

Master's Degree Programme

Nuclear Engineering

Specialization Applied Physics of Ionizing Radiation

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Quantum Physics	02KFM	Jizba	2+1 z, zk	-	3	-
Nuclear Safety	17JABE	Frýbortová, Sklenka	4+0 zk	-	5	-
Research Project 1, 2	16VUJI12	Trojek	0+6 z	0+8 kz	6	8
Advanced Experimental Neutron Physics	17PENF	Huml	-	1+3 kz	-	4
Advanced Topics in Nuclear and Radiation Physics	16PPJRF	Musílek, Urban	2+1 z, zk	-	3	-
Instrumentation for Radiation Measurements	16MERV	Průša	2+2 z, zk	-	4	-
Practicum in Detection and Dosimetry of Ionizing Radiation	16PDZNMS	Martinčík, Průša	0+4 kz	-	4	-
Accelerators in Medicine and Technology	16UMT	Augsten	1+0 kz	-	1	-
Monte Carlo Method in Radiation Physics	16MCRF	Klusoň, Urban	-	2+2 z, zk	-	4
Ionizing Radiation in the Environment	16IZZP	Štěpán, Vrba T.	-	2+1 z, zk	-	3
Integral Dosimetry Methods	16IDOZ	Ambrožová, Musílek	-	2+0 zk	-	2
Methods of Analytical Measurement	16AMMN	Pilařová, Průšová	-	2+0 kz	-	2
Excursion	16EX	Thinová	-	1 týden z	-	2
Optional courses:						
Radiation Effects in Matter	16REL	Pilařová	2+0 zk	-	2	-
Treatment of Experimental Data	16ZED	Pilařová	-	2+0 zk	-	2
Monte Carlo Method	18MEMC	Jarý, Virius	2+2 z, zk	-	4	-
Radiation Protection	16RAO	Vrba T.	4+0 zk	-	4	-
Practicum in Dosimetry of Ionizing Radiation	16PDIZ	Štěpán	-	0+4 kz	-	4
Digital Image Processing	01DIZO	Flusser, Zitová	-	2+2 zk	-	4
Fundamentals of Clinical Dosimetry	16ZKLD	Čechák, Hanušová, Novotný J.	-	2+0 zk	-	2

Master's Degree Programme

Nuclear Engineering

Specialization Applied Physics of Ionizing Radiation

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Metrology of Ionizing Radiation	16MEIZ	Novotný P., Trojek	2+1 z, zk	-	4	-
Applications of Ionizing Radiation 1	16APIZ1	Čechák, Trojek	3+0 zk	-	3	-
Master Thesis 1, 2	16DPJI12	Trojek	0+10 z	0+20 z	10	20
Applications of Ionizing Radiation 2	17APIZ2	Miglierini, Štefánek	-	2+1 z, zk	-	3
Spectrometry in Dosimetry	16SPD	Čechák, Novotný P.	2+0 zk	-	2	-
Mathematical Methods and Modelling	16MMM	Klusoň, Urban	0+2 z	-	2	-
Medical Application of Ionizing Radiation	16AIZM	Hanušová, Jelínek-Michaelidesová	2+1 z, zk	-	3	-
Microdosimetry	16MDOZI	Jelínek-Michaelidesová, Pachnerová-Brabcová	2+0 kz	-	2	-
Overview of Elementary Particle Physics	16PFE	Smolík	2+0 kz	-	2	-
Seminar 2	16SEM2	Pilařová	-	0+2 z	-	2
Optional courses:						
Neutron Dosimetry	16DNEU	Ploc	2+0 zk	-	2	-
Clinical Dosimetry	16KLD2	Hanušová, Novotný J., Trojek	2+0 kz	-	2	-
Machine Learning 1	01SU1	Flusser	2+1 zk	-	3	-
Dosimetry of Internal Radiation Sources	16DZAR	Musílek	-	2+0 zk	-	2
Radiobiology	16RBIO	Davídková	-	2+0 zk	-	2
Introduction to Physics of Scintillators and Phosphors	16FSC	Níkl	-	2+0 zk	-	2
Design of Semiconductor Detectors of Ionizing Radiation	16KPD	Kákona	-	0+3 z	-	3
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

Master's Degree Programme

Physical Electronics

Specialization Photonics

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Electrodynamics 1, 2	12ELDY12	Čtyrokový	2+0 z, zk	4+0 z, zk	3	5
Computational Physics 1	12PF1	Klimo, Kuchařík	2+0 zk	-	2	-
Research Project 1, 2	12VUFL12	Šiňor	0+6 z	0+8 kz	6	8
Optical Physics	12FOPT	Kwiecien	3+0 z, zk	-	3	-
Quantum Electronics	12KVEN	Richter, Dvořák	3+1 z, zk	-	5	-
Statistical Optics	12SOP	Richter	2+0 z, zk	-	2	-
Selected Chapters of Modern Optics	12MODO	Kwiecien, Marešová	2+0 z	-	2	-
Nonlinear Optics	12NOP	Richter	-	3+1 z, zk	-	4
Quantum Optics	12KOP	Richter, Dvořák	-	3+1 z, zk	-	5
Computer Control of Experiment	12POEX	Čech, Vyhlídal	-	2+0 z	-	2
Optical Spectroscopy	12OSP	Michl	-	2+0 kz	-	2
Optional courses:						
Measurements Methods in Electronics and Optics	12MMEO	Pína	-	2+0 zk	-	2
Physics of Detection and Detectors of Optical Radiation	12FDD	Pína	2+0 zk	-	2	-
Laser Plasma as Source of Radiation and Particles	12LPZ	Nejdl	2+0 zk	-	2	-
Solid-state, Diode and Dye lasers	12PDBL	Jelínková, Kubeček	-	2+0 z, zk	-	2
Nanochemistry	12NCH	Proška	2+0 zk	-	2	-
Preparation of Semiconductor Nanostructures	12PN	Hulicius	-	2+0 zk	-	2
Laser Physics	12FLA	Šulc	-	4+0 z, zk	-	4
Atomic Physics	12AF	Šiňor	4+0 z, zk	-	4	-
Molecular Nanosystems	11MONA	Kratochvílová	2+0 zk	-	2	-
Computational Physics 2	12PF2	Klimo, Kuchařík	-	1+1 z, zk	-	2
Quantum Information and Communication	02QIC	Gábris, Štefaňák	3+1 z, zk	-	4	-
Open Quantum Systems	02OKS	Novotný	-	2+0 z	-	2
Nano-Materials - Preparation and Properties	11NAMA	Kratochvílová	-	2+0 zk	-	2

Master's Degree Programme

Physical Electronics

Specialization Photonics

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Solid State Physics	11FYPL	Aubrechtová, Kučeráková, Kalvoda	3+1 z, zk	-	4	-
Master Thesis Seminar 1, 2	12DSFE12	Jelínková	0+2 z	0+2 z	2	2
Master Thesis 1, 2	12DPFE12	Jelínková	0+10 z	0+20 z	10	20
Nanophysics	12NF	Šiňor Richter	1+1 zk	-	2	-
Fourier Optics and Optical Signal Processing	12OZS	Kwiecien, Richter	3+0 z, zk	-	3	-
Advanced Optical Laboratory	12PPRO	Jančárek	0+4 kz	-	6	-
Geometrical Optics	12GOP	Dvořák	-	2+0 kz	-	2
Optional courses:						
Advanced Laser Spectroscopy (1)	12PLS	Michl	2+0 zk	-	2	-
Gas and X-ray Lasers	12RGL	Jančárek	-	2+0 kz	-	2
Advanced Laser Technology Laboratory	12PPLT	Kubeček, Němec	0+4 kz	-	6	-
Integrated Optics	12INTO	Čtyroký	2+0 z, zk	-	2	-
Optical Sensors	12OSE	Homola	-	2+0 zk	-	2
X-ray Photonics	12RFO	Pína	2 zk	-	2	-
Ultra-short Pulse Generation	12UKP	Jelínek, Kubeček	2+0 zk	-	2	-
Fiber Lasers and Amplifiers	12VLS	Peterka	2+0 zk	-	3	-
Computer Simulation of Condensed Matter	11SIKL	Kalvoda, Sedlák	2+2 z, zk	-	4	-
Physics of Surfaces and Interfaces	11FPOR	Kalvoda	2+0 zk	-	2	-
SEM and Methods of Microbeam Analysis	11SEM	Kopeček	2+0 zk	-	2	-
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

Master's Degree Programme

Plasma Physics and Thermonuclear Fusion

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Plasma Theory 1, 2	02TPLA12	Kulhánek	2+2 z, zk	3+1 z, zk	5	5
Plasma Diagnostics	02DPLA	Řezáč	-	2+1 z, zk	-	3
Computational Physics 1	12PFTF1	Klimo, Kuchařík	-	1+1 z, zk	-	2
Technology of Thermonuclear Facilities	02TTJZ	Entler	-	3+0 zk	-	3
Inertial Fusion Physics	12FIF	Klimo, Limpouch	3+1 z, zk	-	4	-
Physics of Tokamaks	02FT	Mlynář, Břeň	3+1 z, zk	-	4	-
Atomic and Molecular Physics	02AMF	Břeň	2+2 z, zk	-	4	-
Materials Science	14NAMA	Čech, Haušild	2+1 kz	-	3	-
Materials Science for Reactors	14NMR	Haušild	-	2+0 zk	-	2
Laboratory Work in Plasma Physics 1, 2	02PRPL12	Brotánková, Svoboda	0+2 z	0+2 kz	2	2
Research Project 1, 2	02VUTF12	Mlynář	0+6 z	0+8 kz	6	8
Optional courses:						
Topics in Magnetic Confinement Fusion	02PMCF	Mlynář	-	0+2 kz	-	2
Superconductivity and Low Temperature	11SUPR	Janů, Ledinský	4+0 zk	-	4	-
Low Temperature Plasmas and Discharges	12NIPL	Nejdl	4+0 z, zk	-	4	-
Differential Equations on Computer	12DRP	Liska	2+2 z, zk	-	5	-
Computer Control of Experiment	12POEX	Čech, Vyhlídal	-	2+0 z	-	2
Optical Spectroscopy	12OSP	Michl	-	2+0 kz	-	2
Nuclear Technology Devices	16ZJT	Augsten, Čechák	2+0 zk	-	2	-
Winter (Summer) School of Plasma Physics and Fusion Physics 1, 2 ⁽¹⁾	02ZLSTF12	Svoboda	1 týden z	1 týden z	1	1
Computer Modelling of Plasma	02PMPL	Plašil	-	2+1 z, zk	-	3

(1) The course is intended for students of this program only.

Master's Degree Programme

Plasma Physics and Thermonuclear Fusion

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Computational Physics 2	12PPTF2	Klimo, Kuchařík	2+0 z, zk	-	2	-
Seminar FPTF 1, 2	02STFU12	Čeřovský, Mlynář	0+2 z	0+2 z	2	2
ITER and the Accompanying Programme	02ITERA	Mlynář	-	2+0 zk	-	2
Pinches	02PINCE	Klír	2+0 zk	-	2	-
Thermonuclear Fusion and Society	02TFS	Svoboda	-	2+0 z	-	2
Master Thesis 1, 2	02DPTF12	Mlynář	0+10 z	0+20 z	10	20
Optional courses:						
Mathematical Modelling of Non-linear Systems	01MMNS	Beneš	1+1 zk	-	3	-
Laser Plasma as Source of Radiation and Particles	12LPZ	Nejdl	2+0 zk	-	2	-
Computer Simulations in Physics of Many Particles 1, 2	12SFMC12	Předota, Houdek	3+1 z, zk	2+0 zk	4	2
Neutron Dosimetry	16DNEU	Ploc	2+0 zk	-	2	-
Introduction to Environment	16ZIVO	Čechák, Thinová	2+0 kz	-	2	-
Radiation Effects in Matter	16REL	Pilařová	2+0 zk	-	2	-
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

Master's Degree Programme

Solid State Engineering

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Solid State Theory 1	11TPL1	Hamrle, Kalvoda	4+0 zk	-	6	-
Physics of Metals	11FKOV	Seiner	2+0 zk	-	2	-
Semiconductor Physics	11POLO	Potůček	4+0 zk	-	4	-
Seminar and Educational Trips 1	11SMEX1	Drahokoupil, Kolenko	2+2 z	-	4	-
Research Project 1	11VUIP1	Kalvoda	0+6 z	-	6	-
Solid State Theory 2	11TPL2	Hamrle, Kalvoda	-	2+0 zk	-	3
Seminar on Solid State Theory	11STPL	Sedlák, Seiner, Repček	-	0+2 kz	-	2
Physics of Dielectrics	11FDEL	Bryknar, Mihóková	-	2+0 zk	-	2
Physics of Magnetic Materials	11FMGL	Hamrle, Zajac	-	2+0 zk	-	2
Seminar and Educational Trips 2	11SMEX2	Drahokoupil, Kolenko	-	2+2 z	-	4
Research Project 2	11VUIP2	Kalvoda	-	0+8 kz	-	8
Required optional courses ⁽¹⁾						
Practical Training in Solid State Structure Analysis	11PSPL	Čapek, Kučeráková	0+4 kz	-	4	-
Practical Training in Electronics	11EP	Jiroušek	0+4 kz	-	4	-
Laboratory Trainings in Solid State Physics	11PPOL	Levinský	-	0+4 kz	-	4
Optional courses:						
Real Time Software	11RTSW	Dráb, Jiroušek	-	2+0 z	-	2
Superconductivity and Low Temperature	11SUPR	Janů, Ledinský	4+0 zk	-	4	-
Chemical Aspects of Solids	11CHA	Knížek	2+0 zk	-	2	-
Metallic Oxides	11KO	Hejtmánek	-	2+0 zk	-	2
Physics of Solid State Phase Transitions	11FPPL	Hlinka	-	2+0 zk	-	2
Neutron Diffractometry	11AND	Kučeráková, Vratislav	2+0 zk	-	2	-
Diffraction Methods of Structural Biology	11DMSX	Dohnálek	-	2+1 z, zk	-	3
Quantum Optics	12KOP	Richter, Dvořák	-	3+1 z, zk	-	5
Molecular Nanosystems	11MONA	Kratochvílová	2+0 zk	-	2	-
Optical Spectroscopy of Inorganic Solids	11OSAL	Potůček	-	2+0 zk	-	2
Selected Topics in Structure of Condensed Matter	11VPSX	Drahokoupil	-	1+1 z, zk	-	2
Nano-Materials - Preparation and Properties	11NAMA	Kratochvílová	-	2+0 zk	-	2
Resonance Spectroscopy of Solid State	11RSPL	Buryi	2+0 zk	-	2	-

(1) At least one course must be enrolled.

Master's Degree Programme

Solid State Engineering

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Computer Simulation of Condensed Matter	11SIKL	Kalvoda, Sedlák, Drahokoupil	2+2 z, zk	-	4	-
Optical Properties of Solids	11OPTX	Bryknar, Dragounová-Aubrechtová	2+0 zk	-	2	-
Physics of Surfaces and Interfaces	11FPOR	Kalvoda	2+0 zk	-	2	-
Intrinsic Dynamics of Materials	11VDM	Seiner	2+0 zk	-	2	-
Seminar and Educational Trips 3	11SMEX3	Drahokoupil, Kolenko	2+2 z	-	4	-
Master Thesis 1	11DPIP1	Kalvoda	0+10 z	-	10	-
Seminar and Educational Trips 4	11SMEX4	Drahokoupil, Kolenko	-	2+2 z	-	4
Master Thesis 2	11DPIP2	Kalvoda	-	0+20 z	-	20
Optional courses:						
Theory and Construction of Photovoltaic Cells	11PCPC	Pfleger	2+0 zk	-	2	-
Diffraction Analysis of Mechanical Stress	11DAN	Ganev, Kraus	2+0 zk	-	2	-
Neutronography in Material Research	11NMV	Kučeráková, Vratislav	-	2+0 zk	-	2
Smart Materials and Their Applications	11SMAM	Potůček, Sedlák	-	2+0 zk	-	2
Principles and Applications of Optical Sensors	11PAO	Aubrecht	-	2+0 zk	-	2
Magnetic Materials	11MAM	Heczko	2+0 zk	-	2	-
Practical course in optical spectroscopy of solids	11POSPL	Aubrechtová, Potůček	0+4 kz	-	4	-
Laboratory in Macromolecular Crystallography 1, 2	11PMK12	Koval	0+4 kz	0+4 kz	4	4
SEM and Methods of Microbeam Analysis	11SEM	Kopeček	2+0 zk	-	2	-
Practical Aspects of Point Defects Study	11PASD	Buryi	-	2+0 zk	-	2
Physics of Detection and Detectors of Optical Radiation	12FDD	Pína	2+0 zk	-	2	-
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

Master's Degree Programme

Nuclear and Particle Physics

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Quantum Field Theory 1, 2	02KTPA12	Jizba, Štefaňák, Zatloukal	4+2 z, zk	4+2 z, zk	8	8
Modern Detectors	02MTD	Adam	2+0 zk	-	2	-
Statistical Data Analysis 1, 2	02SZD12	Myška	2+2 z, zk	2+2 z, zk	4	4
Seminar 1, 2	02SE12	Bielčík	0+3 z	0+3 z	3	3
Research Project 1, 2	02VUJC12	Bielčík	0+6 z	0+8 kz	6	8
Detector Systems and Data Acquisition	02SDSD	Broz	-	2+0 zk	-	2
Required optional courses type A ⁽¹⁾						
Extreme States of Matter ⁽²⁾	02EXSH	Bielčík, Šumbera	2+0 zk	-	2	-
Physics of Ultrarelativistic Nuclear Collisions ⁽²⁾	02FUJS	Křížiková- Gajdošová	-	2+0 zk	-	2
Accelerators 1, 2 ⁽³⁾	02UC12	Krůs	2+0 zk	2+0 zk	2	2
General Theory of Relativity ⁽⁴⁾	02GTR	Tomášik	2+2 z, zk	-	4	-
Optional courses:						
Workshop 2	02VS2	Bielčík	1 týden z	-	1	-
Special Practicum 1, 2	02SPRA12	Čepila	0+4 kz	0+4 kz	6	6
Seminar on Quark-Gluon Plasma 3, 4	02ROZ34	Bielčík, Bielčíková, Tomášik	2+0 z	2+0 z	2	2
Physics of Atomic Nuclei	02FAJ	Adam, Veselý	-	4+0 zk	-	4
Topics in Theory of Probability for Physicists	02PRF	Šumbera	2+0 z	-	2	-
Astroparticle Physics 1, 2	02ACF12	Vícha	2+0 zk	2+0 zk	2	2
Monte Carlo Method	18MEMC	Jarý, Virius	2+2 z, zk	-	4	-
Selected Topics on Relativistic Nucleus-Nucleus Collisions	02VPJRS	Karpenko, Trzeciak	-	2+1 z, zk	-	3
Object Oriented Programming	18OOP	Virius	0+2 z	-	2	-
Data Science	01DAS	Franc	1+2 kz	-	3	-
Neural Networks and their Application	01NEUR1	Hakl, Holeňa	-	2+0 zk	-	2

(1) At least one of the groups E, I or T must be enrolled.

(2) Courses Experimental (E)

(3) Courses Instrumental (I)

(4) Courses Theoretical (T)

Master's Degree Programme

Nuclear and Particle Physics

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Fundamentals of Electroweak Theory	02ZELW	Bielčíková, Tomášik	3+2 z, zk	-	6	-
Seminar 3, 4	02SE34	Bielčík	0+3 z	0+3 z	3	3
Master Thesis 1, 2	02DPJC12	Bielčík	0+10 z	0+20 z	10	20
Quantum Chromodynamics	02ZQCD	Bielčíková, Tomášik	-	3+2 z, zk	-	6
Optional courses:						
Workshop 3	02VS3	Bielčík	1 týden z	-	1	-
Seminar on Quark-Gluon Plasma 5, 6	02ROZ56	Bielčík, Bielčíková, Tomášik	2+0 z	2+0 z	2	2
Materials in Experimental Nuclear Physics	02MAT	Škoda	2+0 zk	-	2	-
Nuclear Spectroscopy	02JSP	Wagner	-	2+2 z, zk	-	5
Physics behind Standard Model	02BSM	Hubáček	2+0 z	-	2	-
Computer Control of Experiments	17PRE	Kropík	2+1 z, zk	-	3	-
Matrix Lie Group Representations	02REP	Hrivnák	2+0 z	-	2	-
Applied Quantum Chromodynamics at High Energies	02AQCD	Nemčík	-	2+0 zk	-	2
Particle Plasma Accelerators	02LPA	Krůs	-	2+0 zk	-	2
Quantum Many-Body Problem in the Theory of Atomic Nuclei	02KMP	Veselý	2+0 zk	-	2	-
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

**Master's Degree Programme
Nuclear Engineering
Specialization Nuclear Reactors**

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Quantum Physics	02KFM	Jizba	2+1 z, zk	-	3	-
Nuclear Safety	17JABE	Frýbortová, Sklenka	4+0 zk	-	5	-
Research Project 1, 2	16VUJI12	Trojek	0+6 z	0+8 kz	6	8
Advanced Experimental Neutron Physics	17PENF	Huml	-	1+3 kz	-	4
Nuclear Reactor Physics	17FARE	Fejt, Frýbort, Frýbortová	2+2 z, zk	-	4	-
Experimental Reactor Physics	17ERF	Rataj	1+3 kz	-	4	-
Thermohydraulics of Nuclear Reactors	17THYR	Kobylka	-	3+1 z, zk	-	4
Reactor Kinetics and Dynamics	17KID	Huml	-	2+2 z, zk	-	4
Core Physics and Fuel Management	17PRF	Frýbortová, Sklenka	-	2+1 z, zk	-	3
Required optional courses gruppe 1 ⁽⁶⁾						
Nuclear Research Installations	17VYRE	Sklenka, Matoušková	2+2 zk	-	4	-
Stochastic Methods in Reactor Physics	17SMRF	Huml	2+2 kz	-	4	-
Deterministic Methods in Reactor Physics ⁽¹⁾	17DERF	Fejt, Frýbort	-	2+2 kz	-	4
Neutron Activation Analysis ⁽²⁾	17NAA	Štefánik	-	2+2 kz	-	4
Required optional courses gruppe 2 ⁽⁷⁾						
Gamma-ray Spectroscopy	17SPEK	Štefánik	2+2 kz	-	4	-
Materials Science	14NAMA	Čech, Haušild	2+1 kz	-	3	-
Materials Science for Reactors ⁽³⁾	14NMR	Haušild	-	2+0 zk	-	2
Chemistry Programme of Nuclear Power Plants	15PCJE	Drtinová	3+0 z, zk	-	3	-
Optional courses:						
Digital Safety Systems of Nuclear Reactors	17CIBS	Kropík	2+0 z, zk	-	2	-
Economics of Nuclear Power Plants ⁽⁴⁾	17EK	Starý	2+0 zk	-	2	-
Informatics for Modern Physicists ⁽⁵⁾	17IMF	Havlůj	0+3 kz	-	3	-
Nuclear Fuel Cycle	17PALX	Losa, Sklenka, Starý	2+0 zk	-	2	-
Nuclear Legislation in Practice	17ALEP	Drábová	-	2+0 kz	-	2
Design and Equipment of Nuclear Power Plants	17KOJX	Rataj, Zácha	-	3+0 zk	-	3
Team project	17TYPR	Frýbort	2+2 kz	-	4	-

(1) To be enrolled only after passing 17FARE.

(2) To be enrolled only after passing 17SPEK.

(3) To be enrolled only after passing 14NMA

(4) The course can be enrolled only if 17ZEH is not passed.

(5) The course opens for 3 students at least. The enrollment must be performed at least 3 workdays prior to the semester at the latest.

- (6) At least two courses must be enrolled.
- (7) At least one course must be enrolled.

Master's Degree Programme

Nuclear Engineering

Specialization Nuclear Reactors

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Metrology of Ionizing Radiation	16MEIZ	Novotný P., Trojek	2+1 z, zk	-	4	-
Applications of Ionizing Radiation 1	16APIZ1	Čechák, Trojek	3+0 zk	-	3	-
Master Thesis 1, 2	16DPJI12	Trojek	0+10 z	0+20 z	10	20
Applications of Ionizing Radiation 2	17APIZ2	Miglierini, Štefánik	-	2+1 z, zk	-	3
Thermomechanics of Nuclear Fuels	17TERP	Ševeček	2+2 z, zk	-	4	-
Internship in Nuclear Power Plant	17PAJE	Kropfík	1 týden z	-	2	-
New Nuclear Sources	17NJZ	Bílý	3+0 zk	-	3	-
Required optional courses gruppe 1 ⁽⁵⁾						
Safety Analyses of Nuclear Installations	17BAJZ	Fejt, Frýbortová	2+2 kz	-	4	-
Thermohydraulic Design of Nuclear Reactors ⁽¹⁾	17THAR	Kobylka	2+2 zk	-	4	-
Thermomechanical Design of Nuclear Fuels ⁽²⁾	17TNAP	Ševeček	-	2+2 kz	-	4
Accidents in Nuclear Installations ⁽³⁾	17HAV	Fejt, Frýbort, Rýdl	-	2+2 kz	-	4
Required optional courses gruppe 2 ⁽⁶⁾						
Spent Nuclear Fuel and Radioactive Wastes	17VRAO	Losa	3+1 zk	-	4	-
Critical Experiment ⁽⁴⁾	17KEX	Huml, Rataj	1+3 kz	-	4	-
Advanced Experimental Reactor Physics ⁽⁴⁾	17PERF	Huml, Rataj	-	1+3 kz	-	4
Optional courses:						
Simulation of NPP Operational States	17SIPS	Kobylka	-	0+3 kz	-	3
Radiation Protection of Nuclear Facilities	17ROJ	Starý	-	2+0 zk	-	2
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

(1) To be enrolled after passing 17THYR.

(2) To be enrolled after passing 17TERP.

(3) To be enrolled after passing 17JABE.

(4) To be enrolled after passing 17ERF.

(5) At least two courses must be enrolled.

(6) At least one course must be enrolled.

Master's Degree Programme

Physical Electronics

Specialization Laser Physics and Technology

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Electrodynamics 1, 2	12ELDY12	Čtyrokový	2+0 z, zk	4+0 z, zk	3	5
Computational Physics 1	12PF1	Klimo, Kuchařík	2+0 zk	-	2	-
Research Project 1, 2	12VUFL12	Šiňor	0+6 z	0+8 kz	6	8
Optical Physics	12FOPT	Kwiecien	3+0 z, zk	-	3	-
Quantum Electronics	12KVEN	Richter, Dvořák	3+1 z, zk	-	5	-
Open Resonators	12OREZ	Kubeček	2+1 z, zk	-	4	-
Nonlinear Optics	12NOP	Richter	-	3+1 z, zk	-	4
Laser Physics	12FLA	Šulc	-	4+0 z, zk	-	4
Solid-state, Diode and Dye lasers	12PDBL	Jelínková, Kubeček	-	2+0 z, zk	-	2
Computer Control of Experiment	12POEX	Čech, Vyhlídal	-	2+0 z	-	2
Optional courses:						
Statistical Optics	12SOP	Richter	2+0 z, zk	-	2	-
Geometrical Optics	12GOP	Dvořák	-	2+0 kz	-	2
Optical Spectroscopy	12OSP	Michl	-	2+0 kz	-	2
Quantum Optics	12KOP	Richter, Dvořák	-	3+1 z, zk	-	5
Physics of Detection and Detectors of Optical Radiation	12FDD	Pína	2+0 zk	-	2	-
X-ray Photonics	12RFO	Pína	2 zk	-	2	-
Laser Plasma as Source of Radiation and Particles	12LPZ	Nejdl	2+0 zk	-	2	-
Electronics 3	12EL3	Pavel	2+0 zk	-	2	-
Advanced Practicum in Electronics 1, 2	12EP12	Pavel	0+2 kz	0+2 kz	3	3

(1) Enrollment on 12EP12 possible if 12EL3 is enrolled or passed.

Master's Degree Programme

Physical Electronics

Specialization Laser Physics and Technology

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Solid State Physics	11FYPL	Aubrechtová, Kučeráková, Kalvoda	3+1 z, zk	-	4	-
Master Thesis Seminar 1, 2	12DSFE12	Jelínková	0+2 z	0+2 z	2	2
Master Thesis 1, 2	12DPFE12	Jelínková	0+10 z	0+20 z	10	20
Ultra-short Pulse Generation	12UKP	Jelínek, Kubeček	2+0 zk	-	2	-
Advanced Laser Technology Laboratory	12PPLT	Kubeček, Němec	0+4 kz	-	6	-
Gas and X-ray Lasers	12RGL	Jančárek	-	2+0 kz	-	2
Optional courses:						
Electronics for Lasers	12ELA	Pavel	2+0 zk	-	2	-
Advanced Laser Spectroscopy	12PLS	Michl	2+0 zk	-	2	-
Fourier Optics and Optical Signal Processing	12OZS	Kwiecien, Richter	3+0 z, zk	-	3	-
Laser in Medicine	12PLM	Jelínková, Němec	-	4 kz	-	6
Advanced Optical Laboratory	12PPRO	Jančárek	0+4 kz	-	6	-
Laser, Plasma and Bundle Technologies	12LPST	Jančárek, Jelínková	-	2+2 zk	-	4
Fiber Lasers and Amplifiers	12VLS	Peterka	2+0 zk	-	3	-
Measurements Methods in Electronics and Optics	12MMEO	Pína	-	2+0 zk	-	2
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

Master's Degree Programme

Mathematical Physics

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Geometric Methods in Physics 2	02GMF2	Šnobl, Vysoký	-	2+2 z, zk	-	5
Finite Groups and Representations	02GR	Chadzitaskos	2+1 z, zk	-	3	-
Quantum Physics	02KFA	Jex I., Jex M.	-	4+2 z, zk	-	6
Quantum Field Theory 1, 2	02KTPA12	Jizba, Štefaňák, Zatloukal	4+2 z, zk	4+2 z, zk	8	8
Lie Algebras and Lie Groups	02LAG	Šnobl	4+2 z, zk	-	7	-
Research Project 1, 2	02VUMF12	Šnobl, Štefaňák	0+6 z	0+8 kz	6	8
Winter School of Mathematical Physics ⁽¹⁾	02ZS	Hrivnák	1 týden z	-	1	-
Optional courses:						
Quantum Information and Communication	02QIC	Gábris, Štefaňák	3+1 z, zk	-	4	-
Quantum Programming	02QPRGA	Gábris, Yalcinkaya	-	1+1 z	-	3
Functional Analysis 3	01FAN3	Šťovíček	2+2 z, zk	-	5	-
Theory of Random Processes	01NAH	Vybíral	3+0 zk	-	3	-
Variational Methods	01VAM	Beneš	1+1 zk	-	3	-
Advanced Topics of Quantum Theory	02PPKT	Exner	-	2+0 zk	-	2
Graph Theory	01TG	Volec, Pelantová	4+0 zk	-	5	-
Solvable Models of Mathematical Physics ⁽²⁾	02RMMF	Hlavatý	-	2+0 z	-	2
Introduction to Strings 1, 2 ⁽²⁾	02UST12	Hlavatý	2+1 z	2+1 z	3	3
Quantum Optics 1, 2	02KO12	Jex, Potoček	2+2 z, zk	2+2 z, zk	4	4
Open Quantum Systems	02OKS	Novotný	-	2+0 z	-	2

(1) For students of this field only.

(2) These courses alternate with each other. In the academic year 2023/2024 the course 02RMMF takes place.

Master's Degree Programme

Mathematical Physics

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Algebraic Topology	02ALT	Vysoký	2+2 z, zk	-	4	-
Master Thesis 1, 2	02DPMF12	Šnobl, Štefaňák	0+10 z	0+20 z	10	20
Master Thesis Seminar	02DSMF	Hrivnák	-	0+2 z	-	1
Selected Topics in Statistical Physics and Thermodynamics	02VPSFA	Jex, Novotný	4+2 z, zk	-	7	-
Optional courses:						
Relativistic Physics 1, 2	02REL12	Bičák, Semerák	4+2 z, zk	4+2 z, zk	6	6
Quantum Information and Communication	02QIC	Gábris, Štefaňák	3+1 z, zk	-	4	-
Integrability and beyond	02INB	Šnobl, Marchesiello	-	2+0 z	-	2
Physics of Graphene Described by Dirac Equation	02FG	Jakubský	-	2+0 z	-	2
Quantum chemistry	02KCH	Jex M.	2+1 z, zk	-	3	-
Quantum Groups 1	01KVGR1	Burdík	2+0 z	-	2	-
Mathematical Modelling of Non-linear Systems	01MMNS	Beneš	1+1 zk	-	3	-
Quantum Circle 1, 2	02KVK12	Exner	0+2 z	0+2 z	2	2
Solvable Models of Mathematical Physics ⁽¹⁾	02RMMF	Hlavatý	-	2+0 z	-	2
Introduction to Strings 1, 2 ⁽¹⁾	02UST12	Hlavatý	2+1 z	2+1 z	3	3
Geometrical Aspects of Spectral Theory	01SPEC	Krejčířík	-	2+0 zk	-	2
Coxeter Groups	02COX	Hrivnák	2+0 z	-	2	-
Asymptotical Methods	01ASY	Mikyška	2+1 z, zk	-	3	-
Symmetry Groups of Quantum Systems	02GSKS	Tolar	2+0 zk	-	2	-
Seminar on Quantum Field Theory	02SKTP	Jizba	-	2+1 z	-	3

(1) These courses alternate according to regulations of the department. In the academic year 2023/2024 the course 02RMMF takes place.

Master's Degree Programme

Physical Electronics

Specialization Computational Physics

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Electrodynamics 1, 2	12ELDY12	Čtyrokový	2+0 z, zk	4+0 z, zk	3	5
Computational Physics 1	12PF1	Klimo, Kuchařík	2+0 zk	-	2	-
Research Project 1, 2	12VUFL12	Šiňor	0+6 z	0+8 kz	6	8
Differential Equations on Computer	12DRP	Liska	2+2 z, zk	-	5	-
Parallel Algorithms and Architectures	01PAA	Oberhuber	-	2+1 kz	-	4
Inertial Fusion Physics	12FIF	Klimo, Limpouch	3+1 z, zk	-	4	-
Computational Physics 2	12PF2	Klimo, Kuchařík	-	1+1 z, zk	-	2
Finite Element Method	01MKP	Beneš	-	1+1 zk	-	3
Fundamentals of Laser-Plasma Physics	12ZFLP	Klimo, Pšikal	-	2+0 zk	-	2
Digital Image Processing	01DIZO	Flusser, Zitová	-	2+2 zk	-	4
Optional courses:						
Object Oriented Programming	18OOP	Virus	0+2 z	-	2	-
Computer Simulations in Physics of Many Particles 1, 2	12SFMC12	Předota, Houdek	3+1 z, zk	2+0 zk	4	2
Quantum Electronics	12KVEN	Richter, Dvořák	3+1 z, zk	-	5	-
Quantum Optics	12KOP	Richter, Dvořák	-	3+1 z, zk	-	5
Laser Plasma as Source of Radiation and Particles	12LPZ	Nejdl	2+0 zk	-	2	-
Variational Methods	01VAM	Beneš	1+1 zk	-	3	-
Introduction to Mainframe	01UMF	Oberhuber	1+1 z	-	2	-
Mathematical Methods in Fluid Dynamics	01MMDY	Strachota	2+0 zk	-	2	-
Numerical Methods in Fluid Dynamics	01NMDT	Strachota	-	2+0 zk	-	2
Introduction to Computer Security 2	01ZPB2	Vokáč	1+1 z	-	2	-
Graph Theory	01TG	Volec, Pelantová	4+0 zk	-	5	-
Quantum Information and Communication	02QIC	Gábris, Štefaňák	3+1 z, zk	-	4	-

Master's Degree Programme

Physical Electronics

Specialization Computational Physics

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Solid State Physics	11FYPL	Aubrechtová, Kučeráková, Kalvoda	3+1 z, zk	-	4	-
Master Thesis Seminar 1, 2	12DSFE12	Jelínková	0+2 z	0+2 z	2	2
Master Thesis 1, 2	12DPFE12	Jelínková	0+10 z	0+20 z	10	20
Atomic Physics	12AF	Šiňor	4+0 z, zk	-	4	-
Robust Numerical Algorithms	12RNA	Váchal	1+1 z	-	2	-
Optional courses:						
Monte Carlo Method	18MEMC	Jarý, Virius	2+2 z, zk	-	4	-
Mathematical Modelling of Non-linear Systems	01MMNS	Beneš	1+1 zk	-	3	-
X-ray Photonics	12RFO	Pína	2 zk	-	2	-
Mathematical Logic	01MAL	Čintula	2+1 z, zk	-	4	-
Laser Plasma as Source of Radiation and Particles	12LPZ	Nejdl	2+0 zk	-	2	-
Machine Learning 1	01SU1	Flusser	2+1 zk	-	3	-
Nonlinear Optics	12NOP	Richter	-	3+1 z, zk	-	4
Neural Networks and their Application	01NEUR1	Hakl, Holeňa	-	2+0 zk	-	2
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

Master's Degree Programme

Quantum Technologies

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Quantum Information and Communication	02QIC	Gábris, Štefaňák	3+1 z, zk	-	4	-
Quantum Optics 1, 2	02KO12	Jex, Potoček	2+2 z, zk	2+2 z, zk	4	4
Quantum Field Theory 1, 2	02KTPA12	Jizba, Štefaňák, Zatloukal	4+2 z, zk	4+2 z, zk	8	8
Quantum Generators of Optical Radiation 1	12KGOZ1	Jelínek, Jelínková, Němec	2+0 zk	-	2	-
Quantum Generators of Optical Radiation 2	12KGOZ2	Šulc	-	2+2 z, zk	-	4
Theory of Solid State 1, 2	11TPLQ12	Hamrle, Seiner	2+2 z, zk	2+2 z, zk	4	4
Research Project 1, 2	02VUQT12	Hamrle, Štefaňák, Šulc	0+6 z	0+8 kz	6	8
Optional courses:						
Information Theory	01TIN	Hobza	2+0 zk	-	2	-
Graph Theory	01TG	Volec, Pelantová	4+0 zk	-	5	-
Quantum Programming	02QPRGA	Gábris, Yalcinkaya	-	1+1 z	-	3
Open Quantum Systems	02OKS	Novotný	-	2+0 z	-	2
Matrix Lie Group Representations	02REP	Hrivnák	2+0 z	-	2	-
Statistical Data Analysis 1, 2	02SZD12	Myška	2+2 z, zk	2+2 z, zk	4	4
Accelerators 1, 2	02UC12	Krůs	2+0 zk	2+0 zk	2	2
Advanced C++	18PCP	Virus	-	2+2 z, zk	-	4
Object Oriented Programming	18OOP	Virus	0+2 z	-	2	-
Monte Carlo Method	18MEMC	Jarý, Virus	2+2 z, zk	-	4	-
Superconductivity and Low Temperature	11SUPR	Janů, Ledinský	4+0 zk	-	4	-
Molecular Nanosystems	11MONA	Kratochvílová	2+0 zk	-	2	-
Nano-Materials - Preparation and Properties	11NAMA	Kratochvílová	-	2+0 zk	-	2
Statistical Optics	12SOP	Richter	2+0 z, zk	-	2	-
Nonlinear Optics	12NOP	Richter	-	3+1 z, zk	-	4

Master's Degree Programme

Quantum Technologies

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Quantum Field Theory 3	02KTPA3	Jizba, Zatloukal	4+2 z, zk	-	8	-
Master Thesis 1, 2	02DPQT12	Hamrle, Štefaňák, Šulc	0+10 z	0+20 z	10	20
Optional courses:						
Selected Topics in Statistical Physics and Thermodynamics	02VPSFA	Jex, Novotný	4+2 z, zk	-	7	-
Seminar on Quantum Field Theory	02SKTP	Jizba	-	2+1 z	-	3
Quantum Circle 1, 2	02KVK12	Exner	0+2 z	0+2 z	2	2
Quantum Chemistry	02KCH	Jex M.	2+1 z, zk	-	3	-
Physics of Graphene Described by Dirac Equation	02FG	Jakubský	-	2+0 z	-	2
Physics of Detection and Detectors of Optical Radiation	12FDD	Pína	2+0 zk	-	2	-
Open Resonators	12OREZ	Kubeček	2+1 z, zk	-	4	-
X-ray Photonics	12RFO	Pína	2 zk	-	2	-
Ultra-short Pulse Generation	12UKP	Jelínek, Kubeček	2+0 zk	-	2	-
Selected Chapters of Modern Optics	12MODO	Kwecien, Marešová	2+0 z	-	2	-
Nanophysics	12NF	Šiňor, Richter	1+1 zk	-	2	-
Nonlinear Optics	12NOP	Richter	-	3+1 z, zk	-	4
Quantum Chromodynamics	02ZQCD	Bielčíková, Tomášik	-	3+2 z, zk	-	6
Fundamentals of Electroweak Theory	02ZELW	Bielčíková, Tomášik	3+2 z, zk	-	6	-
Computer Simulation of Condensed Matter	11SIKL	Kalvoda, Sedlák	2+2 z, zk	-	4	-
Physics of Surfaces and Interfaces	11FPOR	Kalvoda	2+0 zk	-	2	-
Optical Properties of Solids	11OPTX	Bryknar, Potůček	2+0 zk	-	2	-
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-