

Universitatea din București
FACULTY OF PHYSICS
DOMENUL DE STUDII UNIVERSITARE DE MASTER: FIZICĂ/PHYSICS
PROGRAMUL DE STUDII UNIVERSITARE DE MASTER: THEORETICAL AND COMPUTATIONAL PHYSICS
Limba de predare: ENGLEZĂ
FORMA DE ÎNVĂȚĂMÂNT: CU FRECVENȚĂ
DURATA STUDIILOR: 2 ANI (4 Semestre)
Număr total de credite ECTS: 120
Nivelul: 7
Promoția:

Anul I - Semestrul I
Anul universitar 2026-2027

Nr. Crt.	Cod disciplină	Denumirea disciplinei	Categorie formativă (DF/DS/DC)	Regim (DOB/DOP/DFA)	C	S	L/LP	P	Total ore	Total ore online	ECTS	Forma de evaluare
1.	DOB.101.TCP	Quantum Statistical Physics	DF	DOB	2	1	0	0	3	0	7	EXAM
2.	DOB.102.TCP	Group Theory and Applications in Physics	DF	DOB	1	1	0	0	2	0	6	EXAM
3.	DOB.103.TCP	Ethics and academic integrity	DC	DOB	1	0	0	0	1	0	3	VERIFICARE
4.	DOP.104.TCP	Elective course, package DOP.104 / Opțional pachet DOP.104	DS	DOP	2	2	0	0	4	0	7	EXAM
5.	DOP.105.TCP	Elective course, package DOP.105 / Opțional pachet DOP.105	DS	DOP	2	0	2	0	4	0	7	EXAM
6.	DFA.106.TCP	Volunteering	DC	DFA	0	0	0	0	0	0	1	VERIFICARE
7.	DFA.107.TCP	Condensed state physics / Fizica stării condensate	DF	DFA	2	2	0	0	4	0	6	EXAMEN
8.	DFA.108.TCP	Data science and computational electronic structure methods for soft-end bio-matter	DC	DFA	1	0	1	0	2	0	3	EXAMEN
TOTAL					8	4	2	0	14	0	30	

C = curs; S = seminar; L/LP = laborator / lucrări practice; P = proiect.
discipline fundamentale (DF) discipline de specializare (DS) discipline de domeniu (DD) discipline complementare (DC)
discipline obligatorii (DOB) discipline opționale (DOP) discipline facultative (DFA)

Pachet opționale Anul I, Semestrul 1	Disciplina
Elective course, package DOP.104 / Opțional pachet DOP.104	Nonlinear dynamics, chaos, physics of complex systems
	Special chapters of Mathematics
Elective course, package	Artificial intelligence and machine learning in theoretical physics

Discipline facultative:
Volunteering
Data science and computational electronic structure methods for soft-end bio-matter
Condensed state physics / Fizica stării condensate

DOP.105 / Optional pachet DOP.105	Simulation methods in theoretical physics
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Anul I - Semestrul II
Anul universitar 2026-2027

Nr. Crt.	Cod disciplină	Denumirea disciplinei	Categorie formativă (DF/DS/DC)	Regim (DOB/DOP/DFA)	C	S	L/LP	P	Total ore	Total ore online	ECTS	Forma de evaluare
1.	DOB.109.TCP	Relativistic quantum mechanics and Quantum electrodynamics	DF	DOB	2	2	0	0	4	0	6	EXAM
2.	DOB.110.TCP	Theory of Nuclear systems and photonuclear reactions	DS	DOB	2	1	0	0	3	0	6	EXAM
3.	DOB.111.TCP	Introduction to quantum theory of identical particles	DS	DOB	2	2	0	0	4	0	6	EXAM
4.	DOP.112.TCP	Elective course, package DOP.112 / Opțional pachet DOP.112	DS	DOP	1	0	1	0	2	0	6	EXAM
5.	DOP.113.TCP	Elective course, package DOP.113 / Opțional pachet DOP.113	DS	DOP	2	1	1	0	4	0	6	EXAM
6.	DFA.114.TCP	Advanced methods for parallel computing	DC	DFA	2	0	2	0	4	0	4	COLOCVIU
7.	DFA.115.TCP	Physics of mesoscopic systems	DS	DFA	2	2	0	0	4	0	4	EXAMEN
8.	DFA.116.TCP	Linear response theory / Teoria răspunsului liniar	DS	DFA	2	2	0	0	4	0	7	EXAMEN
9.	DFA.117.TCP	Volunteering	DC	DFA	0	0	0	0	0	0	1	VERIFICARE
TOTAL					9	6	2	0	17	0	30	

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Pachet opționale Anul I, Semestrul 2	Disciplina
Elective course, package DOP.112 / Opțional pachet DOP.112	Interaction of laser radiation with matter
	Quantum Optics
Elective course, package DOP.113 / Opțional pachet DOP.113	Quantum information and communication
	Collision theory

Discipline facultative:
Physics of mesoscopic systems
Advanced methods for parallel computing
Volunteering
Linear response theory / Teoria răspunsului liniar

Anul II - Semestrul I
Anul universitar 2026-2027

Nr. Crt.	Cod disciplină	Denumirea disciplinei	Categorie formativă (DF/DS/DC)	Regim (DOB/DOP/DFA)	C	S	L/LP	P	Total ore	Total ore online	ECTS	Forma de evaluare
1.	DOB.201.TCP	Introduction to quantum theory of fields	DF	DOB	2	2	0	0	4	0	8	EXAM
2.	DOP.202.TCP	Elective course, package DOP.202 / Opțional pachet DOP.202	DS	DOP	2	0	1	0	3	0	7	EXAM

3.	DOP.203.TCP	Elective course, package DOP.203 / Opțional pachet DOP.203	DS	DOP	2	0	1	0	3	0	7	EXAM
4.	DOP.204.TCP	Elective course, package DOP.204 / Opțional pachet DOP.204	DS	DOP	2	2	0	0	4	0	8	EXAM
5.	DFA.205.TCP	Computational approaches in high-energy physics	DS	DFA	2	0	2	0	4	0	3	EXAM
6.	DFA.206.TCP	Volunteering	DC	DFA	0	0	0	0	0	0	1	VERIFICARE
TOTAL					8	4	2	0	14	0	30	

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Pachet opțional Anul II, Semestrul 1	Disciplina
Elective course, package DOP.202 / Opțional pachet DOP.202	Advanced methods in statistical physics
	Computational methods for electronic structures of condensed systems
Elective course, package DOP.203 / Opțional pachet DOP.203	Computational methods in modern physics
	Theory of intense laser radiation interaction with atomic and nuclear systems
Elective course, package DOP.204 / Opțional pachet DOP.204	Non-abelian gauge theories and standard model of elementary particles
	Theory of hadronic matter in extreme conditions and quark-gluon plasma

Discipline facultative:
Computational approaches in high-energy physics
Volunteering

Anul II - Semestrul II
Anul universitar 2026-2027

Nr. Crt.	Cod disciplină	Denumirea disciplinei	Categorie formativă (DF/DS/DC)	Regim (DOB/DOP/DFA)	C	S	L/LP	P	Total ore*	Total ore online	ECTS	Forma de evaluare
1.	DOB.207.TCP	Introduction to gravity theory and cosmology	DS	DOB	2	1	0	0	3	0	7	EXAM
2.	DOB.208.TCP	Research activity (traineeship – 120 hours / 10 weeks)	DS	DOB	0	0	0	10	10	0	20	VERIFICARE
3.	DOB.209.TCP	Finalization of master thesis (60 hours / 2 weeks)	DS	DOB	0	0	0	5	5	0	3	VERIFICARE
4.	DFA.210.TCP	Extensions of the standard model of elementary particles	DS	DFA	2	2	0	0	4	0	3	EXAM
5.	DFA.211.TCP	Introduction to string theory	DS	DFA	2	2	0	0	4	0	4	EXAM
6.	DFA.212.TCP	Volunteering	DC	DFA	0	0	0	0	0	0	1	VERIFICARE
TOTAL					2	1	0	15	18	0	30	

* În cazul activităților de practică este media pe săptămână

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1.	DOB.213.TCP	Public defense of master thesis	DS	DOB	0	0	0	0	0	0	10	EXAM
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Discipline facultative:
Extensions of the standard model of elementary particles
Introduction to string theory
Volunteering

Sinteze pentru verificarea conformității cu standardele ARACIS

Categ oria	Total ore	% ore	ECTS	% ECTS	Observații / standard domeniu
DF	182	21.67	27	22.5	
DS	644	76.67	90	75	
DD	0	0	0	0	
DC	14	1.67	3	2.5	

Categ oria	Total ore	% ore	ECTS	% ECTS	Observații / standard domeniu
DOB	504	60	72	60	
DOP	336	40	48	40	
DFA	388	46.19	38	31.67	

Tip activitate	Total ore	% din total
Curs	370	44.05
Seminar	206	24.52
Laborator/Lucrari practice	84	10
Proiect*	180	21.43
Practica	120	14.29
total	840	

*Include practica

Numărul orelor de practică (fără elaborarea lucrării de licență)	120
Numărul orelor de practică pentru elaborarea lucrării de licență	60
Total ore practică	180