20		graded credit	2
3.	Dissertation seminars and lab (diploma)	2		80	80	graded credit	18
4.	Optical microscopy: from bright field to confocal fluorescence	2			15	graded credit	2
5.	Introduction to fluorescence spectroscopy	2			15	graded credit	2
6.	Micromagnetic simulations	2			15	graded credit	2
7.	Spectroscopic characterization of down- and up-converting nanomaterials	2			15	graded credit	2
8.	Fundamentals of control engineering	2			15	graded credit	2
9.	Nuclear magnetic resonance	2			15	graded credit	2
10.	Fabrication and analysis of surface nanostructures I	2			15	graded credit	2
11.	Voltammetry and chronoamperometry of materials for sunlight energy conversion	2			15	graded credit	2
12.	Course from the list of Physics Program Council	2			15	graded credit	2
13.	Intellectual Property, Patents, and Entrepreneurship		15			graded credit	1
Semester II total (285 h)			15	130	140		31
Year I total (604 h)			289	175	140		62

Year II - Semester III							
1.	Humanistic lecture	3	30	15		graded credit	4
2.	Students seminars 3	3		20		graded credit	2
3.	Dissertation seminars and lab (diploma)	3		80	80	graded credit	18
4.	Time-resolved absorption measurements	3			15	graded credit	2
5.	Fabrication and analysis of surface nanostructures II	3			15	graded credit	2
6.	Coarse-grained Monte Carlo simulations of polymers	3			15	graded credit	2
7.	Electron Microscopy	3			15	graded credit	2
8.	Molecular dynamics simulations – part I	3			15	graded credit	2
9.	Numerical Simulations of Metamaterials, Plasmonic Structures, and Photonic Crystals	3			15	graded credit	2
10.	Liquids in confinement; the novel phases in nanopores	3			15	graded credit	2
11.	Preparation and characterization of solar cells	3			15	graded credit	2
12.	Course from the list of Physics Program Council	3			15	graded credit	2
Semester III total (285 h)			30	115	140		32
Year II - Semester IV							
1.	Students seminars 4	4		20		graded credit	2
2.	External practices (10 weeks)	4				graded credit	18
3.	Atomic Layer Deposition technique	4			15	graded credit	2
4.	X-ray diffraction and Differential Scanning Calorimetry	4			15	graded credit	2
5.	Coarse-grained molecular dynamics simulations of polyelectrolytes	4			15	graded credit	2
6.	Molecular dynamics simulations – part II	4			15	graded credit	2
7.	Brillouin scattering	4			15	graded credit	2
8.	Spectroscopic properties of photosynthetic pigments	4			15	graded credit	2
9.	Focused Ion Beam technique	4			15	graded credit	2
10.	Course from the list of Physics Program Council	4			15	graded credit	2
Semester IV total (65 h)				20	45		26
Year II total (350 h) **Entire program total: 954 h**			30	135	185		58 **120**

Explanations:

Classes on yellow background are selective (7 lectures in semester I, 4 courses in semester II and III and 3 courses in semester IV). Classes on white background are obligatory for all the students.

Additional 2 ECTS points from specialist English will be as part of subject-related lectures conducted in English.

Every year, the Physics Program Council will propose and approve before each year an offer of lectures and classes to choose from (the last item in each semester), as well as Humanistic Lecture and the lecture of Intellectual Property, Patents, and Entrepreneurship.

Each student of PAMEP specialization is obliged to take a 10-weeks-long (approximately 450 credit hours of student's work) internship in a R&D company or a research group outside of the Faculty of Physics at AMU (including international companies and groups). Part of this time may be allocated to shorter study visits to private companies or public sector organizations and to classes with employers' representatives or labor market advisors (including online meetings). Such internship takes place during the last (IV) semester of the program as part of "External practices" course. The internship program choice is the responsibility of a student although it has to be approved by the dissertation supervisor, who deems the internship completed on the basis of an appropriate document signed by an internship supervisor or a research group supervisor. Internships take place after signing an appropriate agreement between the Faculty of Physics of the Adam Mickiewicz University and the unit / company where the internship will be carried out.