LIST OF DISCIPLINES STUDIED, GROUPED BY YEARS AND SEMESTER OF STUDY

Study year I Academic year 2025-2026														
Nr. crt.	**Discipline**	**C1**	**Teaching university**	**C2. Discipline Code**	**Semester I**					**Semester II**				
					Number of hours/ week				**No. of credits**	**Number of hours/ week**				**No. of credits**
					C	**S**	**L**	**P**		**C**	**S**	**L**	**P**	
1.	Relativistic Quantum Mechanics and Quantum Electrodynamics	DF	UBB/ UAIC	DI.101.HEP	2	2	-	-	6	-	-	-	-	-
2.	Introduction to the standard model of elementary particles	DF	UB	DI.102.HEP	2	2	-	-	6	-	-	-	-	-
3.	Particle Detectors Fundamentals I	DF	UB	DI.103.HEP	2	-	2	-	6	-	-	-	-	-
4.	Data analysis in high energy physics: a practical guide to statistical methods I	DS	UB	DI.104.HEP	2	-	2	-	6	-	-	-	-	-
5.	Ethics in research	DC	UAIC/ UB/ UBB/ UVT	DI.105.HEP	1	-	-	-	2					
6.	Research Practice	DS	UAIC/ UB/ UBB/ UVT	DI.106.HEP	-	-	-	3	3	-	-	-	-	-
7.	The standard model	DF	UB/ UVT	DI.107.HEP	-	-	-	-	-	2	2	-	-	6
8.	Particle Detectors II	DF	UB	DI.108.HEP	-	-	-	-	-	2	-	2	-	6
9.	Computational approaches in high-energy physics	DS	UAIC/ UB	DO.109.1.HEP	-	-	-	-	-	2	-	2	-	6
	Data analysis in high energy physics: a practical guide to		UB	DO.109.2.HEP							-	2		

	statistical methods II													
	Introduction to gravity theory and cosmology		UVT	DO.109.3.HEP						2	2	-	-	
10.	Programming in C++ and Python for HEP	DS	UAIC/UBB	DO.110.1.HEP	-	-	-	-	-	2	-	2	-	6
	Data Aquisition Methods in HEP I		UB	DO.110.2.HEP										
11.	Research Practice	DS	UAIC/ UB/ UBB/ UVT	DI.111.HEP	-	-	-	-	-	-	-	-	4	6
Total					9	8		3		8	8		4	
Total teaching hours per week					20				30	20				30

Noncompulsory Disciplines														
Nr. crt.	**Disciplina**	**C1**	**Teaching university**	**Discipline Code**	**Semester I**					**Semester II**				
					Number of hours/ week				**Number of credits**	**Number of hours/ week**				**Number of credits**
					C	**S**	**L**	**P**		**C**	**S**	**L**	**P**	
1.	Programming through Python	DC	UAIC /UBB	DFC.111.HEP	2	-	2	-	4	-	-	-	-	-
2.	Non-abelian gauge theories	DS	UB	DFC.112.HEP	2	2	-	-	4	-	-	-	-	-
3.	Volunteering	DC		DFC.113.HEP					1					1

Study year II

Academic year 2026-2027

Nr. crt.	Discipline	C1	Teaching university	C2. Discipline Code	Semester I					Semester II				
					Number of hours/ week				No. of credits	Number of hours/ week				No. of credits
					C	S	L	P		C	S	L	P	
1.	Extensions of the standard model of elementary particles (BSM)	DS	UB	DI.201.HEP	2	2	-	-	6	-	-	-	-	-
2.	Monte Carlo simulations in particle physics I	DF	UBB/UB	DI.202.HEP	2	2	-	-	6	-	-	-	-	-
3.	Frontiers in Particle Physics	DS	UBB	DO.203.1.HEP	2	2	-	-	6	-	-	-	-	-
	Computational frameworks for particle physics theoretical models		UB	DO.203.2.HEP	2	-	2							
	Stellar Astrophysics		UVT	DO.203.3.HEP	2	2	-	-	6	-	-	-	-	-
4.	Particle Physics at the LHC	DS	UB/UAIC	DO.204.1.HEP	2	2	-	-	6	-	-	-	-	-
	Data Aquisition Methods in HEP II		UB	DO.204.3.HEP	2	-	2		6					
5.	Research Practice	DS	UAIC/ UB/ UBB/ UVT	DI.205.HEP	-	-	-	4	6	-	-	-	-	-
6.	Monte Carlo simulations in particle physics II (in high energy physics)	DS	UBB/UB	DI.206.HEP	-	-	-	-	-	2	-	2	-	6
7.	Specialization practice	DS	UAIC/ UB/ UBB/ UVT	DI.207.HEP	-	-	-	-	-	-	-	-	8	12
8.	Scientific research	DS	UAIC/	DI.20	-	-	-	-	-	-	-	-		6

	internship		UB/ UBB/ UVT	8.HEP								4	
9.	Practice for elaboration of dissertation	DS	UAIC/ UB/ UBB/ UVT	DI.209.HEP	-	-	-	-	-	-	-	4	6
Total					8	8		4		2	2	16	
Total teaching hours per week					20				30	20			30

Noncompulsory Disciplines													
Nr. crt.	**Disciplina**	**C1**	**Teaching university**	**Discipline Code**	**Semester I**					**Semester II**			
					Number of hours/ week				**Number of credits**	**Number of hours/ week**			**Number of credits**
					C	**S**	**L**	**P**		**C**	**S**	**L**	**P**	
1.	Introduction to VHDL	DC	UBB/UB	DFC.210.HEP	2	-	2	-	4	-	-	-	-	-
2.	Volunteering	DC		DFC.211.HEP					1					

Legend

C1	content criterion
C2	the obligation criterion
DF	fundamental disciplines
DD	field disciplines (where applicable)
DS	specialized disciplines
DC	complementary disciplines
DI	compulsory (imposed) disciplines
DO	Optional/ ellective disciplines (of your choice)
DFC	Noncompulsory disciplines
CP	professional competency
CT	transversal competence
C	course-type didactic activity
S	seminar-type didactic activity
L	didactic activity of practical laboratory type
P	didactic activity of the internship type

Discipline code: <the obligation criterion ><year of study *x* no. discipline *yy*><acronym of the study programme>

GENERAL ASSESSMENT I

(by content criterion)

Nr. crt.	Tip disciplină/ *Type of discipline*	Număr total de ore							% din total	Prevedere standard specific ARACIS
		Anul I/ *Year I*		Anul II/ *Year II*		Întreg programul de studii				
		Curs	S/L/P	Curs	S/L/P	Curs	S/L/P	**Total**		
1.	Fundamentale/ *Fundamental*	140	140	28	28	168	168	336	**32,3%**	-
2.	De domeniu (dacă există)	-	-	-	-	-	-	-	**-**	-
3.	De specialitate/ *Specialised*	84	182	104	320	188	502	690	**66,3%**	-
4.	Complementare/ *Complementary*	14	-	-		14	0	14	**1,4%**	-
TOTAL		**238**	**322**	**132**	**348**	**370**	**670**	**1040**	**100%**	-

Total ore:1040
Total ore de curs: 370 din care 60% online
Total ore de activități practice: 670 din care 30% online

GENERAL ASSESSMENT II

(according to the mandatory criterion)

Nr. crt.	Tip disciplină/ *Type of discipline*	Număr total de ore							% din total	Prevedere standard specific ARACIS
		Anul I/ *Year I*		Anul II/ *Year II*		Întreg programul de studii				
		Curs	S/L/P	Curs	S/L/P	Curs	S/L/P	**Total**		
1.	Obligatorie/ Compulsory	182	266	76	292	258	558	816	78,5%	-
2.	Opțională/ Elective	56	56	56	56	112	112	224	21,5%	-
TOTAL		**238**	**322**	**132**	**348**	**370**	**670**	**1040**	100%	-
Facultative/ Optional		56	56	28	28	**84**	**84**	**168**		Suplimentar
Raport total (ore de seminar/laborator/practică) / ore de curs						**1,81**				***1<R<2***

CORELAREA DINTRE COMPETENȚE, REZULTATELE AȘTEPTATE ALE ÎNVĂȚĂRII ȘI DISCIPLINELE STUDIATE

Correlation of expected learning outcomes with the studied disciplines

Rezultate așteptate ale învățării / *expected learning outcomes*	Relativistic Quantum Mechanics and Quantum Electrodynamics	Introduction to the standard model of elementary particles	Particle Detectors Fundamentals I	Data analysis in high energy physics: a practical guide to statistical methods I	Ethics in research	The standard model	Particle Detectors II	Computational approaches in high-energy physics	Data analysis in high energy physics: a practical guide to statistical methods II	Introduction to gravity theory and cosmology	Programming in C++ and Python for HEP	Data Aquisition Methods in HEP I	Extensions of the standard model of elementary particles (BSM)	Monte Carlo simulations in particle physics I	Frontiers in Particle Physics	Computational frameworks for particle physics theoretical models	Stellar astrophysics	Particle Physics at the LHC	Data Aquisition Methods in HEP II	Monte Carlo simulations in particle physics II (in high energy physics)	Research Practice	Specialization practice	Scientific research internship	Practice for elaboration of dissertation
Cunoștințe/ *Knowledge*																								
to know the fundamental constituents of matter and their interactions described by quantum field theory;	X	X	X			X	X			X			X		X			X			X	X	X	X
to know the high energy particle physics open questions;		X	X							X			X		X		X	X			X			
to know the concepts related to high energy physics, which involves a critical understanding of theories and principles of Standard Model of elementary particles and its extensions;	X	X	X			X	X			X			X	X	X			X		X	X	X	X	X
to know the computational approaches in high-energy physics;				X				X	X		X			X		X			X	X	X	X	X	X
to know the methods of analysis and the criteria for choosing the appropriate solutions to achieve specific performances;	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to know the working formulas for calculations with physical quantities using properly the principles and laws of physics;	X	X	X	X		X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X

Rezultate așteptate ale învățării ***/ expected learning outcomes***	Relativistic Quantum Mechanics and Quantum Electrodynamics	Introduction to the standard model of elementary particles	Particle Detectors Fundamentals I	Data analysis in high energy physics: a practical guide to statistical methods I	Ethics in research	The standard model	Particle Detectors II	Computational approaches in high-energy physics	Data analysis in high energy physics: a practical guide to statistical methods II	Introduction to gravity theory and cosmology	Programming in C++ and Python for HEP	Data Aquisition Methods in HEP I	Extensions of the standard model of elementary particles (BSM)	Monte Carlo simulations in particle physics I	Frontiers in Particle Physics	Computational frameworks for particle physics theoretical models	Stellar astrophysics	Particle Physics at the LHC	Data Aquisition Methods in HEP II	Monte Carlo simulations in particle physics II (in high energy physics)	Research Practice	Specialization practice	Scientific research internship	Practice for elaboration of dissertation
to know the programming languages and software applications specific to high-energy physics;				X				X	X		X	X		X		X			X	X	X	X	X	X
to know physical phenomena and interpret them by formulating hypotheses and operationalizing key concepts and the appropriate use of laboratory equipment;	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to know the constructive and operating principles of the particle detectors and to explain how to use it;			X	X			X		X									X				X		
to know the basic concepts from related fields in order to use them appropriately in complex teams;										X					X		X							
Abilități/ ***Skills***																								
to apply the methods of analysis and the criteria for choosing the appropriate solutions to achieve specific performances;	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to deduce working formulas for calculations with physical quantities using the principles and laws of physics appropriately;	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to perform comparison studies between theoretical and experimental results with the aim of advancing knowledge;	X	X	X	X		X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
to deduce the working formulas for calculations with physical quantities, using appropriately the principles and laws of physics;	X	X	X			X				X		X	X	X	X		X							
to describe physical systems using specific theories and tools (experimental and theoretical models, algorithms, schemes, etc.);	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to describe and explain the fundamental principles of physics, including those of Standard Model and its extensions, astrophysics, cosmology;	X	X	X			X	X			X					X		X	X			X	X	X	X

Rezultate așteptate ale învățării ***/ expected learning outcomes***	Relativistic Quantum Mechanics and Quantum Electrodynamics	Introduction to the standard model of elementary particles	Particle Detectors Fundamentals I	Data analysis in high energy physics: a practical guide to statistical methods I	Ethics in research	The standard model	Particle Detectors II	Computational approaches in high-energy physics	Data analysis in high energy physics: a practical guide to statistical methods II	Introduction to gravity theory and cosmology	Programming in C++ and Python for HEP	Data Aquisition Methods in HEP I	Extensions of the standard model of elementary particles (BSM)	Monte Carlo simulations in particle physics I	Frontiers in Particle Physics	Computational frameworks for particle physics theoretical models	Stellar astrophysics	Particle Physics at the LHC	Data Aquisition Methods in HEP II	Monte Carlo simulations in particle physics II (in high energy physics)	Research Practice	Specialization practice	Scientific research internship	Practice for elaboration of dissertation
to apply the principles and laws of physics in solving theoretical or practical problems, under conditions of qualified assistance;	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to apply the analysis methods and the criteria for choosing the appropriate solutions to achieve the specified performances;	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to describe crucial experiments in the history of high-energy physics and explain how they led to revisions of our theoretical descriptions of nature;	X	X	X			X	X			X			X		X			X						
to use the computer and specific software tools for the numerical simulation of the physical processes;				X				X	X		X	X		X		X			X	X	X	X	X	X
to use the computer to control some experiments or processes and to acquire data			X	X			X	X	X		X	X		X		X		X	X	X	X	X	X	X
to acquire a coherent and functional system of fundamental knowledge in the field of science;	X	X	X	X			X			X			X	X	X		X	X			X			
to elaborate and present reports on the physical principles in front of an informed public;																					X	X	X	X
to write and present scientific reports in the field of high-energy physics;																					X	X	X	X
to make associations between high-energy physics concepts and other related fields;	X	X								X				X	X		X							
Responsabilitate și autonomie/ Responsibility and autonomy																								
to assume responsibility for managing professional development;					X																	X	X	X
to solve concrete tasks related to high-energy physics experiments;		X	X	X		X	X	X				X						X	X		X	X	X	X

Rezultate așteptate ale învățării ***/ expected learning outcomes***	Relativistic Quantum Mechanics and Quantum Electrodynamics	Introduction to the standard model of elementary particles	Particle Detectors Fundamentals I	Data analysis in high energy physics: a practical guide to statistical methods I	Ethics in research	The standard model	Particle Detectors II	Computational approaches in high-energy physics	Data analysis in high energy physics: a practical guide to statistical methods II	Introduction to gravity theory and cosmology	Programming in C++ and Python for HEP	Data Aquisition Methods in HEP I	Extensions of the standard model of elementary particles (BSM)	Monte Carlo simulations in particle physics I	Frontiers in Particle Physics	Computational frameworks for particle physics theoretical models	Stellar astrophysics	Particle Physics at the LHC	Data Aquisition Methods in HEP II	Monte Carlo simulations in particle physics II (in high energy physics)	Research Practice	Specialization practice	Scientific research internship	Practice for elaboration of dissertation
to present and popularize high energy particle physics across all audiences and age groups;		X	X	X		X				X			X		X		X	X				X	X	X
to critically analyze a specialized report, scientific communication with a medium degree of difficulty in the field of high-energy physics;				X	X	X		X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to be autonomous in the context of handling physical data, including in situations requiring an interdisciplinary approach;		X		X				X	X		X		X		X	X	X	X		X		X	X	X
to autonomously use information sources and resources for communication and assisted professional training (Internet portals, specialized software applications, databases, online courses, etc.) in English;	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
to carry out research internships in various research units related to high-energy physics experiments in order to become familiar with and operate modern equipment, obtain interesting results and prepare reports on the activity carried out;																					X	X	X	X
to manage complex technical or professional activities or projects, by assuming responsibility for decision-making in unpredictable study situations.																		X		X	X	X	X	X