Anexa 1 a planului de învățământ - rezultatele învățării
Programul de studii: **Physics of Advanced Materials and Nanostructures 2026/2027**

Rezultate ale învăţării	Cunoștințe	Aptitudini	Responsabilitate şi autonomie	Discipline
R1	The student/graduate explains and interprets concepts, theories, models and principles of physics, highlighting practical applications	The student/graduate applies the principles and laws of physics in solving theoretical or practical problems, including in partially unpredictable situations.	The student/graduate manages technical or professional activities or projects, making decisions including in unforeseen situations.	DOB.102.PMAN Condensed state physics / Fizica stării condensate, DOB.103.PMAN Group theory and application in physics / Teoria grupurilor și aplicații în fizică, DOB.105.PMAN Materials characterization techniques / Tehnici de caracterizare a materialelor, DOB.109.PMAN Magnetism.Spintronics / Magnetism.Spintronică, DOB.111.PMAN Preparation methods for nanomaterials and nanostructures / Tehnici de preparare pentru nanomateriale și nanostructuri
R2	The student/graduate deduces working formulas for calculations with physical quantities, correctly using fundamental principles and laws of physics.	The student/graduate evaluates critically scientific communications or specialized reports of medium difficulty, analyzing the arguments and conclusions presented.	The student/graduate performs independent work tasks responsibly and contributes to interdisciplinary approaches.	DOB.101.PMAN Quantum statistical physics / Fizică statistică cuantică, DOB.103.PMAN Group theory and application in physics / Teoria grupurilor și aplicații în fizică, DOB.105.PMAN Materials characterization techniques / Tehnici de caracterizare a materialelor, DOB.109.PMAN Magnetism.Spintronics / Magnetism.Spintronică, DOB.110.PMAN Organic semiconductors and applications / Semiconductori organici și aplicații
R3	The student/graduate	The student/graduate	The student/graduate	DOB.105.PMAN Materials characterization

	identifies methods, techniques and laboratory instruments necessary for designing and carrying out experiments specific to materials physics.	critically evaluates the results of experiments in order to determine physical quantities of interest for materials physics.	demonstrates autonomy in the operation and maintenance of laboratory equipment, respecting safety and quality standards.	techniques / Tehnici de caracterizare a materialelor, DOB.109.PMAN Magnetism.Spintronics / Magnetism.Spintronică, DOB.111.PMAN Preparation methods for nanomaterials and nanostructures / Tehnici de preparare pentru nanomateriale și nanostructuri, DFA.113.PMAN Interaction of laser radiation with matter / Interacția radiației laser cu materia, DOB.201.PMAN Nanostructures for electronics and optoelectronics / Nanostructuri pentru electronică și optoelectronică
R4	The student/graduate knows the principles of operation, safety and maintenance of equipment used in specialized laboratories.	tudent/graduate uses correctly specific laboratory equipments, demonstrating practical skills in calibration, maintenance and operation.	The student/graduate organizes efficiently her/ his professional activity and working time in accordance with research standards	DOB.104.PMAN Experimental methods in physics / Metode experimentale în fizică , DOB.105.PMAN Materials characterization techniques / Tehnici de caracterizare a materialelor, DOB.111.PMAN Preparation methods for nanomaterials and nanostructures / Tehnici de preparare pentru nanomateriale și nanostructuri, DFA.113.PMAN Interaction of laser radiation with matter / Interacția radiației laser cu materia, DOB.201.PMAN Nanostructures for electronics and optoelectronics / Nanostructuri pentru electronică și optoelectronică
R5	The student/graduate integrates knowledge from physics,	The student/graduate uses interdisciplinary knowledge from	The student/graduate adequately manages experimental and	DOB.101.PMAN Quantum statistical physics / Fizică statistică cuantică, DOB.102.PMAN Condensed state physics / Fizica stării

	mathematics, and materials science to solve complex problems in the field.	physics, mathematics and materials science to model and understand the observed processes.	computational data to support her/his decisions.	condensate, DOB.103.PMAN Group theory and application in physics / Teoria grupurilor și aplicații în fizică, DOB.105.PMAN Materials characterization techniques / Tehnici de caracterizare a materialelor, DOB.110.PMAN Organic semiconductors and applications / Semiconductori organici și aplicații
R6	The student/graduate knows the principles and applications of specialized software in data acquisition and analysis.	The student/graduate uses computer programs for simulations and computational modeling.	The student/graduate assumes responsibility for making decisions based on the interpretation of digital data.	DOB.104.PMAN Experimental methods in physics / Metode experimentale în fizică , DOB.105.PMAN Materials characterization techniques / Tehnici de caracterizare a materialelor, DOP.112.1.PMAN Physics of mesoscopic systems / Fizica sistemelor mezoscopice, DOP.112.2.PMAN Transport phenomena in disordered materials / Fenomene de transport în materiale dezordonate, DOP.112.3.PMAN Linear response theory / Teoria răspunsului liniar
R7	The student/graduate knows the ethical norms and principles regarding both the scientific research in the field and the culture of responsibility in intellectual work.	The student/graduate assimilates the explicit (texts with normative value) or implicit (customs, practices) norms that regulate academic and research conduct in the field.	The student/graduate demonstrates solidarity, reactivity and support for strengthening academic integrity.	DOB.106.PMAN Ethics and academic integrity / Etica și integritate academică, DOB.211.PMAN Research activity (traineeship) / Practică de cercetare, DOB.212.PMAN Finalization of master thesis (56 hours / 2 weeks) / Finalizarea lucrării de disertație
R8	The student/graduate knows the principles of communication and collaboration in	The student/graduate applies effective communication and coordination	The Student/Graduate participates actively and responsibly in team activities, respecting the	DOB.106.PMAN Ethics and academic integrity / Etica și integritate academică, DOB.211.PMAN Research activity (traineeship) / Practică de cercetare,

	multidisciplinary teams and the hierarchical structure specific to organizations.	techniques in diverse teams, managing tasks and professional relationships at different hierarchical levels.	roles and rules of the organization, and requests the necessary support to achieve common goals.	DOB.212.PMAN Finalization of master thesis (56 hours / 2 weeks) / Finalizarea lucrării de disertație, DOB.215.PMAN Defense of master thesis
R9	The student/graduate knows and understands the operating principles and areas of applicability for scientific equipments associated with experimental techniques specific to materials physics.	The student/graduate collects and interprets data resulting from the application of scientific methods, integrating the results obtained into an analytical framework.	The student/graduate analyzes experimental data and extracts information about the quantities of interest.	DOB.105.PMAN Materials characterization techniques / Tehnici de caracterizare a materialelor, DOB.201.PMAN Nanostructures for electronics and optoelectronics / Nanostructuri pentru electronică și optoelectronică , DOB.210.PMAN Physics of liquid crystals and polymeric materials / Fizica cristalelor lichide și materiale polimerice, DOB.211.PMAN Research activity (traineeship) / Practică de cercetare, DOP.202.1.PMAN Nonlinear optics / Optică neliniară
R10	The student/graduate acquires civic competences.	The student/graduate improves communication skills.	Shows spirit of initiative and entrepreneurship.	DFA.107.PMAN Volunteering / Voluntariat, DFA.115.PMAN Volunteering / Voluntariat, DOB.211.PMAN Research activity (traineeship) / Practică de cercetare, DFA.205.PMAN Volunteering / Voluntariat, DFA.214.PMAN Volunteering / Voluntariat

Anexa 2 a planului de învățământ - matricea rezultatelor învățării

Disciplina \ Rezultat	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Nr rez
Quantum statistical physics / Fizică statistică cuantică		X			X						**2**
Condensed state physics / Fizica stării condensate	X				X						**2**

Group theory and application in physics / Teoria grupurilor și aplicații în fizică	X	X			X						**3**
Experimental methods in physics / Metode experimentale în fizică				X		X					**2**
Materials characterization techniques / Tehnici de caracterizare a materialelor	X	X	X	X	X	X			X		**7**
Ethics and academic integrity / Etica și integritate academică							X	X			**2**
Volunteering / Voluntariat										X	**1**
Processing with laser beams / Procesare cu fascicule laser	X	X			X	X					**4**
Magnetism.Spintronics / Magnetism.Spintronică	X	X	X								**3**
Organic semiconductors and applications / Semiconductori organici și aplicații		X			X						**2**
Preparation methods for nanomaterials and nanostructures / Tehnici de preparare pentru nanomateriale și nanostructuri	X	X	X	X	X						**5**
Physics of mesoscopic systems / Fizica sistemelor mezoscopice	X	X			X	X					**4**
Transport phenomena in disordered materials / Fenomene de transport în materiale dezordonate	X	X			X	X					**4**
Linear response theory / Teoria răspunsului liniar	X	X			X	X					**4**
Interaction of laser radiation with matter / Interacția radiației laser cu materia			X	X							**2**
Phase transitions in condensed matter / Tranziții de fază în materia condensată			X	X							**2**

Volunteering / Voluntariat										X	**1**
Nanostructures for electronics and optoelectronics / Nanostructuri pentru electronică și optoelectronică	X	X	X	X	X	X			X		**7**
Nonlinear optics / Optică neliniară	X			X					X		**3**
Physics of dielectric materials / Fizica materialelor dielectrice			X	X		X					**3**
Computational methods for electronic structure of materials / Metode computaționale pentru structura electronică a materialelor	X	X	X								**3**
Advanced methods in statistical physics / Metode avansate în fizica statistică	X	X			X						**3**
Special electronic and optoelectronic devices / Dispozitive electronice și optoelectronice speciale			X	X		X					**3**
Physics and technology of thin films / Fizica și tehnologia filmelor subțiri			X	X		X					**3**
Volunteering / Voluntariat										X	**1**
Computational methods in condensed matter / Metode computaționale în fizica stării condensate	X	X			X						**3**
Plasma spectroscopy / Spectroscopia plasmei			X	X							**2**
Virtual instrumentation and data acquisition / Instrumentație virtuală și achiziție de date				X		X			X		**3**
Plasmonics and metamaterials / Plasmonică și metamateriale	X	X			X						**3**
Physics of liquid crystals and polymeric materials / Fizica cristalelor lichide și materiale polimerice	X	X	X	X		X			X		**6**

Research activity (traineeship) / Practică de cercetare		X	X	X	X	X	X	X	X	X	**9**
Finalization of master thesis (56 hours / 2 weeks) / Finalizarea lucrării de disertație	X	X	X				X	X			**5**
Homogeneous and inhomogeneous waveguides. Applications / Ghiduri de undă omogene și neomogene. Aplicații	X	X			X						**3**
Volunteering / Voluntariat										X	**1**
Total	**18**	**19**	**14**	**14**	**16**	**13**	**3**	**3**	**6**	**5**	