

Physicist MSc (Responsible: Gábor Takács)

Researcher Physicist Specialization (Responsible: Gábor Takács)

Legend

Type: C - compulsory, E - elective modules, O - optional

Grading: e - examination, c - coursework grade, a - audit, ce - comprehensive examination

- Proposed semester, *proposed semester of elective courses, @-alternative semester

E/O - Proposed semester for courses running biannually: E (for students starting in even year) O (for students starting in odd year)

Subject	Type	Eval	Credit	Hours			Semester (spring start)				Semester (fall start)				Semester course active		
				Lect	Prac	Lab	1	2	3	4	1	2	3	4			
GENERAL CURRICULUM																	
CRITERION COURSES				0													
Basic Physics Knowledge	C	a	0	0	0	0									every semester		
Internship RP	C	a	0	0	0	0		#		#			#		every fall		
CORE SUBJECTS				13													
Artificial Intelligence in Physics	C	e	5	1	0	2		#			#				every fall		
Physics Laboratory NM	C	c	6	0	0	4		#			#				every fall		
Colloquium Series 1	C	c	1	1	0	0		#				#			every semester		
Colloquium Series 2	C	c	1	1	0	0			#				#		every semester		
MANAGAMENT AND COMMUNICATION (one course from the list below)				E		3	2	0	0	0	0	3	0	0	3	0	0
Innovation and Green Finance	E	e	3	2	0	0		*			*					every semester	
English for University Studies B2+	E	e	3	0	2	0		*			*					every spring	
Public Speaking B2+	E	e	3	0	2	0		*			*					every spring	
Academic Writing C1	E	e	3	0	2	0		*			*					every spring	
Professional Speaking C1	E	e	3	0	2	0		*			*					every spring	
Discussing Engineering C1	E	e	3	0	2	0		*			*					every spring	
CORE ELECTIVE PHYSICS COURSE (3 courses from the list below)				E		15				10	5	0	0	5	5	5	0
Statistical Physics	E	e	5	2	1	0		*			*		*			every fall	
Particle Physics	E	e	5	2	1	0		*			*		*			every fall	
Nuclear Physics	E	e	5	2	1	0	*		*		*		*			every spring	
Quantum Physics of Atoms	E	e	5	2	1	0	*		*		*		*			every spring	
Nanophysics	E	e	5	2	1	0	*		*		*		*			every spring	
Nanotechnology and Materials Science	E	e	5	3	0	0	*		*		*		*			every fall	
Fundamentals of Photonics	E	e	5	2	1	0	*		*		*		*			every fall	
Computer Simulations in Physics	E	e	5	2	0	1	*		*		*		*			every spring	
DIPLOMA WORK																	
Diploma Work RP 1	C	c	10	0	0	7				#					#	every semester	
Diploma Work RP 2	C	c	20	0	0	13				#					#	every semester	
OPTIONAL COURSES (any BME course)			O			6				3	0	3	0	3	0	3	0
RESEARCHER PHYSICIST SPECIALIZATION																	
COMPULSORY FROM THE CORE PHYSICS COURSE BLOCK																	
Statistical Physics	C	e	5	2	1	0		*		*	*		*			every fall	
COMPULSORY SPECIALISATION COURSES			C														
Seminar RP 1	C	c	2	0	2	0	#				#					every semester	
Seminar RP 2	C	c	2	0	2	0		#				#				every semester	
Seminar RP 3	C	c	2	0	2	0			#					#		every semester	
Project Laboratory RP 1	C	c	7	0	0	5		#				#				every semester	
Project Laboratory RP 2	C	c	13	0	0	8			#					#		every semester	
CORE SPECIALISATION COURSES (at least one from the list below)			E			7			7	0	0	0	0	7	0	0	
Modern Solid State Physics	E	e	7	3	2	0	*		*		*		*		*	every spring	
Quantum Field Theory	E	e	7	3	2	0	*		*		*		*		*	every spring	
ELECTIVE SPECIALIZATION COURSES (30 credits from the list below)			E			20			8	4	8	0	9	5	6	0	
Elective Project Laboratory RP	E	e	10	0	0	7	*	*	*	*	*	*	*	*	*	every semester	
Statistical Physics subject group																	
Non-equilibrium Statistical Physics	E	e	5	2	1	0	*		*		*		*		*	every spring	
Classical and Quantum Phase Transitions	E	e	5	2	1	0	O		E			E		O		odd spring	
Solid State Physics subject group																	
Semiconductor Physics	E	e	3	2	0	0		*		*	*		*		*	every fall	
Advanced Semiconductor Devices	E	e	3	2	0	0	*		*		*		*		*	every spring	
Theory of Magnetism	E	e	5	2	1	0	*		*		*		*		*	every spring	
Optical Spectroscopy in Materials Science	E	e	5	3	0	0	*		*		*		*		*	every spring	
Condensed Matter Quantum Field Theory	E	e	6	3	1	0	E		O			O		E		even spring	
Electronic Structure of Solid Matter	E	e	5	2	1	0		E		O	O		E			odd fall	
Superconductivity	E	e	3	2	0	0		*		*	*		*		*	every fall	
Quantum Physics subject group																	
Advanced Quantum Field Theory	E	e	4	2	1	0	E		O			O		E		even spring	
Quantum World	E	e	3	2	0	0	O		E			E		O		odd spring	
The Physics of One-Dimensional Systems	E	e	3	2	0	0		O		E	E		O			even fall	
Quantum Technology subject group																	
Quantum Information Processing	E	e	3	2	0	0	O		E			E		O		odd spring	
Quantum Optics	E	e	5	2	1	0	*		*	*	*	*	*	*	*	every fall	
Quantum Computing Architectures	E	e	3	2	0	0	*		*	*	*	*	*	*	*	every fall	
Transport in Complex Nanostructures	E	e	5	3	0	0	E		O			O		E		odd spring	
Topological Insulators	E	e	3	2	0	0		E		O	O		E			odd fall	
Mathematical Physics subject group																	
Dynamical Systems	E	e	5	3	1	0	*		*		*		*		*	every spring	
Lie-groups in Physics (maybe a full group theory course or two???)	E	e	3	2	0	0	O		E			E		O		odd spring	
Numerical Methods	E	e	7	4	0	2		*		*	*	*	*	*	*	every fall	

Computer Modelling and Complex Networks subject group															
Complex Networks	E	e	4	3	1	0		*		*	*		*		every fall
Introduction to Data Science	E	e	7	3	1	1		*		*	*		*		every fall
Artificial Intelligence in Data Science	E	c	5	1	0	2		*		*	*		*		every fall
AI Assisted Scientific Programming	C	e	5	0	0	3	#						#		every spring
Further elective subjects (only if not taken during BSc)															
Advanced Mechanics	E	c	3	2	0	0		*		*			*	*	every spring
Advanced Mechanics Project Work	E	e	4	0	1	0		*		*			*	*	every spring
Advanced Electrodynamics	E	c	3	2	0	0		*		*	*		*		every fall
Advanced Electrodynamics Project Work	E	e	4	0	1	0		*		*	*		*		every fall
Advanced Quantum Mechanics	E	c	3	2	0	0		*		*			*	*	every spring
Advanced Quantum Mechanics Project Work	E	e	4	0	1	0		*		*			*	*	every spring
Classical and Quantum Chaos	E	e	3	2	0	0		*		*	*		*	*	every fall
Theory of Relativity	E	c	3	2	0	0		*		*			*	*	every spring
Note: 6 credits can be taken from any other specialisation without request															
RECOMMENDED OPTIONAL COURSES															
Quantum Physics subject group															
Physics of Disordered Systems	O	e	4	2	1	0		E		O	O		E		odd fall
Random Matrix Theory and Its Physical Applications	O	e	3	2	0	0		O		E	E		O		even fall
Mathematical Physics subject group															
Geometry of Classical Field Theories	O	e	3	2	0	0		*		*	*		*		every fall
Vector Spaces in Physics	O	e	3	2	0	0		*		*	*		*		every fall
Computer Modelling and Complex Networks subject group															
Evolutionary Game Theory	O	e	3	2	0	0	O		E				E	O	odd spring
Financial Engineering	O	c	3	2	0	0	O		E				E	O	odd spring
TOTAL NUMBER OF CREDITS								30	30	30	30	30	30	30	30