ČVUT

ČESKÉ VYSOKÉ
UČENÍ TECHNICKÉ
V PRAZE

Czech Technical University in Prague

Curricula 2024—2025

Faculty of Nuclear Sciences and Physical Engineering

CONTENT

FACULTY OF NUCLEAR SCIENCES AND PHYSICAL ENGINEERING

CZECH TECHNICAL UNIVERSITY IN PRAGUE

The Faculty of Nuclear Sciences and Physical Engineering (FNSPE) was established in 1955, as part of the Charles University, but in 1959 became a new special faculty of the Czech Technical University in Prague. The establishment of the Faculty was connected with the beginning of a new era of the peaceful use of nuclear energy. A complex approach to all nuclear branches was intended, so specialists from universities, technological institutions, and industry were brought together to comply with this task. Later, newly developed areas of physics application, e.g. plasma and solid state physics, lasers, cosmic research were included in the Faculty curricula.

The characteristics of the Faculty activities developed during its history, and the most advanced areas of technological progress have always attracted its attention. Students with a special interest in mathematics were taught individually, and, subsequently, the study of mathematical engineering was established. In the last fifteen years the rapidly developing branches of mathematical and software engineering, interdisciplinary application to ecology, medicine, economy, archeology have been also evolved. The Faculty is equipped with several large research facilities, such as the VR-1 training nuclear reactor, scanning electron microscopes, high power laser systems, computational and advanced radiochemical laboratories, and satellite laser ranging station (Helwan, Egypt).

ANNUAL ACADEMIC CALENDAR 2024 – 2025

ACADEMIC YEAR	Sep 23 2024 – Sep 21 2025
ENROLLMENT	
Aug 28 - Aug 30 2024	1st year of bachelor's program
Aug 1 – Sep 22 2024	higher years
Sep 9 2024	self-payers
Sep 16 – Sep 20 2024	Orientation Week
WINTER SEMESTER	
Oct 4 2024	Commencement Ceremony for new students
Sep 23 2024 – Dec 20 2024	scheduled classes (13 weeks)
Dec 23 2024 – Jan 5 2025	winter holidays
Jan 6 2025 – Feb 16 2025	examination period
until Nov 30 2024	applications for February final examinations
until Jan 6 2025	theses submission for February final examinations
until Jan 17 2025	closure of study results for February final examinations
Jan 27 – Feb 7 2025	February final examinations
SUMMER SEMESTER	
Jan 13 – Feb 16 2025	enrollment to summer semester
Feb 17 – May 16 2025	scheduled classes (13 weeks)
May 19 – May 23 2025	additional classes
May 26 – Jun 29 2025	examination period
Jun 30 – Aug 31 2025	summer holidays
Sep 1 – Sep 19 2025	extended examination period
until Mar 31 2025	applications for June final examinations
until May 9 2025	theses submission for June final examinations
until May 23 2025	closure of study results for June final examinations
until May 31 2025	applications for September final examinations
until Aug 4 2025	theses submission for September final examinations
until Aug 15 2025	closure of study results for September final examinations
Jun 2 – Jun 13 2025	June final examinations
Aug 25 – Sep 5 2025	September final examinations
May 14 2025	Rector's Day

Approved by the management of the FNSPE CTU in Prague on March 20, 2024.

CZECH TECHNICAL UNIVERSITY IN PRAGUE

MEMBERS OF THE TOP MANAGEMENT OF CTU

Rector	doc. RNDr. Vojtěch Petráček, CSc.
Vice-rectors	doc. Dr. Ing. Gabriela Achtenová Vice-Rector for Bachelor and Master Studies
	prof. Ing. Zbyněk Škvor, CSc. Vice-Rector for Science, Creative Activities and PhD Studies
	prof. Ing. Oldřich Starý, CSc. Vice-Rector for International Relations
	Ing. Veronika Kramaříková, MBA Vice-rector for Development and Strategy
	prof. Ing. Alena Kohoutková, CSc. FEng Vice-Rector for Construction
	Ing. Radek Holý, Ph.D. Vice-Rector for Quality Management
Registrar	Mgr. Jiří Špelina
Chancellor	Ing. Lucie Orgoníková

FACULTY OF NUCLEAR SCIENCES AND PHYSICAL ENGINEERING

https://fjfi.cvut.cz/en/

GOVERNANCE AND ACADEMIC BODIES

Dean	doc. Ing. Václav Čuba, Ph.D.
Vice-deans	prof. Mgr. Milan Krbálek, Ph.D. Vice-dean for Student Affairs
	prof. Dr. Ing. Petr Haušild Vice-dean for Science and Research
	doc. Ing. Jan Čepila, Ph.D. Vice-dean for Development
	doc. RNDr. Jan Vybíral, Ph.D. Vice-dean for Public Relations
Secretary	Mgr. Alena Králová
Ombudsman	Bc. Radka Mika Havlíková

SCIENTIFIC BOARD

Chair	doc. Ing. Václav Čuba, Ph.D., Dean of the Faculty
Internal members	prof. Dr. Ing. Petr Haušild
	prof. Ing. Igor Jex, DrSc.
	prof. Ing. Jan John, CSc.
	prof. Ing. Ivan Richter, Dr.
	doc. Ing. Ladislav Kalvoda, CSc.
	doc. Ing. Jaromír Kukal, Ph.D.
	prof. Ing. Jiří Kunz, CSc.
	prof. Ing. Ladislav Musílek, CSc.
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	Ing. Marie Davídková, Ph.D. (SÚRO, v.v.i.)
	Ing. Dana Drábová, Ph.D., dr. h. c. (SÚJB)
	Ing. Jiří Hejtmánek, CSc. (FZÚ AV ČR, v.v.i.)
	prof. Ing. Aleš Helebrant, CSc. (FCHT VŠCHT)
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	doc. Ing. Jan Mareš, Ph.D. (FCHI VŠCHT)

ACADEMIC SENATE

Academic staff:

Ing. Kamil Augsten, Ph.D.

Ing. Josef Blažej, Ph.D.

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Mgr. Miloslava Čechová

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Ing. Dušan Kobylka, Ph.D.

Mgr. Dana Majerová, Ph.D.

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Ing. Pavel Strachota, Ph.D.

Ing. Matěj Tušek, Ph.D.

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Beáta Hrdličková

David Chudožilov

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DEAN'S OFFICE – ADMINISTRATIVE DEPARTMENTS

The Dean's office is the executive body of the Faculty. It is responsible for Faculty operations, including its economy, management issues, and business activities. The Dean's Office is headed by the Faculty Secretary.

STUDY OFFICE

The department is responsible for administering academic matters for all bachelor and master students from the time they are admitted until they graduate as well as for reviewing the Faculty's activities. The department is responsible to the Vice-dean for Student Affairs.

Department of Student Affairs in Prague

Tuesday	from 9.00 a.m. to 11.30 a.m.	
Wednesday	from 9.00 a.m. to 11.30 a.m.	from 1.00 p.m. to 3.00 p.m.
Thursday		from 1.00 p.m. to 3.00 p.m.

Department of Student Affairs in Děčín

Monday to Friday	from 8:30 a.m. to 11:00 a.m

Department of Science, Research, and International Relations

The department is responsible for the agenda of Doctoral Programme students. It also administers business trips and study trips abroad for students and employees, visits of foreign guests, and, with the respective departments, records international contracts, grant applications, awarded grants, and publications. It also prepares all documents for regular meetings of the Scientific Board (endowment and professorship procedures), appointments for the State Doctoral Examination Board, approval of supervisors, etc.

Opening hours for PhD students

Monday	from 9.00 a.m. to 11.00 a.m.	from 1.00 p.m. to 3.00 p.m.
Wednesday	from 9.00 a.m. to 11.00 a.m.	from 1.00 p.m. to 3.00 p.m.

THE LIBRARY / READING ROOM IS OPEN

Monday	from 9:00 a.m. to 4:00 p.m.
Tuesday	from 9:00 a.m. to 12:00 p.m., 1:00 p.m. to 4:00 p.m.
Wednesday	from 9:00 a.m. to 6:00 p.m.
Thursday	from 9:00 a.m. to 12:00 p.m., 1:00 p.m. to 4:00 p.m.
Friday	from 9:00 a.m. to 12:00 p.m.

THE BOX OFFICE IS OPEN

Monday to Thursday	from 10.00 a.m. to 11.00 a.m. from 2.00 p.m. to 3.00 p.m.
Friday	from 10.00 a.m. to 11.00 a.m.

LIST OF DEPARTMENTS

DEPARTMENT	ABBREVIATION	CODE
Department of Mathematics	KM	01
Department of Physics	KF	02
Department of Human Sciences and Languages	KJ	04
Department of Solid State Engineering	KIPL	11
Department of Laser Physics and Photonics	KLFF	12
Department of Materials	KMAT	14
Department of Nuclear Chemistry	KJCH	15
Department of Dosimetry and Application of Ionising Radiation	KDAIZ	16
Department of Nuclear Reactors	KJR	17
Department of Software Engineering	KSI	18

DEPARTMENTS

14101 DEPARTMENT OF MATHEMATICS - KM

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Department Secretary	Ing. Pavel Strachota, Ph.D.
Department Assistant	Bc. Ivana Kukalová
Academic staff	prof. Dr. Ing. Michal Beneš prof. RNDr. Čestmír Burdík, DrSc. prof. Ing. Jan Flusser, DrSc. prof. Ing. Miloslav Havlíček, DrSc. prof. Ing. Václav Klika, Ph.D. prof. Mgr. Milan Krbálek, Ph.D. prof. Mgr. David Krejčiřík, Ph.D., DSc. prof. Ing. Zuzana Masáková, Ph.D. prof. Ing. Jiří Mikyška, Ph.D. prof. Ing. Edita Pelantová, CSc. prof. Ing. Pavel Šťovíček, DrSc. prof. RNDr. Jan Vybíral, Ph.D. doc. Ing. Ľubomíra Dvořáková, Ph.D. doc. Ing. Radek Fučík, Ph.D. doc. Ing. Tomáš Hobza, Ph.D. doc. Ing. Tomáš Oberhuber, Ph.D. doc. Ing. Severin Pošta, Ph.D. doc. Ing. Matěj Tušek, Ph.D. Ing. Petr Ambrož, Ph.D. Ing. Jiří Franc, Ph.D. Ing. Miroslav Kolář, Ph.D. Ing. Václav Kůs, Ph.D. Ing. Pavel Strachota, Ph.D. Ing. František Štampach, Ph.D. Mgr. Jan Volec, Ph.D. Ing. Zdeněk Čulík

	Mgr. Maksym Dreval
	Ing. Petr Vokáč
Administrative staff and technicians	Pavel Kerouš

The Department of Mathematics is responsible for all courses in mathematics for all fields of study. Students gain an in-depth knowledge of mathematical analysis, linear algebra in courses of three levels of difficulty: A, B, or C called Mathematics. They also acquire the basics of computer literacy. Further courses comprise: ordinary and partial differential equations, numerical methods, theory of probability and mathematical statistics.

The Department of Mathematics comprises four research teams (groups)

GAMS - Group of Applied Mathematics and Stochastics is involved in studies of physical, biological, and social systems; methods in mathematical statistics; mathematical calculus and analysis; and theory of probability. They are especially concerned with statistical analysis of data, formulation of theoretical transport models and searching for relevant analytical solutions, mathematical methods in defectoscopy, probabilistic estimates of small social groups, study of the phenomenon known as Φ-divergence, mathematical models of pedestrian movement, panic models, and others.

MAFIA - Group of Methods of Algebra and Functional Analysis in Applications is involved in mathematical physics research. It is focused mainly on problems of interest in terms of both mathematics and physics. The main research topics are: Lie and Hopf algebras, Hilbert space operators, integratable systems, solvable models of quantum physics, time-dependent quantum systems and perturbative methods in both classical and quantum mechanics.

MMG - Mathematical Modelling Group is concerned with mathematical modelling and simulations of complex phenomena in high-tech design, protection of the environment, and computer science. The group divides the responsibility between research and development and training young experts in mathematical engineering, is also successful in cooperating with prestigious universities and institutions and industrial companies worldwide.

TIGR - Activities of the Theoretical Informatics Group are devoted to current issues of discrete mathematics and applications to informatics and physics, such as non-standard representation of real numbers, combinatorics of words, and aperiodic tiling of space. Currently, the main focus is on combinatorial, algebraic and numeral theoretical numeral tasks with applications in theoretical informatics.

14102 DEPARTMENT OF PHYSICS - KF

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	Ing. Vojtěch Svoboda, CSc.
	Barbara Antonina Trzeciak, Ph.D.
	Ing. Jan Vysoký, Ph.D.
	RNDr. Vladimír Wagner, CSc.
	Ing. Libor Škoda
Professional staff	prof. RNDr. Pavel Exner, DrSc.
	RNDr. Jana Brotánková, Ph.D.
	Dr. Iurii Karpenko
	Ing. Ondřej Ficker, Ph.D.
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	Ing. Michal Marčišovský, Ph.D.
	Ing. Marek Matas, Ph.D.
	Ing. Oliver Matonoha, Ph.D.
	Ing. Radek Novotný, Ph.D.
	Ing. Filip Petrásek, Ph.D.
	Ing. Josef Schmidt, Ph.D.
	Ing. Peter Švihra, Ph.D.
	Ing. Pavel Vančura, Ph.D.
	Ing. Václav Zatloukal, Ph.D.
	Ing. Zdenko Janoška, Ph.D.
	Iskender Yalcinkaya Ph.D.
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	Ing. Jakub Jirsa
	Ing. Anežka Kabátová
	Ing. Vladimír Kafka
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	Ing. Anhelina Kostina
	Bc. Denis Lednický
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	Ing. Pavel Staněk
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	Ing. Matěj Vaculčiak
Administrative staff and technicians	Mgr. Zdeňka Císlerová
	Ing. Martin Himmel
	Monika Mikšovská
	Lucie Tomášová
	Ing. Barbora Janošková

The Department of Physics offers basic courses in physics, physics labs for bachelor students, and physics courses following the core course. The body of physics knowledge from the core course in physics is essential for higher courses attended at departments training students for their chosen specialisation.

Research in the department is focused on many problems of mathematical physics, quantum information and communication, nuclear and particle physics, as well as plasma and tokamak physics. Department members and their students cooperate with many leading scientific centres in Europe and in the world, including CERN and BNL. Thus, students can join young dynamic teams with a strong professional outlook, also outside the academic milieu. To do science and teach, the Department operates its own fusion reactor (tokamak) called Golem and Centre of Advanced Detection Systems Development, Doppler Institute of Theoretical Physics and Centre of Relativistic and Ultra-Relativistic Nuclear Collisions Physics are also affiliated with the Department.

14104 DEPARTMENT OF HUMANITIES AND LANGUAGES - KHVJ

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The Department of Humanities and Languages is responsible for running modern languages courses for specific professional and academic purposes for students attending all academic programmes (i.e. Bachelor, Master and Doctoral) at the Faculty. The bachelor language courses are provided in two languages, at three levels, from complete beginners (Spanish, French, and Russian – 5 semesters) through intermediate to advanced in German and English (3 semesters, also with native speakers). In addition, the Department runs professional extended English courses in the three-year Applied Information Technology course. The final bachelor project is then submitted and defended in English and students should demonstrate their high-level proficiency in speaking and writing in English; the student must demonstrate their ability to express their own ideas fluently in a foreign language.

In addition to modern languages, the Department offers specialised courses for foreign students, namely Czech for intermediate students running for 3 semesters.

In addition to teaching, the Department members prepare up-to-date language instruction materials for academic and professional purposes and provide editing consultations and services for academic staff.

14111 DEPARTMENT OF SOLID STATE ENGINEERING - KIPL

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	Ing. Kristýna Zoubková
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	Miroslav Pleninger
	Milena Uhmannová

The Department educates specialists in physical engineering, specifically in solid state engineering. Their study combines solid theoretical foundations in mathematics and physics with experimental and engineering courses. Students will become familiar with key concepts in modern theoretical and experimental physics of condensed matter, applied optics, nuclear physics, and electronics. Within the master's course, they build on their bachelor course foundations, adding to them quantum theory of solid matter and physical systems: superconductors and their theory; low temperature physics; dielectric and semiconductor materials physics; biological structures; or "smart" materials. The courses are also focused on many other disciplines, for example, technology and analysis of semiconductors, development of optical fibre sensors and special photonic materials, application of dielectric crystals, use of special diffraction techniques for material testing, use of databases providing information on material research or mathematical modelling of structures, properties, physical phenomena and technological processes.

The scientific and research activities of the department concentrate in specialised scientific centres - laboratories involved in both fundamental and applied research. Courses in all study programmes (Bachelor, Master, Doctoral) are closely linked with research projects of the department's laboratories and are involved in cooperation with research and educational institutions from the Czech Republic and abroad.

14112 DEPARTMENT OF LASER PHYSICS AND PHOTONICS – KLFF

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	Ing. Dominka Jochcová
	Ing. Matěj Klíma, Ph.D.
	Luca Mascaretti, MSc., Ph.D.
	Ing. Jaroslav Nejdl, Ph.D.
	Ing. Michal Nevrkla, Ph.D.
	Ing. Richard Švejkar, Ph.D.
	Ing. Milan Burda
	Ing. Lubomír Hudec
	Ing. Kryštof Kadlec
	Ing. Karel Kouba
	Ing. Jan Kratochvíl
	Ing. Jiří Löffelmann
	Ing. Lucie Marešová
	Ing. Jan Olšan
	Ing. Adam Říha
	Ing. Karel Veselský
Administrative staff and technicians	Josef Brzák
	Daniel Hausenblas
	Dita Pokorná

Due to the wide scope of the Department's educational programme students receive general foundations in applied physics as well as a broader knowledge of and experimental experience in the physics and technology of lasers, both classical and quantum electronics, modern optics, optoelectronics, microelectronics, nanostructures and advanced technologies, holography, in technology and applications of ion beams, etc.

The Department offers students well-equipped laboratories with modern experimental and computational technologies as well as laboratories for hands-on training of electronics, optoelectronics and optics, and laser instrumentation, as well as to computer laboratories (with PCs and workstations) that can be used throughout the week, round-the-clock. Student projects often develop new propositions in fundamental research mainly in optical processing of signals, meta-materials, X-ray diffraction optics, etc.

14114 DEPARTMENT OF MATERIALS - KMAT

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Professional staff	Ing. Jan Adámek Ing. Kateřina Jiroušková doc. Ing. Radek Mušálek, Ph.D.
Administrative staff and technicians	Jiří Švácha

Courses offered by the Department are firmly anchored in general foundations of mathematics and physics, upon which higher advanced courses can develop knowledge of solid state physics, applied mechanics, fracture mechanics as well as other physical and mathematical disciplines. Considerable emphasis is placed on training in experimental methods for studying properties of materials. Students also acquire knowledge and skills needed for creative use of computer technology. The professional profile of future graduates is based on early involvement in solving research problems for the Department and research institutions.

Scientific and research activities of the Department in fundamental research and research in cooperation with industry arise from a complex approach towards the study of fatigue properties of bodies and structures, comprising physical and metallurgical aspects, application of fracture mechanics, mathematical modelling of stress and strain fields, research of fatigue processes in micro-volumes and probabilistic approach towards the study of systems reliability. Part of the department is also the fractography laboratory workplace with the prestigious status of being the authorised testing facility for the Czech aviation industry and research.

14115 DEPARTMENT OF NUCLEAR CHEMISTRY - KJCH

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Emeritus Academic staff memeber	doc. Ing. Karel Štamberg, CSc.
Professional staff	doc. Merja Johanna Herzig, Ph.D. Mgr. Lucie Baborová, Ph.D. Ing. Xenie Popovič, Ph.D. Ing. Marta Burešová Ing. Miriam Mindová Ing. Lukáš Ondrák Ing. Kateřina Ondrák Fialová Ing. Tomáš Prášek Ing. Michal Sakmár Ing. Kristýna Havlinová Ing. Jan Král Ing. Tereza Janská Ing. Ondřej Holas Ing. Jan Houzar Mgr. Petros Leivadaros

Administrative staff and technicians	Ing. Šárka Hráčková Mgr. Štěpánka Maliňáková Alena Matyášová Olga Múčková Jana Steinerová Martin Šácha

For Bachelor Programme graduates, the Department's curriculum provides sufficiently broad foundations in mathematics and physics, as well as and in the theoretical and applied knowledge of all fundamental fields of chemistry, i.e. physical, inorganic, analytical, general, and organic chemistry and in biochemistry. Based on these foundations, the specialised nuclear chemistry disciplines of student´s choosing are then developed in the Continuation Master Course, i.e. applied nuclear chemistry, environmental chemistry, and radioecology, or nuclear chemistry for biology and medicine. The Department also offers Doctoral Programme courses and organises specialised Lifelong Learning courses even at an international level in cooperation with other Faculty departments, national institutions, or European structures.

Science and research of the Department are focused on radioecology, research into radionuclides and the behaviour of trace elements in the environment, separation of radionuclides and heavy metals, radioanalytical chemistry, radiopharmaceutical chemistry, waste management and application of radiation chemistry methods, modelling of separation and migration processes, and use of radionuclides and ionizing radiation in research.

14116 DEPARTMENT OF DOSIMETRY AND APPLICATION OF IONIZING RADIATION - KDAIZ

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Professional staff	Ing. Aneta Dušková MSc. Andrej Gvozdic Ing. Tereza Hanušová, Ph.D. Ing. Anna Jelínek Michaelidesová, Ph.D. Ing. Martin Kaschner Ing. Irena Koniarová, Ph.D. Ing. Ondřej Kořistka Bc. Zbyněk Král Ing. Karolína Lavičková Ing. Vladimír Linhart, Ph.D. Ing. Jiří Martinčík, Ph.D. Ing. Josef Novotný, Ph.D. Ing. Pavel Novotný, Ph.D. Ing. Kateřina Pilařová, Ph.D. Mgr. Václav Procházka, Ph.D. Mgr. Hana Průšová, Ph.D. Ing. Václav Štěpán, Ph.D. Ing. Jiří Trnka, Ph.D.

Administrative staff and technicians	Ing. Zuzana Augstenová
	Petra Urbanová
	Simona Možnarová
	Vladimír Němec

Courses offered by the Department put considerable emphasis on experimental nuclear physics and technology, personal dosimetry, environmental issues, dosimetry of nuclear power facilities, radiation metrology, applications of ionizing radiation in science, technology, medicine and other fields using radiation sources or radionuclides. Significant attention is also paid to the use of computational methods in monitoring interactions of radiation with matter and to the evaluation of biological effects of radiation based on determination of relevant dosimetric quantities.

The Department staff are involved in solving fundamental and applied research projects both on dosimetry and radiation protection and on specialised areas of ionising radiation. Members of the Department also closely cooperate in teaching and R&D activities with other universities, research institutes in the Czech Republic as well as abroad.

14117 DEPARTMENT OF NUCLEAR REACTORS - KJR

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Department Assistant	Zdeňka Chaberová Romana Šimonová
Academic staff	prof. Ing. Bedřich Heřmanský, CSc. prof. Ing. Marcel Miglierini, DrSc. doc. Ing. Martin Kropík, CSc. doc. Ing. Ľubomír Sklenka, Ph.D. doc. Ing. Milan Štefánik, Ph.D. Ing. Tomáš Bílý, Ph.D. Ing. Martin Cesnek, Ph.D. Ing. Filip Fejt, Ph.D. Ing. Jan Frýbort, Ph.D. Ing. Lenka Frýbortová, Ph.D. Ing. Ondřej Huml, Ph.D. Ing. Dušan Kobylka, Ph.D. Ing. Jan Rataj, Ph.D. Ing. Martin Ševeček, Ph.D. Ing. Miloš Tichý, CSc.
Professional staff	Ing. Evžen Losa, Ph.D. Ing. Adam Kecek, Ph.D. Ing. Ján Kozic Ing. Jana Matoušková, Ph.D. Ing. Ondřej Novák, Ph.D. Ing. Sebastian Nývlt Ing. Radovan Starý Ing. Pavel Suk Bc. Linda Keltnerová Bc. Ondřej Lachout Bc. Jakub Mátl Bc. Josef Sabol

	Bc. Michaela Svatošová
Project management	Alena Šedlbauerová
Administrative staff and technicians	Vojtěch Fornůsek Jan Hrubý Marek Šedlbauer

Students will acquire knowledge of the fundamentals of physics, mathematics and computer science (IT) disciplines, and, in the advanced courses, of nuclear techniques used in nuclear power engineering and of ionizing radiation protection. While still on the Bachelor Programme, students can head towards careers in nuclear power engineering or in theoretical studies through the choice of appropriate optional courses, which gives them an advantage when entering the Continuation Master Programme. In these courses, they study advanced topics of neutron physics and thermohydraulics focused on the theory, design and operation of nuclear reactors. Moreover, they also gain practical engineering knowledge of the construction and operation of nuclear facilities. Attendance of theoretical courses is supplemented with experimental training in the Department´s laboratories, and hands-on training on the training reactor VR-1.

Scientific activities of the Department are focused on a broad spectrum of issues of nuclear power engineering. They cover theoretical and experimental reactor physics, safety of nuclear facilities or computational tools for nuclear reactor analyses. The Department staff is also concerned with advanced nuclear reactors, nuclear fuel cycles, spent nuclear fuel, and design and test control and safety systems of nuclear reactors. Finally, the Department members study thermohydraulics of nuclear reactors and thermomechanics of nuclear fuels.

Further, the department organises utilisation of the VR-1 training reactor. The reactor is used in the education of students from the faculty as well as from another ca 12 faculties in the Czech Republic. Technical visits are organised for high school students. Regularly, reactor physics courses are organised for foreign universities. As, well training courses for NPP staff are being carried out.

14118 DEPARTMENT OF SOFTWARE ENGINEERING - KSI

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Department Assistant (Děčín)	Dana Landovská
Department Secretary (Prague)	Ing. Jakub Klinkovský, Ph.D.
Department Secretary (Děčín)	Bc. Josef Drobný
Academic staff	doc. Ing. Jaromír Kukal, Ph.D. doc. Ing. Vojtěch Merunka, Ph.D. doc. Ing. Quang Van Tran, Ph.D. doc. Ing. Miroslav Virius, CSc. Ing. Adam Borovička, Ph.D. Mgr. Jiří Fišer, Ph.D. Ing. Kateřina Horaisová, Ph.D. Ing. Vladimír Jarý, Ph.D. RNDr. Petr Kubera, Ph.D. Mgr. Dana Majerová, Ph.D. Ing. Josef Nový, Ph.D. RNDr. Zuzana Petříčková, Ph.D.
Professional staff	Ing. Mgr. Radek Hřebík, Ph.D.
Research and Development Workers	Ing. Pavel Eichler, Ph.D. Ing. Jakub Klinkovský, Ph.D. Ing. Michal Moc Ing. Jakub Solovský, Ph.D.
Library Worker (Děčín)	Helena Hauzírková

The Department leads courses in the field of computer science, mainly related to areas of scientific computing and data processing, optimization, machine learning and artificial intelligence. The Department's study programme Applied Informatics in Natural Sciences provides students strong interdisciplinary knowledge and connection from computer science to other fields, especially applied physics. The future graduates are trained with emphasis on

successful application of theoretical knowledge to solving practical problems using modern methods and technologies that are suitable in particular cases.

The Department is based in Prague as well as in Děčín where it operates, for example, a 3D printing lab. The Department collaborates with several domestic as well as international academic institutions, companies, medical centers, and public administration institutions. Several members of the department participate in LHC experiments at CERN as software support specialists. Members of this team are responsible for the smooth running of one of the largest database systems, which must be able to process and store high-volume real-time data. Another research objective of the Department is an early diagnosis of Alzheimer's disease, which would contribute to timely medication and thereby reduce disease symptoms and rate of degeneration of the human brain. In addition, the Department is also focused on computer 3D brain image analysis from PET, SPECT or MRI and its evaluation to better understand the data obtained.

DEGREE PROGRAMME STRUCTURE

ACCREDITED BACHELOR'S DEGREE PROGRAMME

PROGRAM	CODE	ABBREVIATION	TIME EXTENT
Mathematical Engineering	B0541A170022	P_ MIB	3
Applied Mathematical Stochastic Methods	B0541A170024	P_ AMSMB	3
Nuclear and Particle Physics	B0533A110015	P_JCF	3
Physical Engineering	B0533A110016	P_FIB	3
Nuclear Chemistry	B0531A130028	P_JCHB	3
Decommissioning of Nuclear Facilities	B0588A110002	P_VJZPB	3
Quantum Technologies	B0533A110024	P_QTB	3
Applied Algebra and Analysis	B0541A170025	P_AAAB	3

BACHELOR'S DEGREE PROGRAMME

MATHEMATICAL ENGINEERING

Area of education: Mathematics (100 %)
Programme coordinator: prof. Dr. Ing. Michal Beneš
Specializations of the study programme:

- ***Mathematical modelling (MM)***
- ***Mathematical Physics (MF)***
- ***Mathematical Informatics (MINF)***

Goals and Outcomes:

The degree course in Mathematical Engineering interrelates courses of several branches of study, namely classical and modern topics of mathematics, physics, and informatics and guides students in the use of the above disciplines in engineering and natural sciences.

Mathematics courses include selected topics of calculus, algebra, differential equations, and numerical mathematics. Physics courses concentrate on mechanics, electricity and magnetism, and waves and optics. Informatics courses equip students with basic computer skills, and develop their abilities in programming, discrete mathematics, and theoretical informatics.

The degree course in Mathematical Engineering offers three specializations of modern mathematics applied to engineering practice. Thus, Mathematical Modelling develops students´ knowledge of functional analysis, partial differential equations, probability, mathematical statistics, and numerical mathematics, and their ability to use them in producing and processing mathematical models for science and engineering via up-to-date computer technology. Mathematical Physics provides an insight into theoretical physics, partial differential equations, and methods of mathematics and geometry used in physics. Mathematical Informatics equips students with a solid knowledge of theoretical informatics, classical and modern programming, network technologies and operation systems.

Understanding the closer links between modern mathematics, physics, and informatics is a good basis for students to obtain a higher academic degree and then be eligible for posts applying their knowledge of mathematics, physics, and natural sciences to practice, science, research, or engineering.

Graduate Profile:

Knowledge: Graduates will have gained the knowledge of fundamental disciplines of mathematics, physics, and informatics. According to graduates´ specialization, this basic body of knowledge is enhanced and supplemented with topics of modern mathematics, physics, and informatics. This knowledge will be applied to developing mathematical models, to the use of mathematical methods of theoretical physics, theoretical informatics, and up-to-date methods of mathematical informatics. Graduates can continue their academic training by entering the Continuation Master Programme or a programme of similar character.

Skills: The skills acquired comprise the following: application of methods and techniques common in the basic fields of mathematics and physics to solving engineering problems via modern computer methods; application of the above methods and techniques to solving real problems in research and engineering practice, in dynamics of continuum, stochastic systems, optimal control, image processing, mathematical and theoretical physics, and in

theoretical and mathematical informatics; ability to interpret results of computations and compare them with the mathematical methods used; ability to follow new trends in a given field, have a quick overview of interdisciplinary findings; to analyse issues, and to synthetize results. The newly acquired skills will also include a sense of responsibility for the work done and decisions made.

Competence: Analytical and systematic approach to what they do - based on the body of knowledge and skills acquired and on the use of information technologies - makes the bachelor graduates well prepared for jobs in industry, for professional use of information, and computer equipment. , for research, and the private sector. They can also continue their academic training in a Continuation Master Programme, develop and administer software applications, process and analyse data and use mathematical methods in practice.

Specializations:

According to the set of compulsory courses, the degree programme further splits into the following specializations.

Mathematical Modelling (MM)

The specialization offers a deeper insight into functional analysis, partial differential equations, probability, mathematical statistics, and numerical mathematics as being used to create and to treat computationally mathematical models for science and engineering in practice.

Mathematical Physics (MF)

The specialization offers a deeper insight into theoretical physics, partial differential equations, and methods of mathematics and geometry used in physics.

Mathematical Informatics (MINF)

The specialization focuses on theoretical informatics, classical and modern programming, network technologies, and operational systems.

State final examination:

- Calculus and linear algebra – compulsory part of examination
- Foundations of numerical mathematics – optional part of examination
- General algebra and its applications – optional part of examination
- Analytical mechanics – optional part of examination

APPLIED MATHEMATICAL STOCHASTIC METHODS

Area of education: Mathematics (100 %)

Programme coordinator: prof. Mgr. Milan Krbálek, Ph.D.

Goals and Outcomes:

The Bachelor Course is of interdisciplinary character and covers classical and cutting-edge topics of mathematics, physics, and informatics. As against mathematical disciplines offered at the Faculty as part of other fields, the course emphasizes understanding elementary as well as advanced issues of mathematical statistics with a view to prepare students for solving real tasks in professional placements. Students are acquainted with issues of mathematics explored in both the academic and commercial milieus.

Mathematics courses include sections of calculus, linear algebra, probability, and mathematical statistics. Physics courses are devoted to mechanics, electricity and magnetism, waves and optics, as well as theoretical physics. Informatics courses are important in shaping fundamental computer skills and acquaint students with techniques of programming and methods of symbolic calculations.

Modern mathematics, physics, and informatics are deeply interlinked, and so, thanks to the knowledge acquired, graduates can upgrade their qualifications by entering more advanced study programmes and thus be eligible for professional placements in the fields of mathematics, physics, natural sciences and engineering. They can also be successful in science, research, and commercial professions making use of mathematical methods.

Graduate Profile:

Knowledge: The graduate will have gained the knowledge of fundamental disciplines of mathematics, physics, and informatics further extended by theoretical statistics and applied statistics (Markov chains, machine learning, statistics of particle systems). Afterwards, the graduates can continue this degree course by entering the Continuation Master Programme in the same or related field of study.

Skills: The graduates will have acquired an ability to apply independently the methods, procedures, and models of solving real problems of stochastic/economic/socio-dynamic, and physical systems, such as processing a large amount of data, decision making under uncertainties, tasks of machine learning and digital image processing, numerical and optimization tasks or process control. Also, an ability to compare the outcomes of mathematical methods with the experimental/empirical results obtained. As well as an ability to follow new trends in the respective field and quickly become familiar with interdisciplinary issues, analyse issues, and synthetise results. The newly acquired skills will also include a sense of responsibility for the work done and decisions made.

Competence: The graduates can enter professional jobs in industry, the banking and private commercial sectors, and science and research, because they are professionally trained to approach issues analytically and systematically plus use advanced computer technology. The Bachelor Course prepared them adequately for a Continuation Master Programme or for jobs in private enterprises or commerce concerned with designing, implementing, and evaluating applied methods of mathematics.

State final examination:

- Calculus
- Probability and mathematical statistics

NUCLEAR AND PARTICLE PHYSICS

Area of education: Physics (100 %)

Programme coordinator: doc. Dr. rer. nat. Mgr. Jaroslav Bielčík

Goals and Outcomes:

The course is oriented towards nuclear physics and elementary particle physics, i.e. disciplines presenting fundamental facts about the structure of matter and principal interactions of the microworld. However, many findings and methods have surpassed the realm of physics and found their place in many fields of human activities. The degree course is based mainly on the common core of mathematics and physics.

The degree course is based on theoretical courses dealing with subatomic physics and quantum mechanics, building on a series of lectures on mechanics, electricity and magnetism, waves and optics, atomic physics, theoretical physics, thermodynamics, and statistical physics. The courses of theoretical character are supplemented with courses characterising the specialization, namely courses on detectors and principles of detection, physical measurements, and experimental physics. An important part of the degree course is mastering experimental physics, experimental techniques and physics practicals. Mathematics courses include calculus, linear algebra, numerical methods, equations of mathematical physics, and basics of programming.

The course lays stress on modern methods of obtaining experimental data and on their computational processing, on methods of machine learning, physical interpretation of experimental results, formulation of theoretical models, as well as possible applications in practice of the facts obtained. Also, part of the course is laboratory training. Preference is given to one-to-one tutorials with the supervisor. Students are also invited to join research teams and are given guidance on teamwork. Therefore, they have a chance to study also at such collaborating institutions as the Czech Academy of Sciences, CERN Geneva, the Brookhaven National Laboratory, and GSI Darmstadt.

As evident, this is a complex interdisciplinary programme preparing graduates for careers in industry or in academic institutions.

Graduate Profile:

Knowledge: The graduates will have acquired the most complex specialized knowledge of modern physics and mathematics, which will enable them to be creative members of teams addressing new interdisciplinary issues of science and engineering. They are familiar with issues of nuclear, particle, and quantum physics, detection methods, and detectors of ionizing radiation. They can directly continue their higher education in the same or a similar Continuation Master Programme.

Skills: The graduates will have gained skills in applying up-to-date methods of modern physics to tackle issues of nuclear and particle physics, as well as skills in preparing and performing experiments and in processing and interpreting the results of measurements followed by a comprehensive analysis of statistical and systematic errors of measurements.. And also, they will have gained experience in international teamwork and skills in presenting and communicating the results obtained to peers and defending them.

Competence: Owing to their training in using analytical and systematic approach to what they do and mastery of skills in using up-to-date computers and methods of machine learning, the Bachelor Course graduates are good candidates for positions in industry, research, and the

private sector. They are also eligible to work in nuclear research institutions, health care, or in car industry. As qualified physicists-experimenters, the graduates can gain positions in fundamental, applied, strategic, and even engineering research. They are ready to address issues in physics, making use of the latest experimental techniques and of large data processing equipment.

State final examination:

- Classical physics
- Subatomic physics

PHYSICAL ENGINEERING

Area of education: Physics (100 %)
Programme coordinator: doc. Ing. Ladislav Kalvoda, CSc.
Specializations of the study programme:

- ***Solid State Engineering (IPL)***
- ***Physical Engineering of Materials (FIM)***
- ***Laser Technology and Photonics (LTF)***
- ***Computer Physics (PF)***
- ***Plasma Physics and Thermonuclear Fusion (FPTF)***

Goals and Outcomes:

The degree course in Physical Engineering covers courses of several branches of study and includes both classical and up-to-date topics of physics, mathematics, and informatics. Thus, the graduates are perfectly prepared to use physical methods in real life applications of engineering and natural sciences, as well as up-to-date computer technology.

The fundamental physics courses cover mechanics, electricity and magnetism, waves and optics, thermodynamics, theoretical physics, and experimental physics. Mathematics courses include topics of calculus and analysis, algebra, numerical methods, and equations of mathematical physics and mathematical statistics. Informatics courses develop students´ computer, programming , and internet skills.

The degree course offers five high-degree specializations in modern physics applied to engineering and natural sciences. Solid State Engineering educates students to understand the structure of solids and how it relates to their electric, magnetic, and optical properties as well as to the role and structure of electronic components used in physical experiments. The course specializing in Physical Engineering of Materials synthetizes the issues of applied mechanics and materials science. Closely related to them is the study of response of bodies to stress, increase in temperature, the environment, and other external effects in relation to the physical properties of materials. Mastering these facts is inevitable for developing new materials and technologies and for increasing the operation parameters, operation lifetimes, and reliability of components in industry. Laser technology and photonics course specializes in the study and applications of optical physics, laser radiation, nanostructures, beams of charged particles, and plasma. Computer physics provides students with balanced knowledge of physical foundations of top technologies, informatics and computer systems. Plasma physics and thermonuclear fusion specialization is oriented towards international research into plasma physics issues and development of sophisticated plasma technologies, stressing the problem of getting effective control over thermonuclear fusion to be effectively used for power generation in the future.

Linking the knowledge of modern physics, mathematics, and informatics is a good start for graduates to upgrade their qualification in some advanced degree courses and be offered positions in the field of physics, engineering, and natural sciences, as well as in science and research.

Graduate Profile:

Knowledge: Graduates will have acquired the fundamental knowledge of physics, mathematics, and informatics, further deepened in their respective specialization by the

most important experimental methods and theoretical models of modern condensed matter physics, physical metallurgy, methods for characterising materials and engineering mechanics, plasma physics and theory and technology of thermonuclear fusion, laser technologies, optics, photonics as well as computer physics. Graduates can directly opt for a Continuation Master Degree in the same or similar field.

Skills: The graduates are skilled in using methods and procedures used in the main disciplines of physics in solving engineering issues via modern computer technology and are able to use such methods and procedures of physics and mathematics in research and solving engineering problems of materials, solids, laser technology, and plasma physics. They are also ready to prepare and perform physical measurements, analyse the results obtained, and keep up-to-date with the new trends in their respective field and quickly address new facts, analyse issues, and synthetize the results. They were also trained do develop a sense of responsibility for the work done and decisions made.

Competence: Due to their analytical and systematic approach to what they do as trained in the bachelor courses plus skills in handling modern computer technology, the graduates have a wide range of career choices: to seek admission to some Continuation Master Programme , to join a laboratory or test facility, to certify products, to work in metrology or in institutions using applied laser or plasma technology.

Specializations:

According to compulsory courses chosen by the student, the degree programme further splits into the following specializations:

Solid State Engineering (IPL)

The specialization provides a deeper insight into the structure of solids and how it relates to their electric, magnetic, and optical properties as well as to the role and structure of electronic components used in physical experiments.

Physical Engineering of Materials (FIM)

The degree course specializing in Physical Engineering of Materials synthetizes issues of applied mechanics and materials science. Closely related to them is the study of response of bodies to stress, increase in temperature, environment, and other external effects in relation to the physical properties of materials. Mastering these facts is inevitable for developing new materials and technologies and for increasing the operation parameters, operation lifetimes, and reliability of components in industry.

Laser Technology and Photonics (LFT)

Laser technology and photonics degree course specializes in the study and applications of optical physics, laser radiation, nanostructures, beams of charged particles, and plasma. Part of the course is hands-on training in laboratories.

Computer Physics (PF)

Computer physics degree course provides students with balanced knowledge of physical foundations of top technologies, informatics, and computer systems.

Plasma Physics and Thermonuclear Fusion (FPTF)

Plasma physics and thermonuclear fusion degree course is oriented towards international research into plasma physics issues and development of sophisticated plasma technologies, stressing the problem of getting effective control over thermonuclear fusion to be effectively used for power generation in the future. Part of the course is work on the fusion reactor.

State final examination:

- Applied physics - compulsory part of examination
- Mechanics of materials - optional part of examination
- Structure and physics of solids - optional part of examination
- Fundamentals of plasma physics - optional part of examination
- Fundamentals of laser technology and photonics – optional part of examination
- Fundamentals of scientific computation - optional part of examination

NUCLEAR CHEMISTRY

Area of education: Chemistry (100 %)

Programme coordinator: doc. Ing. Václav Čuba, Ph.D.

Goals and Outcomes:

Nuclear chemistry is a scientific discipline concerned with the properties of matter and phenomena of chemical and physico-chemical nature, having origin in the nucleus of the atom or in which the nucleus and its transformations play a participative role. Understanding the properties of the nucleus and its behaviour can often be immensely helpful in studying and finding a solution to many problems – not only of chemical character. Such insight, however, is to be based on solid foundations of chemistry and physics.

The idea of the Bachelor´s Degree Course in Nuclear Chemistry is to offer students both quite strong foundations of mathematics and physics, and of theoretical and practical training in the fundamental branches of chemistry, i.e. in physical, inorganic, analytical, and organic chemistry as well as biochemistry. The course curriculum goes deeper, and includes both theoretical and practical courses in nuclear chemistry. Besides the fundamental principles of general nuclear chemistry, the course includes lectures on detection of ionizing radiation, dosimetry, radiation protection, and respective legislation. A special cluster of lectures presents topics on the role and safe operation of nuclear power plants. Laboratory experiments are invaluable for gaining practical experience. Chemistry labs and practicals in all branches of chemistry, and selected sections of physics and the knowledge gained in lectures add substantially to the job potentials of future graduates. Labs in radiochemical techniques and in detection on ionizing radiation bolster theoretical aspects of courses and, at the same time, bolster habits for handling open sources of ionizing radiation and management of experiments.

The three-year degree course aims at training graduates whose prospects on the labour market will be equal to the prospects of graduates in other fields of chemistry. Moreover, beyond their general qualification, our graduates equipped with a theoretical and practical background in nuclear chemistry are ready to work without any guidance in institutions operating open and closed sources of ionizing radiation (emitters). The course curriculum also encompasses knowledge of physical principles of radiation protection and relevant legislation, trains independent work habits, planning, and a high degree of concentration of attention, which is useful in science and research positions in industry, power engineering, nuclear safety, radiation protection, or the country´s administration. To sum up, the graduates have excellent chances to continue their academic training in chemistry and be admitted to the Continuation Master Programme “Nuclear Chemistry“ (in preparation) to be offered by the Faculty of Nuclear Sciences and Physical Engineering.

Graduate Profile:

Knowledge: The course equips students with broad foundations of mathematics and physics, a good basis for broadening their horizons of chemistry, namely physical, inorganic, analytical, and organic chemistry, and biochemistry, as well as nuclear chemistry - the key course of the degree programme.

Skills: The solid theoretical and practical foundations for various chemical disciplines of the course programme equip students with a set of skills requisite for independent work in a chemical or radiochemical lab, as well techniques used in chemistry, including chemical processes, chemical design of complex instruments, and instrumental analysis. A very special

skill in nuclear chemistry is safe manipulation of open an closed sources of ionizing radiation because such activities require planning and organizational skills and are closely relate to radiation protection and doing work with efficiency. Great stress is also laid on analytical and interpretation skills obtained via assessment of experimental results.

Competence: Graduates will have obtained skills and knowledge required to assume positions in nuclear and chemical industry, in research, power engineering, health care, and environment protection institutions. Solid background in radiation protection and legislation makes them eligible for positions in supervision and control bodies such as the State Office for Nuclear Safety (SÚJB), the Radioactive Waste Repository Authority (SÚRAO), and the National Radiation Protection Institute (SÚRO). Their academic background makes them also eligible to take an examination in special professional competence for jobs in ionizing radiation protection. Language courses in two languages qualify graduates even for international career openings. And also, they can advance their academic training by applying for admission to a Continuation Master Programme in any discipline of chemistry, and, preferably, in Nuclear Chemistry offered by the Faculty of Nuclear Sciences and Physical Engineering.

State final examination:

- General Chemistry
- Nuclear Chemistry

DECOMMISSIONING OF NUCLEAR FACILITIES

Area of education: Physics (52 %), Chemistry (16 %), Power engineering (32 %)

Programme coordinator: Ing. Lenka Frýbortová, Ph.D.

Goals and Outcomes:

The decommissioning of nuclear installations is a process based on a body of knowledge of several fields, the linking and applications of which are a major intellectual challenge demanding innovational and engineering decisions. The decommissioning process needs highly qualified experts intimately familiar with the nuclear installations as such (i.e. their structure and function) but also being versed in chemistry, radioactive waste treatment , legislation, economy, planning, and safety issues, and even in radiation protection. The latter expects an understanding of the negative biological effects of ionizing radiation and interaction with matter, as well as of the latest legislation. Decommissioning covers also other places of work using sources of ionizing radiation, which must be decommissioned according to the legislation in force.

The Bachelor Course is based on general courses in fundamentals of mathematics, physics, and chemistry, supplemented with courses on atomic and quantum physics, physics of ionizing radiation, nuclear chemistry, and detection and dosimetry of ionizing radiation. This goes hand in hand with practical training in laboratories and visits to places of work concerned with decommissioning of nuclear installations. Courses in two foreign languages open careers in international or foreign projects. Graduates are also trained to obtain a special professional qualification based on an examination accredited by the State Office for Nuclear Safety (SÚJB). The lectures, practical and laboratory sessions of each academic year are designed in such a way that the degree course structure is continuous, consistent and complementary. The degree course takes into consideration the latest trends and findings in the respective fields and reflects them in the course curriculum, and, therefore, students can incorporate them into the bachelor project often implemented in some renown institution, eg. ÚJV Řež pcl. (ÚJV Řež, a.s)., DIAMO, s.p.(DIAMO, state enterprise), CEZ Group, pcl (ČEZ, a.s.) Radioactive Waste Repository Authority (SÚRAO), National Radiation Protection Institute, p.r.i. (SÚRO, v.v.i.), NUVIA, pcl (NUVIA , a.s.), National Institute for Nuclear, Chemical and Biological Protection, p.r.i. (Státní ústav chemické, biologické a jaderné ochrany v.v.i.).

The aim of the degree course is to educate experts qualified for safe decommissioning of nuclear installations and safe handling of sources of ionizing radiation. Graduates are also competent to do research, fill positions in industry, or use their skills in state administration. Their physical, mathematical, and chemical competences plus knowledge of dosimetry qualifies them for entering a higher degree course ,e.g. Decommissioning of Nuclear Installations, a new degree course to be opened at the Faculty of Nuclear Sciences and Physical Engineering.

Graduate Profile:

Knowledge: Graduates will have obtained quite extensive foundations of mathematics and physics to build on and add a package of knew knowledge of nuclear and quantum physics, physics of ionizing radiation, nuclear chemistry, and issues on detection and dosimetry, and radiation protection. However, the key course is concerned with the decommissioning of nuclear installations. The Bachelor Degree in this course is a prerequisite for entering the more advanced Continuation Master Course in Decommissioning of Nuclear Installations.

Skills: The graduates are trained to prepare, perform physical and dosimetry measurements and to process and analyse the data obtained. A very specific skill of the graduates is safe manipulation of sources of ionizing radiation, including open emitters. Graduates can also use their knowledge of legislation and economics in planning decommissioning projects. Next to technical skills gained through class attendance, typical assets of graduates comprise adaptability and orientation in interdisciplinary issues, being skilled in analysing and processing problems computationally, in synthetizing data and and being skilled in good written communication. With regard to the engineering character of the degree course, the mathematics, nuclear physics, and chemistry courses equip graduates with good analytical and technical thinking and practical skills which they need to perform successfully measurements, work in a chemical laboratory and solve practical issues with an interdisciplinary overview.

Competence: The body of knowledge and skills gained plus analytical and systematic approach to work make graduates ready for careers in institutions using nuclear technologies, ionizing radiation, or radionuclides, and, first of all, in institutions decommissioning nuclear installations, solving ecological burdens, and providing radiation protection of individuals and of the environment. Foundations of radiation protection and legislation mastered as part of the degree course, make graduates eligible for carers in supervisory bodies and national or state institutions like the State Office for Nuclear Safety (SÚJB), Radioactive Waste Repository Authority (SÚRAO), National Radiation Protection Institute (SÚRO) , and others. Having passed an examination in Radiation Protection, students can take an SÚJB- accredited examination to gain an expert qualification. Also, graduates´ competences in two foreign languages opens up opportunities to seek jobs abroad. The Bachelor Degree qualifies them for entering a higher degree course specializing in nuclear engineering, at best The Decommissioning of Nuclear Installationsdegre course offered by the Faculty of Nuclear Sciences and Physical Engineering.

State final examination:

- Fundamentals of nuclear physics and chemistry
- Theory of decommissioning nuclear installations

QUANTUM TECHNOLOGIES

Area of education: Physics (100 %)

Programme coordinator: doc. Ing. Martin Štefaňák, Ph.D.

Goals and Outcomes:

The degree course is of interdisciplinary character, covering classical and modern sections of mathematics, physics, and informatics. It prepares students for jobs in physics, natural sciences and engineering and for use of modern computational methods. The degree course structure is based on core courses on mathematics, i.e. calculus; linear algebra; linear equations; differential equations; probability theory and statistics; and equations of mathematical physics and functions of complex variables. Physics courses cover introduction to mechanics, electricity and magnetism, thermal physics, waves and optics, and theoretical and statistical physics. However, the core of the degree course is quantum physics. Apart from theory, students get practical hands-on training in physics labs, solids labs, laser labs, and linear optics labs and, moreover, in practicals. Part of the study is a bachelor project; elaborating on its topic, students acquire a detailed knowledge of their specialization. Competency in two foreign languages makes graduates eligible for participation in international or foreign projects.

Graduate Profile:

Knowledge: Graduates are versed in the core disciplines of mathematics, physics , and informatics, and even more specialized in quantum physics, and physics of solids and lasers , both theoretically and practically. They can directly continue their academic training in a continuation master degree course In the same or similar field.

Skills: They are skilled in using various calculation methods and procedures of mathematics and physics to tackle - both theoretically and practically – engineering research and scientific issues of quantum theory, theory of solids, and physics and technology of lasers. They are skilled in modern computational methods and laboratory equipment, as well as in keeping up-to-date with the new trends of their respective field and in analysing problems and synthesizing the findings. As expected ,the newly acquired skills include the sense of responsibility for the work done and decisions made.

Competence: Due to their analytical and systematic approach to solving problems and their skilled use of computational techniques, graduates are competent to assume posts adequate to BSc. in the system of education, research and industry. They are also eligible for more advanced degree courses, or they can participate in the development of modern technologies.

State final examination:

- Classical physics – compulsory part of examination
- Quantum mechanics - optional part of examination

APPLIED ALGEBRA AND ANALYSIS

Area of education: Mathematics (100 %)

Programme coordinator: doc. RNDr. Jan Vybíral, Ph.D.

Goals and Outcomes:

The degree course is oriented towards advanced methods of algebra and calculus used in present-day applied mathematics. The degree course provides solid foundations for a number of mathematical disciplines and a mastery of many mathematical methods. The aim of the course is to educate specialists able to orient themselves in a wide spectrum of mathematical disciplines. Throughout the course, students are trained to approach issues independently and analytically and to use the methods mastered in natural sciences and engineering, e.g. in biology, medicine, economy, and informatics. The bachelor project is a good basis for consolidating their habits and skills of independent work. The standard duration of the degree course is 3 years.

Graduate Profile:

Knowledge: The degree course provides firm foundations for detailed knowledge of many mathematical disciplines, stressing applied algebraic and analytical methods, and a broad general overview of theoretical physics. The offer of optional courses will extend graduate´s competency by basic theoretical and practical informatics.

Skills: The core courses on mathematics included in the degree course are as follows: calculus in real and complex fields; linear and general algebra; discrete mathematics; numerical mathematics; ordinary differential equations; basic course on functional analysis; elements of the theory of probability; mathematical statistics; equations of mathematical physics and calculus; and linear optimization. Students can also attend many optional highly specialized or application-oriented lectures of their choice.

Competence: Graduates will be creative in analyzing and solving issues of mathematical character existing in various fields of science and technology. They will also have a chance to continue their academic training in the continuing advanced degree courses and acquire some new specialized knowledge of other fields, according to the type of course they may choose. Moreover, it is understood that graduates will have developed a sense of responsibility for their work done and decisions made.

State final examination:

- Calculus and linear algebra – compulsory part of examination
- Fundamentals of functional analysis – optional part of examination
- Probability and mathematical statistics - optional part of examination

ACCREDITED MASTER'S DEGREE PROGRAMME

PROGRAM	CODE	ABBREVIATION	TIME EXTENT
Mathematical Engineering	N0541A170028	P_MIN	2
Mathematical Informatics	N0541A170031	P_MINFN	2
Mathematical Physics	N0533A110032	P_MFN	2
Applied Mathematical Stochastic Methods	N0541A170029	P_AMSMN	2
Nuclear Engineering	N0533A110041	P_JIN	2
Nuclear and Particle Physics	N0533A110030	P_JCFN	2
Physical Electronics	N0533A110043	P_FEN	2
Solid State Engineering	N0533A110038	P_IPLN	2
Physical Engineering of Materials	N0533A110036	P_FIMN	2
Plasma Physics and Thermonuclear Fusion	N0533A110034	P_FPTFN	2
Nuclear Chemistry	N0531A130039	P_JCH	2
Decommissioning of Nuclear Facilities	N0788A110002	P_VJZPN	2
Quantum Technologies	N0533A110047	P_QTN	2
Applied Analysis and Algebra	N0541A170035	P_AAAN	2

MASTER'S DEGREE PROGRAMME

MATHEMATICAL ENGINEERING

Area of education: Mathematics (100 %)

Programme coordinator: prof. Dr. Ing. Michal Beneš

Goals and Outcomes:

The Continuation Master Course is interdisciplinary and is oriented towards advanced parts of mathematics and informatics applied to natural sciences, physics, and engineering. The courses go deep into the above fields and will give a broad overview of the present-day state of the art. The specialized courses of the curriculum cover functional analysis, variation methods, dynamics of continuum, stochastic systems and their applications in creating mathematical models and their computational processing for various fields of science, engineering, environmental protection, or biology. The degree course also comprises independent student projects on individually tailored topics, enabling deeper orientation in the issue. These projects often result in new findings and data publishable in professional periodicals. The interconnected knowledge of modern mathematics, physics, and informatics is a good basis for more advanced studies and jobs in physical, mathematical, and engineering practice and in natural sciences, as well as for positions in science, research and engineering.

Graduate Profile:

Knowledge: Graduates will be acquainted with the advanced parts of mathematics and informatics. According to their specialization, they will deepen their understanding of modern mathematics, informatics, and scientific and engineering calculations used for creating mathematical models for various fields of science, engineering, protection of the environment, and biology.

Skills: Graduates will be skilled in using methods and procedures of mathematics and physics for solving actual engineering issues by modern computer technology. They know how to apply advanced methods and processes of mathematics to solving actual research and engineering issues in dynamics of continuum, stochastic systems, optimal control, image processing, mathematical informatics, and intensive calculations and compare the methods with the data obtained. Graduates are prepared to follow new trends in a given field and are able to orient themselves promptly in interdisciplinary problems, in problems analysis and synthesis of results. Typical skills which graduates develop throughout the degree course are adaptability, quick orientation in unknown interdisciplinary problems, analysis and computational processing of issues, synthesis of results, and good written communication. Graduates accept responsibility for their work and the decisions made.

Competence: Due to analytical and systematic approach to what they do, to the knowledge acquired and skills in operating modern computer technology, graduates are good candidates for jobs in industry, research and the private sector. They are able to manage the development of software applications, or assume positions in data processing and analysis, and in practical use of mathematical methods. They may apply for posts in the Czech Academy of Sciences, in research and development centres of big companies, other research institutions, or fill managerial positions.

State final examination:

- Functional analysis - compulsory part of examination
- Variational methods – compulsory part of examination
- Numerical mathematics – optional part of examination
- Mathematical optimization – optional part of examination
- Graph theory - optional part of examination

MATHEMATICAL INFORMATICS

Area of education: Mathematics (60 %), Computer science (40 %)

Programme coordinator: prof. Ing. Edita Pelantová, CSc.

Goals and Outcomes:

The dominant idea of the degree course is to link the parts of mathematics fundamental for the theoretical concept of informatics with the instruments and methods instrumental in following through the concept. The disciplines of mathematics include chapters from discrete mathematics, logic, advanced algebra and theory of numbers, theory of languages and automata, and matrix theory. The follow-up courses then build upon these mathematical foundations, namely image processing, neuron networks, and complexity theory. The theoretical background is supplemented by computer skills necessary for research and commercial projects. A considerable emphasis is given to engaging students in independent research projects.

Graduate Profile:

Knowledge: Graduates will be equipped with the knowledge of various disciplines of mathematics with a view to mathematical structures and informatics. The courses offer students not only practical experience but also theoretical knowledge of modern programming and computer technology.

Skills: Graduates are skilled in analysing a problem, formalizing it mathematically and identifying the area of mathematics to be made use of to obtain a solution. They are able to create an algorithm to solve the problem, verify its correctness and determine its complexity. Graduates are able to submit and control a software project, handle big computational systems, networks, and databases, and work in teams. Depending on orientation, they are skilled in mathematical and applied informatics, management of big systems, and intensive and parallel computations. Moreover, graduates are very adaptible, orient themselves quite fast in interdisciplinary issues, have good communication skills, and are responsible for the work done and decisions made.

Competence: Graduates can be successful in industry and in the academic or private sector. The analytical way of thinking, systematic approach to tasks and competent use of up-to-date computer technology makes them ready for positions of software architects in big companies, designers and operators of computer clusters in research centres, and participants in analyses from various walks of life.

State final examination:

- Theory of graphs - compulsory part of examination
- Theory of numbers – optional part of examination I
- Image processing and object recognition – optional part of examination I
- Algebra and its applications – optional part of examination II
- Languages and automata – optional part of examination II

MATHEMATICAL PHYSICS

Area of education: Physics 100 %

Programme coordinator: doc. Ing. Libor Šnobl, Ph.D.

Goals and Outcomes:

The study of Mathematical Physics is focused on advanced areas of modern mathematical physics and applied mathematics. It leads its graduates to apply the acquired knowledge in the development of theoretical physics, with a particular focus on mathematically rigorous procedures and methods, as well as in theoretical analysis and description of physical models for more experimentally focused physics disciplines, in scientific and engineering practice, also involving modern computer technology.

The subjects of the study are focused on deepening the knowledge of the needed fields of physics and mathematics and provide sufficient overview of the current state of theoretical and mathematical physics. The programme also involves compulsory student projects designed to work on an individually assigned research topic. These projects allow each student a better orientation in the field of his specialization and usually lead to original research results publishable in international professional journals.

Students gain deeper insight especially in quantum mechanics and field theory, classical and quantum

theories of gravity, statistical physics, quantum information theory, and related modern fields of mathematics, e.g. in differential geometry and topology, theory of Lie groups, algebras and their representations, functional analysis and in the spectral theory of operators.

The programme is designed for particularly gifted students, with great motivation to study and with an inclination towards academic career.

Graduate Profile:

Knowledge: The graduates will gain a broad knowledge of the above mentioned advanced mathematical and physical disciplines, which depending on their particular specialization can be deepened in the fields of particle physics, applied mathematics or scientific and technical calculations.

Skills: Application of methods and procedures from various areas of mathematics and physics towards the solution of theoretical and application-oriented scientific, research and engineering problems. In addition to the special knowledge gained from the study, they also include typical sfot skills of students of the Mathematical Physics programme: adaptability, quick orientation in new interdisciplinary issues, analysis of problems and their computer processing, synthesis of results and good written expression.

Competence: Graduates will find employment in the academic sphere, applied research and industry thanks to their analytic and systematic approach to problems and their ability to work with modern computing technology. The primary focus of the study programme is to prepare its graduates to work at universities, in

institutes of the Academy of Sciences and other research organizations. However, given the skills acquired, in particular analytical way of thinking, it is possible to successfully apply them in research, development and analytical departments of companies across the economy, including banks, insurance companies and

consulting firms.

State final examination:

- defence of the diploma project
- oral examination in the general subject

  Quantum Physics
- oral examination in the profile subject

  Advanced Geometric Methods in Physics
- oral examination in the profile subject with optional choice:

  Quantum Field Theory

  Lie Algebras, Lie Groups and Their Applications

  Statistical Physics

APPLIED MATHEMATICAL STOCHASTIC METHODS

Area of education: Mathematics (100 %)

Programme coordinator: prof. Mgr. Milan Krbálek, Ph.D.

Goals and Outcomes:

The Continuation Master Course in Applied Mathematical Stochastic Methods lays stress on mathematical stochastic methods and their practical applications. It is oriented towards building up an advanced theoretical apparatus of mathematical statistics and other fields of mathematics and towards analysing practical issues the solution of which enables effective application of the theory studied. Students are also trained to apply mathematical statisctics and mathematics to natural sciences or engineering and commercial practice.

The programme is a follow-up to the Bachelor´s Degree Course.

The master programme covers courses on the theory of informatics, regression analysis, generalized linear models, and in specialized disciplines of mathematics and statistics. The theory taught is only a background to practical issues to be solved by effective application of the theory. In practice, the mathematical apparatus designed is to be used for processing and evaluating general statistical data, estimating statistical characteristics based on sampling, and also applied to advanced methods of interactions in particle systems, statistical prediction of defects in materials, control and modelling of traffic flow, and evaluation methodology for statistical data on reliability and extreme events, and data from particle accelerators. The courses provide a deeper insight into the areas concerned and, therefore, will provide a sufficient overview of the present state of the issues.

Part of the degree course is an individual project on an given topic assigned to each student. Thanks to the project, students will have a deeper insight into the whole issue and often arrive at unique results publishable in professional periodicals.

A complex knowledge of modern mathematics, stochastics, physics, and informatics is a good start position for an even more advanced degree and for jobs using this body of knowledge, and mathematical methods in particular, for being successful in research or commerce.

Graduate Profile:

Knowledge: Graduates will possess a wealth of knowledge of advanced mathematics and statistics. Based on graduate´s orientation, this knowledge can be used in applied stochastic systems, machine learning, modelling car traffic, data science, digital image processing, financial and actuarial mathematics, modelling pedestrian flow, reliability of component systems, and defectoscopy.

Skills: The graduate will be skilled in applying advanced methods of mathematics and statistics (or mathematics in general) to tackling existing research, engineering, and commercial issues arising in management optimization, image processing, decision-making under uncertainties, traffic flow simulations, financial mathematics, and dynamic pricing; they will also acquire skills in comparing the outputs of mathematical methods with real empirical/experimental methods. Graduates will also be able to follow new trends in the respective field and be quickly oriented in interdisciplinary issues, to analyse facts and synthesise results. The newly acquired skills will also include a sense of responsibility for the work done and decisions made.

Competence: With respect to their analytical work habits and ingrained systematic use of modern computer technology, graduates can be employed in industry, banking, research, as well as in private companies and commerce. They can also prove successful in the commercial and private spheres in designing, implementing, and evaluating applied mathematical methods. Moreover, they are also professionally competent to accept managerial roles or research jobs in institutes of the Czech Academy of Sciences, or in research and development centres of big enterprises as well as other research institutions.

State final examination:

- Methods of regressive analysis – compulsory part of examinationt
- Information theory and random processes – optional part of examination I
- Machine learning – optional part of examination I
- Reliability and extreme events – optional part of examination II
- Mathematical models for traffic flow – optional part of examination II

NUCLEAR ENGINEERING

Area of education: Physics (65 %), Power engineering (35 %)
Programme coordinator: prof. Ing. Tomáš Trojek, Ph.D.
Specializations of the study programme:

- ***Applied physics of ionizing radiation (AFIZ)***
- ***Nuclear reactors (JR)***

Goals and Outcomes:
The degree course is oriented towards applications of nuclear sciences to engineering and natural sciences in relation to the peaceful use of nuclear energy, radioactive substances, and ionizing radiation in science, research, and industry. Graduates will be eligible for various professional or managerial positions in nuclear industry, scientific and research institutions, public supervisory and inspection bodies, and other sectors using ionizing radiation. All graduates of the course are proficient in their respective fields and have a good overview of nuclear safety, radiation protection, techniques of measuring radiation, applications of ionizing radiation, and use of radioactive substances in science, industry, and medicine.

Graduates were acquainted with the basic theories of mathematics, physics, informatics, and nuclear enginering in the bachelor course, so the master course in Nuclear Engineering concentrates on presenting knowledge and training skills closely releted to their professional specialization. The course structure is based on advanced courses in physics and nuclear engineering applied to metrology of ionizing radiation, safety of nuclear installations, reactor physics, and instrumentation for nuclear techniques and technologies. The degree course comprises many modern computational methods, specialized laboratory sessions, and independent student projects on individually assigned topics.The aim of the project is to obtain a deep insight into the issue of the topic. Most often the findings offer quite knew data and facts and are publishable in professional periodicals. The latest trends in the field reflected in the degree course are therefore reflected in the master thesis, and students can perfecly cooperate on the thesis with leading specialists from the Faculty or some other institution.

The degree programme offers two specializations, namely Applied physics of ionizing radiation and Nuclear reactors, whose structure provides students with a thorough knowledge of and practical skills in these fields and also with the state of the art. Applied physics of ionizing radiation concentrates on the more detailed theory of nuclear and radiation physics and advanced techniques of monitoring radioactive substances and persons, and environment in the fields of ionizing radiation, and acquaints students with methods of microdosimetry and computational methods for modelling the transport of ionizing radiation in matter. Nuclear reactors offer both theoretical courses and experimental sessions on the physical phenomena taking place in a nuclear reactor, on the nuclear fuel cycle, safety of nuclear installations, advanced nuclear technologies, nuclear technology devices, and neutron applications. Classes take also place in specialized laboratories and on the nuclear reactor and make use of up-to-date computational facilities.

Graduate Profile:

Knowledge: Graduates in Nuclear Engineering are equipped with the knowledge of fundamental disciplines of nuclear physics and, with a view to their specialization, studied nuclear technologies, nuclear power engineering, applications and protection against

ionizing radiation. Graduates in Applied physics of ionizing radiation will gain knowledge of advanced disciplines of nuclear physics further extended - with a view to their orientation – by the theory, nature, properties, and applications of ionizing radiation. Graduates in Nuclear Reactors will be specialists in reactor physics, technology and nuclear fuel behaviour, technologies and safe operation of nuclear installations, nuclear analytical methods, and neutron applications.

Skills: Graduates in Nuclear Engineering are skilled in using methods and processes of applied nuclear physics to solve actual engineering, scientific, and research issues. They are also ready to prepare, perform, analyse, and evaluate demanding experiments and use nuclear analytical methods. Their specialized skills gained in the degree course include also prompt orientation in interdisciplinary issues, analysis of problems, synthesis of the data obtained, and good communication skills. Graduates feel responsible for the work done and decisions made.

Competence: Graduates of Nuclear engineering were given the necessary and useful knowledge for positions in industry, research and development institutions, at universities or in the state administration. They may also fill vacancies such as designer-developer, analyst-evaluator-inspector, senior researcher, or head of an operations team. They are eligible for posts in a variety of fields related to nuclear power engineering, radioecology, in a varied range of uses of ionizing radiation and radionuclides. For their complex theoretical and experimental nuclear engineering background and systematic approach to addressing professional problems, they are eligible for managerial posts in nuclear power plants, industrial operations and development centres, in scientific and research institutions, and in public inspection and supervision bodies.

Specializations of the study program:

Applied physics of ionizing radiation (AFIZ)

The specialization deepens students´ theoretical background in nuclear and radiation physics, and, moreover, introduces them to advanced techniques of monitoring radioactive substances, subjects, and environment in the fields of ionizing radiation, acquaints them with methods of dosimetry, and teaches them computational methods for modelling the transport of ionizing radiation in matter.

Nuclear reactors (JR)

This specialization concentrates on theoretical and experimental study of physical phenomena occurring in the nuclear reactor, of the nuclear fuel cycle, safety of nuclear installations, advanced nuclear technologies, instrumentation of nuclear engineering, and neutron applications. Classes take place also in specialized laboratories inclusive of the nuclear reactor and make use of up-to-date computational facilities of nuclear engineering.

State final examination:

- Nuclear engineering in practice – compulsory part of examination
- Nuclear reactor physics – optional part of examination
- Design of nuclear reactors – optional part of examination
- Safety and operation of nuclear installations – optional part of examination
- Exploitation of nuclear reactors – optional part of examination
- Measurement and evaluation methods of ionizing radiation – optional part of examination
- Nuclear and radiation physics - optional part of examination
- Computational methods in radiation physics – optional part of examination

NUCLEAR AND PARTICLE PHYSICS

Area of education: Physics 100 %

Programme coordinator: doc. Dr. rer. nat. Mgr. Jaroslav Bielčík

Goals and Outcomes:

The master´s degree course is oriented towards nuclear and elementary particle physics, these are the fields of study that bring fundamental knowledge about the structure of matter and basic interactions that are happening in the microworld. Many discoveries and knowledge from physics are already in our daily life and are used in many fields that are not just physics. The study plan that this programme offers is mainly based on advanced modules, such as quantum field theory, particle physics and system of modern detectors together with data analysis and data processing. These modules were chosen due to the needs of modern research in the field of nuclear and elementary physics, students then may further specialize by choosing one of the compulsory elective courses. Students can choose to do theoretical or experimental or accelerators.

The fundamentals of the specialized study are the following common theoretical modules. Such as Quantum field theory 1 and 2, Introduction to Theory of Electroweak Interactions and Introduction to Quantum Chromodynamics. These subjects are then supplemented by subjects of profiling basis such as Modern Detectors, Detector Systems and Data Acquisition together with the Statistical Data Analysis 1 and 2, which will acquaint students with modern technology and the industry. Students will attend a series of seminars 1-4 where they will be presenting their research together with talks about the latest news in physics. Students can specialize by choosing one of the three groups of compulsory elective courses. In the experimentally focused group E they complete the subjects Extreme states of matter and Physics of Ultrarelativistic Nuclear Collisions, in the theoretically focused group T they complete the General Theory of Relativity and in the instrumentally focused group I where they complete Accelerators 1 and 2.

The program emphasizes on modern methods of obtaining experimental data and their processing using computer technology, machine learning, and physical interpretation of experimental results, which is then formulated into theoretical models and possible practical applications for acquired data. Teaching is represented by the form of choice of optional subjects, work in specialized laboratories. There are preferred individual forms of teachings under a supervisor together with seminars. Students are involved in ongoing researches projects where they can contribute to their problem-solving skills and are slowly being prepared for modern collective forms of scientific work in an international group. Teaching takes place in close cooperation with non-faculty workplaces such as (Academy of Sciences of the Czech Republic, CERN Geneva, Brookhaven National Laboratory, GSI Darmstadt, etc.). It is, therefore, a comprehensive study program with interdisciplinary content, the aim of which is to prepare graduates for work in academia and industry.

Graduate Profile:

Knowledge: Graduate will gain the most comprehensive possible knowledge of modern nuclear and particle physics, which will enable him to creatively participate in solving new interdisciplinary scientific and technical problems. The acquired knowledge covers all areas of nuclear, particle and quantum physics, detection methods, ionizing radiation detectors and accelerators. The graduate may directly continue in a follow-up doctoral study in the same or a related field.

Skills: Graduate will gain skills in the application of methods of modern physics in solving problems. The acquired skills will consist of preparation and implementation of experiments and subsequent processing of measurement results which then can be interpreted, this includes a comprehensive analysis of statistical and systematic errors. The graduate will also

gain experience working in large international collaborations and the ability to present, communicate and defend the results obtained and, last but not least, will gain skills to participate in the preparation and construction of accelerators.

Competence: Graduates will find employment in industry, basic and applied research and the private sector thanks to the analytical way of work, the systematic approach given by the acquired knowledge and the ability to work with modern computer technology and machine learning methods. They can work in nuclear research institutions, healthcare or the automotive industry. They acquire the qualification of a physicist - researcher with a wide range of possible applications in research (basic, applied, strategic) and in development for technical practice. They will be prepared to solve physical problems using modern experimental techniques, process large-volume data and operate accelerators.

State final examination:

- defence of the diploma project
- oral examination in the general subject
  Particle Physics
- oral examination in the profile subject
  Experimental Methods
- oral examination in the profile subject with optional choice:
  General Theory of Relativity
  Heavy Ion Physics
  Accelerators

PHYSICAL ELECTRONICS

Area of education: Physics 100 %

Programme coordinator: prof. Dr. Ing. Ivan Richter, Dr.

Specializations of the study programme:

- ***Laser Physics and Technology***
- ***Photonics***
- ***Computational Physics***

Goals and Outcomes:

The master´s degree multidisciplinary program of *Physical Electronics* is oriented towards classical and modern areas of physics, mathematics, and informatics. Specifically, these includes the fields that bring fundamental knowledge about, following the three specializations, laser physics and technique, photonics, and computer physics. The program leads graduates to applications of physical methods in natural-science and engineering practice, often with the help of modern computer technique. The program enables deeper focus in one of the following three specializations of modern applied physics. In the specialization *Laser physics and technology*, students are prepared in the areas and technical applications of coherent laser and charged particle beams and plasma physics. In the specialization *Photonics*, students are prepared in the modern areas of optics, photonics, and photonic nanostructures, including theoretical design, analysis, realization, characterization, and applications. In the specialization *Computational Physics*, students are equally acquired with knowledge of physical backgrounds of high-tech state-of-the-art technologies and modern informatics and computer systems. Deeper interconnection of modern physics, mathematics, and informatics, enables the program graduates to further increase their qualification to higher study degrees, and thus acting in the physical, natural-science, and technical practice, or application in science, research, and technical practice. Many discoveries and knowledge from these areas of applied physics are already applied in our daily life and are used in many surrounding fields. The study plans this program are based on advanced modules, either general or specific to each specialization, such as classical electrodynamic, physical optics, quantum electronics, quantum optics, nonlinear and statistical optics, laser technique, etc. These modules were chosen due to the needs of modern research in the fields of laser physics and technique, photonics, and computer physics.

The program emphasizes on modern methods of obtaining both theoretical and experimental data and their processing using current computer technology, and physical interpretation of experimental results, which is then formulated into theoretical models and possible practical applications. Mandatory courses in each specialization are amended by the form of choice of optional subjects, and work in specialized practical laboratories. Students are involved in ongoing researches projects where they can contribute to their problem-solving skills and are slowly being prepared for modern forms of scientific work. Teaching takes place in close cooperation with non-faculty workplaces such as the Academy of Sciences of the Czech Republic. It is, therefore, a comprehensive study program with interdisciplinary content, the aim of which is to prepare graduates for work in academia and industry.

Graduate Profile:

Knowledge: A graduate will gain the most comprehensive knowledge of fundamental physical, mathematical, and informatics fields which are, in dependence on the particular specialization, deepened in the areas of most important experimental methods and theoretical models of current laser physics and technique, photonics, and computer physics. This will enable the graduates to creatively participate in solving new interdisciplinary

scientific and technical problems in the related areas. The graduates may directly continue in a follow-up doctoral study in the same or a related field (Physical Engineering, Quantum Technologies, and others).

Skills: A graduate will gain skills in the application of methods of modern physics and engineering in solving realistic problems, with the help of modern computer technique. The acquired skills, using the methods and techniques of mathematics and physics, will enable solving realistic research and engineering problems in the areas of laser physics and technique, photonics, and computer physics. The graduate will also gain experience and skills to follow new trends in given areas, and quickly orient in multidisciplinary problems, analyze them and synthesize the results, together with the ability to present, communicate, and defend the results obtained.

Competence: Master graduates will find employment in industry, basic and applied research, and the private sector thanks to the analytical way of work, the systematic approach given by the acquired knowledge and the ability to work with modern computer technology and machine learning methods. They will be prepared to solve physical problems using modern theoretical and experimental techniques. They acquire the qualification of a physicist - researcher with a wide range of possible applications in research (basic, applied, strategic) and in development for technical practice. They can either continue in their studies in doctoral programs, or work in research laboratories, in the development, and test and / or product certificate centers, in metrology, and in various applications of laser and photonic techniques and technologies.

State final examination:

- defence of the diploma project
- oral examination in the general subject
  Electrodynamics
- oral examination in the profile subject with optional choice:
  Optics and Quantum Electronics
  Computational Physics
- oral examination in the profile subject with optional choice:
  Laser Physics and Technology
  Photonics
  Numerical Methods in Applied Physics
  Physics of Laser Plasma and Inertial Fusion

SOLID STATE ENGINEERING

Area of education: Physics 100 %

Programme coordinator: doc. Ing. Ladislav Kalvoda, CSc.

Goals and Outcomes:

Study in *Solid State Enginering* is oriented towards advanced parts of solid state physics and their practical applications in engineering and scientific practice. The aim of the study is to pass a graduate knowledge of the physical nature, theoretical description and interpretation of a variety of special phenomena and properties resulting from the diversity of the internal order of solids, explain and demonstrate the main methods of their experimental studies and computer modeling and give an overview of current and potential applications, which these phenomena and properties use, including interdisciplinary context. The study includes specialized laboratory courses and separate student projects for work on an individually assigned research topic. These projects allow students to asquire a deeper understanding the scientific nature of the given problem and to exercise the already acquired theoretical knowledge, and generally lead to the original results publishable in scientific journals or applicable in the development of new engineering technologies.

Graduate Profile:

Knowledge: The graduate will asquire a broad knowledge in physics, theory and properties of solids, become familiar with theoretical basics and practical implementation of the main experimental methods applied in the study of solids and the basics of computer modeling of their structure and properties, and get sufficient relevant orientation in technical multi-discilinary applications of solid state structures.

Skills: The graduate is able to understand and analyze the physical and technical problems in the field of *Solid State Engineering*, formulate and solve new problems, and the achieved solutions transform to practically applicable results instrumental in solving real engineering, research and scientific problems. In addition to special knowledge acquired by studies, the typical skills of *Solid State Engineering* program graduates involve adaptability, fast orientation in new interdisciplinary issues, analysis of problems and their computer processing, synthesis of final knowledge and good written expression. The acquired features also include personal responsibility for the work done and decisions taken.

Competence: Graduates will find very good applications in industry, research and private sphere due to their working skills combining analytical and synthetic methods, a systematic approach to problems' solution based on the acquired knowledge and the ability to work with modern computing and experimental techniques and technologies. Engineer - Graduated in the Program – finds, due to the acquired widespread knowledge, good application in all academic and industrial workplaces dealing with research and development in one of the fields that use solid state physics, such as microelectronics, surface physics, thin films and low-dimensional systems, sensors, imaging techniques, photovoltaics, low temperature and superconductivity physics, applied photonics and telecommunications, and further in specialized analytical and development laboratories that utilize spectroscopic techniques, X-ray and neutron diffraction, electrical and magnetic measurements or advanced procedures of computer simulations and properties of solids / condensed matter. Due to the analytical and mathematical knowledge, the graduates also apply in the field of management and finance and succeed in leading functions.

State final examination:

- defence of the diploma project
- oral examination in the general subject

Theory of Solids

- oral examination in the profile subject
  Physics of Solids
- oral examination in the profile subject with optional choice:
  Properties of Solids

PHYSICAL ENGINEERING OF MATERIALS

Area of education: Physics (65 %), Power engineering (35 %)

Programme coordinator: prof. Dr. Ing. Petr Haušild

Goals and Outcomes:

Physical Engineering of Materials is an interdisciplinary degree course based on the synthesis of applied mechanics and materials science. It emphasizes detection of the response of bodies and construction elements to loading, increase in temperature, surrounding media, and other side effects. This is closely linked with the disintegration processes related to mechanical and structural properties of materials. This knowledge is indispensable for solving problems of development of new materials and technologies, of operational parameters, life span, and reliability of actual construction elements, disturbance analysis, etc. Students are more deeply acquainted with physics of metals, physical metallurgy, plasticity, continuum dynamics, fracture mechanics, applications of experimental methods, mathematical modelling, etc. The course programme consists of a range of courses of theoretical, experimental, and informational character and is continuously updated. An important part of the programme is individualized student projects usually reflecting the scientific and research activity of the department or members of institutions cooperating in the solutions of grant projects or in contracted research. Students are also trained to perfect their audiovisual or written presentations of their results, because they often co-author papers published in professional periodicals or presented at conferences. Thus, graduates are highly qualified professionals ready to start their career in science, research, or industry.

Graduate Profile:

Knowledge: This degree course is unique in being of interdisciplinary character. Graduates will have acquired a thorough knowledge of advanced sections of applied physics focused mainly on physical metallurgy, modern methods of materials assessment, and engineering mechanics, as well as selected topics of applied mathematics and informatics. The knowledge obtained is in close relation with the needs of science, research, and engineering.

Skills: Graduates are skilled in creative applications of the theory and experimental methods to tackling a wide range of issues of science, research, and engineering, namely analysis of the physics of the issue in question and engineering approach to its solution. Next to the knowledge acquired, typical skills of graduates are adaptability, quick orientation in new interdisciplinary issues, critical analysis of problems, analytical or critical computer-based treatment of a problem, synthesis of findings, and high-quality oral and written presentation of the results obtained. Students´ skills also include the sense of responsibility for the work done and decisions made, because both can have far-reaching consequences for the economy, ecology, and the life of society.

Competence: Due to their skills, knowledge, analytical and systematic approach to problems, and computer competency, graduates are well prepared for jobs in research, industry, the private sector, and even institutes of the Czech Academy of Sciences, higher education, and research and development centres of big companies or other research institutions. Among others, they can occupy positions in non-nuclear and nuclear power generation, in aircraft or transport industry, and even managerial posts. Foreign language training has prepared graduates for cooperation with partners abroad.

State final examination:

- Physical metallurgy - compulsory part of examination
- Applied mechanics – compulsory part of examination
- Disintegration processes – compulsory part of examination

PLASMA PHYSICS AND THERMONUCLEAR FUSION

Area of education: Physics (100 %)

Programme coordinator: doc. Ing. Ondřej Klimo, Ph.D.

Goals and Outcomes:

The degree course is of interdisciplinary character and is oriented towards advanced topics of plasma physics and the related plasma technologies, stressing the management of controlled thermonuclear fusion for the future energy demands of mankind. The course orients graduates towards the use of the acquired body of knowledge in engineering and natural sciences applications and use of the latest computer technology. The degree programme courses offer a deeper insight into the respective disciplines and an adequate overview of the state of the art. Part of the programme consists also in specialized laboratory sessions and independent student projects on individually assigned topics deepening students ´ professional competency. Often, the results of the project are quite unique and are publishable in professional periodicals.

The degree course is oriented towards a body of profound knowledge of mathematics and physics applicable by students to finding solutions to engineering, technological, and research issues of the applied disciplines of physics and of plasma technology, stressing in particular the national and international character of the thermonuclear fusion research. There are three key parts of this Continuation Master Course on Plasma and Thermonuclear Fusion, namely the theory, experimental physics, and fusion technology. Students are instructed to master the basics of all three parts of the programme; nevertheless, they are free to specialize in one of them and choose the optional lectures and the master thesis topic. Lectures on the theory go hand in hand with on-site training on the GOLEM tokamak, internationally famous, used also to design unique plasma practicals. Practical training takes place at partner places of work, in particular in the institutes of the Czech Academy of Sciences (first of all on the COMPASS tokamak). The Faculty membership in EURATOM-IPP.CR is closely linked with the coordinated European fusion research and gives students excellent opportunities for international mobility.

Graduate Profile:

Knowledge: The programme provides students with a detailed knowledge of the theory and technology of plasma physics with a view to research and development and future use in power generation. Students are trained to master the physical and engineering aspects of the discipline.

Skills: The programme clearly orients students towards the issues of science and technology of the sophisticated contemporary challenges arising in applications of plasma physics.

Competence: Graduates are eligible for positions of technical or research staff members qualified in advanced applications of plasma physics, such as thermonuclear fusion reactors of both present-day types, magnetic and inertial plasma confinement, ecology, medicine, materials sciences, research into processes of various states of plasma in space. Thus, the graduates´ complete professional profile is based on the complex of their background, clear prospects for the future, and interdisciplinary training. Therefore, they can easily find jobs in research and modern industry.

State final examination:

- Plasma theory – compulsory part of examination
- Physics of tokamaks – optional part of examination I
- Physics of inertial fusion - optional part of examination I
- Plasma diagnostics – optional part of examination II
- Computational physics – optional part of examination II
- Materials science - optional part of examination II

NUCLEAR CHEMISTRY

Area of education: Chemistry (100 %)

Programme coordinator: prof. Ing. Jan John,CSc.

Goals and Outcomes:

Nuclear chemistry is a scientific discipline concerned with the properties of matter and phenomena of chemical and physico-chemical nature, having origin in the nucleus of the atom, in which the nucleus and its transformations play a participative role. Understanding the properties of the nucleus and its behaviour, can often be immensely helpful in studying and finding solutions to many problems – not only of chemical nature. Such insight, however, is to be based on solid foundations of chemistry and physics.

The Continuation Master Course in Nuclear Chemistry is to train experts for fundamental and applied research and practical applications of nuclear chemistry. The core cluster of compulsory courses offers a deeper knowledge of and skills in nuclear chemistry and its principles in general, and also in three specialized courses, namely: chemistry of the environment and radioecology, applied nuclear chemistry, and nuclear chemistry in biology and medicine. Moreover, the curriculum offers not only compulsory courses, but even courses satisfying students´ interests and giving an overview of the state of the art. The master thesis topic and optional part of the State Final Examination depend on student´s specialization, as given above.

The course curriculum goes even deeper and offers not only theoretical lectures, but also specialized laboratory sessions on solving independently more difficult issues. Student projects are another way how to solve individual assignments on a given topic and get a deeper insight into the issue. These projects often result in quite new findings publishable in professional periodicals. The curriculum takes into account student´s future career and, therefore, comprises a two-week on-site training and research trip one week long to relevant institutions. An expert seminar on the present-day state of nuclear chemistry is also included.

The two-year Continuation Master Course (to be introduced) is suitable for graduates of the Bachelor´s Degree Course in Nuclear Chemistry, but is open also to graduates in other fields, although they will have to complete the knowledge gaps in chemistry , namely the cluster of core lectures, i.e. general nuclear chemistry, detection of ionizing radiation, and dosimetry and radiation protection. All graduates will be professionally qualified to continue their academic training in the doctoral course in Application of Natural Sciences or Nuclear Chemistry at the Faculty of Nuclear Sciences and Physical Engineering or in other doctoral programmes in chemistry or nuclear sciences.

Graduate Profile:

Knowledge: Graduates acquired a profound knowledge of advanced disciplines of nuclear and physical chemistry. Depending on a more specialized orientation, they may use their knowledge and skills in science, engineering, nuclear power engineering, biology, medicine, or protection of the environment. They l also know how to use the basic and advanced analytical, preparative and separation methods in practice.

Skills: The technical skills acquired throughout the degree course are mainly applications of methods and processes of nuclear chemistry to practical solutions of engineering, research, and scientific problems. Graduates adapt easily to new surroundings and new conditions, orient themselves quickly in unknown interdisciplinary problems, are able to analyse

difficult problems and provide a solution or assess, evaluate, and interpret their findings. They accept responsibility for the work done and the decisions made.

Competence: Analytical and complex approach to problems to be solved gives graduates a chance to be efficient members of staff in research and development institutions, in industry, health care, power engineering, or protection of the environment. Their competences in planning and finding solutions to tricky problems and being responsible for their decisions makes graduates good candidates for managerial posts even in non-nuclear sectors. Being systematic and conscientious about their responsibilities, which is a peculiar characteristic of the graduates, is a good recommendation for jobs in supervisory bodies and professional institutions like the State Office for Nuclear Safety (SÚJB), Radioactive Waste Repository Authority (SÚRAO), or the National Radiation Protection Institute (SÚRO), and others. Graduates are also academically qualified to study for a PhD, e.g. in Nuclear Chemistry, or some other doctoral programme in other chemical or nuclear disciplines.

State final examination:

- Physical chemistry - compulsory part of examinationt
- Nuclear chemistry – compulsory part of examination
- Applied nuclear chemistry – optional part of examination
- Chemistry of the environment and radioecology – optional part of examination
- Nuclear chemistry in biology and medicine – optional part of examination

DECOMMISSIONING OF NUCLEAR FACILITIES

Area of education: Physics (46 %), Chemistry (28 %), Power engineering (26 %)
Programme coordinator: doc. Ing. Mojmír Němec, Ph.D.

Goals and Outcomes:

Decommissioning of nuclear installations is a complex interdisciplinary process and to link the disciplines and apply them is demanding as for intellectual, innovation, and engineering decisions to be made. To expedite such a process requires a high degree of professional expertise not only in nuclear installations, their structure and functions, but even in radioactive waste, chemistry, legislation, economy, planning, analyses, and safety. The knowledge required includes also radiation protection and new atomic legislation. Decommissioning is a process affecting not only nuclear installations, but also other workplaces which stopped using sources of ionizing radiation. Decommissioning is subject to the legislation in force.

The course structure of the Continuation Master Course comprises courses built upon the fundamental bachelor course knowledge of nuclear and reactor physics, nuclear chemistry, detection of radiation and dosimetry, and radiation protection. The general knowledge is extended by problems of the whole nuclear fuel cycle, construction materials, construction of nuclear facilities, expected type and level of contamination, decontamination procedures, and waste processing. The degree course programme includes also legislative, safety, economic, ecological and social aspects of the issue, because the aim of decommissioning a nuclear facility is to return the maximum amount of non-contaminated and safe material to the environment. Theory and practical classes go hand in hand: students attend laboratory sessions and computation seminars using modern codes. The programme offers also research trips to and on-site training in institutions using nuclear technology, and communication strategy classes, which are particularly important in this field for addressing the public. Some courses are taught by external specialists, e.g. from the State Office for Nuclear Safety (SÚJB), or those affiliated with companies or institutes already engaged in the decommissioning process.

This two-year Continuation Master Course will suit perfectly graduates who successfully completed the bachelor course in Decommissioning Nuclear Installations (to be opened) at the Faculty of Nuclear Sciences and Physical Engineering. The aim of the two-year course is to educate highly qualified experts in decommissioning nuclear installations - including nuclear waste disposal. Graduates are eligible for posts in science, research, industry, and other jobs; nevertheless, they are also perfect candidates for PhD courses within the programme focused on Application of Natural Sciences in e.g. Nuclear Engineering or Nuclear Chemistry, or other doctoral courses on nuclear and engineering sciences.

Graduate Profile:

Knowledge: Graduates mastered the professional knowledge of the property of materials, nuclear fuel cycle, construction and role of nuclear facilities, decontamination and radioactive waste disposal techniques. They understand the detection methods of ionizing radiation, and applications of the data measured, are able to create monitoring programmes, and other documents as required by the SÚJB legislation. Besides the technical professional knowledge, students develop orientation abilities in legal and economic matters and communication strategies. Seminars run by external experts are an important part of the programme, because students analyse case studies and are informed about the latest issues.

Skills: Graduates can quickly orient themselves in interdisciplinary issues, analyse problems and offer solutions, which is due to their complex interdisciplinary background. Mastery of the principles and role of computational programmes provide students with skills of effective data processing and of simulating the situations to be solved. A specialty skill is safe manipulation of sources of ionizing radiation, including unsealed sources as well as keeping up to date with the new field of industrial practice. Characteristic of graduates is also being responsible for the work done and decisions made.

Competence: Graduates´ competencies comprise analytical and professional way of thinking and a considerable variety of practical skills. Graduates are eligible for a variety of jobs in the decommissioning chain of nuclear facilities, in processes manipulating radioactive wastes, in carrying out projects on radioactive waste repositories, and performing difficult safety analyses. Understanding atomic legislation and competencies of the state administration in peaceful exploitation of nuclear energy offer graduates a favourable opportunity to apply for jobs in the state-administered professional institutions like the State Office for Nuclear Safety (SÚJB), Radioactive Waste Repository Authority (SÚRAO), National Radiation Protection Institute (SÚRO), and others. Graduates may enter either the labour market or continue their academic training in doctoral (PhD) programmes on nuclear and engineering sciences.

State final examination:

- Decommissioning nuclear installations – compulsory part of examination
- Decontamination and manipulating radioactive wastes and spent nuclear fuel – compulsory part of examination
- Nuclear facilities – compulsory part of examination

QUANTUM TECHNOLOGIES

Area of education: Physics 100 %

Programme coordinator: doc. Ing. Martin Štefaňák, PhD.

Goals and Outcomes:

Continuation master's study programme Quantum Technologies is a multidisciplinary study programme aimed at the education of the next generation of experts in the fields of quantum information, quantum communication, quantum optics, lasers physics and technology, condensed matter physics and nanomaterials, who will engage in research and development of modern technologies. The main part of the study is focused on advanced topics of quantum physics and its applications in solid state, light-matter interactions and quantum information. Studies foster independent analytical thinking skills of students and their ability to employ learned methods in various branches of physics and technology. Great emphasis is placed on preparation of students to conduct independent research. Part of the study is the individual student's research project culminating in the master's thesis. Results obtained in the master's thesis will be targeted for publication in a scientific journal.

Graduate Profile:

Knowledge: Graduates acquire a broad knowledge of modern parts of physics, especially of quantum theory, solid state physics and laser theory. Depending on the scientific focus of the graduate the education is further intensified in the fields of quantum optics, quantum information, lasers or nanomaterials. Graduates can proceed with their studies in the follow-up doctoral study programme in the same or related field.

Skills: Application of methods and techniques from various fields of mathematics and physics to solve both theoretical and real-world engineering, research and scientific problems in the areas of quantum theory, classical and quantum optics, quantum information, condensed matter, physics and technology of lasers. Employment of modern computational and laboratory equipment. Ability to pursue modern trends in the respective field of the graduate. Rapid orientation in multidisciplinary issues, analysis of problems and synthesis of results. Responsibility at work and the ability to present the obtained results in a comprehensible way.

Competence: Graduates find application in higher education, research and industry thanks to the acquired knowledge, analytical skills, systematic approach and the ability to work with modern computational technologies. Graduates can work at universities, academic institutes and research and development centers in industry. Competence of graduates lies in the development of modern technologies e.g. in nanomaterials, metrology, informatics or secure communication. Apart from professional expertise the graduates have the ability to succeed in management.

State final examination:

- defence of the diploma project
- oral examination in the general subject
  Methods of Quantum Technologies
- oral examination in two profile subjects with optional choice:
  - Quantum Field Theory
  - Quantum Optics
  - Theory of Solid States
  - Quantum Generators of Optical Radiation
  - Quantum Information and Communication

APPLIED ALGEBRA AND ANALYSIS

Area of education: Mathematics (100 %)

Programme coordinator: doc. RNDr. Dr. Jan Vybíral, Ph.D.

Goals and Outcomes:

The degree course is oriented towards advanced algebraic and analytical methods used in present-day applied mathematics. The course structure is to provide solid foundations for the disciplines of mathematics and to master numerous mathematical methods. The aim of the course is to educate professionals not directly specialized in a single mathematical discipline, but specialists with an overview of a wide spectrum of mathematical disciplines. Throughout the degree course students are intensely trained to develop habits of independent analytical thought, and to employ mathematical methods in many fields of natural sciences and engineering, e.g. in biology, medicine, economy, or information sciences. Within the framework of student projects, research projects, and master thesis students will develop habits for independent work and solution of issues.

The standard duration of the Continuation Master Course is to be 2 years. The course is an immediate follow-up to the Bachelor Degree Course and offers students a complete overview of the spectrum of applicable mathematical disciplines and mathematical methods. The structure of the prestigious course makes use of the long, shared experience of academics and is designed as a continuous sequence of lectures and classes in each academic year, which will develop the academic competences of the bachelor course.

Graduate Profile:

Knowledge: Graduates acquired good foundations of a wide spectrum of mathematical disciplines and, moreover, could choose optional courses in theoretical informatics and informatics in practice. However, great emphasis was placed on applicable algebraic and analytical methods.

Skills: The degree course covers the following advanced disciplines of mathematics: general (universal) algebra, graph theory, functional analysis, variational methods, asymptotic methods, differential calculus on manifolds, introduction to Riemannian geometry, random processes, foundations of modern theory of partial differential equations, theory of semigroups, non-linear optimization, group theory and their representation, and mathematical methods in biology and medicine. Moreover, to acquire a deeper knowledge of more specialized or application-oriented discipline of students´ choice, students may register for many optional lectures.

Competence: Graduates will be able to use the knowledge acquired while analysing and solving actual issues of mathematics in various fields of science and technology. They will be prepared to add and deepen the knowledge of other fields by self-study. The expected characteristics of graduates are responsible approach to the tasks assigned and high standard of presentation skills. Graduates will be prepared to continue their academic training in PhD programmes.

State final examination:

- Functional analysis – compulsory part of examination
- Algebra – compulsory part of examination
- Partial differential equations – optional part of examination
- Advanced probability methods - optional part of examination

POLICIES AND PROCEDURES FOR THE BACHELOR COURSES AND CONTINUATION MASTER COURSES AT THE FACULTY OF NUCLEAR SCIENCES AND PHYSICAL ENGINEERING (FNSPE) OF THE CZECH TECHNICAL UNIVERSITY (CTU) IN PRAGUE

ACADEMIC YEAR 2024-2025

The Policies and Procedures of the FNSPE of the CTU in Prague complement and specify the rules and regulations introduced by the Higher Education Act and the Academic and Examination Statute of the CTU in Prague. This document is binding on all academics and students of FNSPE.

The term **Study Programme** (studijní program in Czech) - as used in this text - refers to the complete programme of academic training duly accredited by FNSPE. The Study Programmes offered by FNSPE are structured and are comprised of Bachelor and Continuation Master Studies. Compliant with the valid accreditation, some Study Programmes are subdivided into **Specializations** (specializace in Czech). If the programme in question does not offer any Specializations, the term **Field of Study** (studijní směr in Czech) refers to the Study Programme. In other cases, it refers to every single Specialization of the Study Programme.

Curriculum (studijní plán in Czech) refers to the set of academic responsibilities to be assumed by students of a specific Field of Study as set by the present Curricula. **Individual Curriculum** (individuální studijní plán in Czech) is a term used to express a unique full-time curriculum which suits a single student, thus, e.g., typically extending a standard curriculum to a longer period of time or adding to it several required prerequisites student did not cope with in the past period of study. **Personal Curriculum** (osobní studijní plán in Czech) then includes the set of personal academic responsibilities (courses to be taken) of a particular student.

Curricula of every single Field of Study of the Bachelor and Continuation Master Programmes, compliant with the CTU Academic and Examination Statute, Sec.4, list both the compulsory and core-elective courses as well as optional courses recommended for the respective Field of Study.

Section 1

Bachelor Programme (BP)

1. Curricula in the Bachelor´s Degree Programme contain compulsory, optional, and core-elective bachelor courses.
2. In the Bachelor Programme, it is not permitted to register for courses of the Continuation Master Programme, the exception being given by Sec. 2, Par. 4 a.

Section 2

Continuation Master Programme (MCP)

1. Curricula in the Field of Study of the Continuation Master´s Degree Programme (CMP) list compulsory, core-elective, and optional master courses. In the Continuation Master Programme, it is not permitted to enrol into courses of the Bachelor´s Degree Programme.
2. To be eligible for the CMP, (in terms of conditions set by law and rules of the admission procedure), all applicants are required to have completed a Bachelor Programme in a related or identical field of study as well as to have successfully passed the entrance examination. However, student may be exempt from the examination on the Dean´s recommendation.
3. If necessary, for the first two years, student on the CMP will have an individual curriculum, so as to attain the competences required for the completed Bachelor´s Degree Course and develop them. The individual curriculum follows from consultations with the respective programme guarantor, and its final version will be available before start of first semester classes.
4. For transfer from the Bachelor Programme to the respective CMP, the following rules are imposed:
   a. In the Bachelor´s Degree Programme, it is possible to register for courses in the recommended 1st year CMP programme provided the credits obtained do not exceed the total number of 30. Such credits must be grated beyond the limit of 180 credits obtained in the Bachelor´s Degree Course.
   b. Provided student has graduated from a Bachelor Course at FNSP and transfers to the CMP, on application, courses listed in the recommended 1st year CMP curriculum can be counted for up to 30 credits if obtained beyond the mandatory minimum of 180 credits as set for the Bachelor Programme by the CTU Academic and Examination Statute.
   c. The CMP will not recognize courses taken within the Bachelor Programme beyond those recommended by the programme of a given field.

Section 3

Registration

1. Bachelor and Continuation Master Degree student will register for the winter semester prior to its beginning. The prerequisite for passage to summer semester is the fulfilment of conditions given by the CTU Academic and Examination Statute, and, upon doing so, student can register for the summer semester, prior to its beginning.
2. Students on higher courses of Bachelor and Continuation Master Programmes will register for the following academic year courses prior to their beginning on having fulfilled passage requirements for the following academic year given by the CTU Academic and Examination Statute.
3. To be eligible for registration to the following academic year, student will have obtained all the required end-of-unit assessments (“zápočet” in Czech, i.e. recognition of the current semester coursework responsibilities) and passed all examinations in the re-registered (i.e. registered for a second time) obligatory courses.

4. Student will register for each course in the electronic information system of the CTU in order that they may function as their personal semester/year study curriculum according to Par.1 and 2, respectively, in agreement with these procedures and the CTU Academic and Examination Statute. To register, the following rules are to be observed:
   a. All students of respective fields of study will register for compulsory courses (see Sec. 4 and 5).
   b. Student will register for optional and core-elective courses according to their choice, taking into account the rules of the curriculum, in particular the sequence of courses, sometimes subject to and required by the curriculum of the field of study.
   c. Bachelor students of a given study programme may register for optional courses of their programme (recommended optional courses or any other courses of other bachelor programmes offered at FNSPE). Upon this, these courses are regarded as an optional part of student´s respective curriculum.
   d. Master students of a given continuation study programme may register for optional courses in the same programme (recommended optional courses) or any courses in the continuation master study programmes of FNSPE. Upon this, these courses are regarded as an optional part of student´s respective field of study curriculum.
   e. Registration to an optional course offered by another institution of higher education is possible on student´s application to the Department of Student Affairs. If successful, student can list the course as optional in their curriculum.
5. Student must not re-register for the same course if they have passed the examination or obtained the "zápočet", as the case may be.
6. If student has discontinued their study in the immediately preceding semester, requirements to be fulfilled are postponed towards the next registration.
7. Details on registration are gradually specified by notices of the Department of Student Affairs.

Section 4

Compulsory Courses under Changes in Curricula

1. If in the course of their programme, a compulsory course is removed from the list, student is not required to complete it; if, however, the respective course is replaced by another compulsory course (and its title or extent is changed, its contents remaining unaltered), student is obliged to take the new course (unless they have completed its previous version).
2. When included into student´s curriculum, the new course must be completed only by students studying no longer than the year of the recommended curriculum to which the new course is transferred. If required, the decision to take the course is made by the head of the respective department guaranteeing the corresponding field of study.

Section 5

Measuring and Assessing Student´s Academic Attainment

1. The main instruments for assessing and measuring student´s academic attainment include the end-of-unit-assessment ("zápočet"), graded assessment ("klasifikovaný zápočet"), and examinations. The term "end-of-unit assessment only" ("samostatný

zápočet“) is used if the course is not concluded by an examination. Obtaining a “zápočet“ is a prerequisite for being admitted to take an examination preceded by such “zápočet“.

2. Examinations are usually administered during the respective semester examination period. An adequate number of evenly spread examination dates will be announced by the tutor in order that students may take the examination within the examination period.
3. End-of-unit assessments and examinations may not be administered before student has completed the respective course. If registered for the course a second time, student may take the end-of-unit assessment or examination any time in the course of the academic year provided they have fulfilled all academic obligations to finish the course and obtained the tutor´s agreement.
4. Winter semester examinations and end-of-unit assessments may be administered during the summer semester or summer semester examination period. No examinations and tests for the end-of-unit assessment for the past academic year will be administered after commencement of the next academic year.
5. To take an examination, student will have registered for it and gained the end-of-term assessment (if required by the curriculum). If student has registered for an examination date and cannot be present for the examination on the chosen date, an advance apology must be made. A belated apology is accepted for serious reasons of absence (mainly on health), but no later than 5 days after the examination date they have been registered for. The examiner will judge the legitimacy of the apology. If student failed to be present for the examination and no apology was made in advance or was not accepted, the examination term expires and the examination is graded as “failure”.
6. If student has not registered for any examination in the respective course within the examination period and has not made any arrangements with the examiner as to the examination term, the examination is graded as “failure.”
7. The tutor´s/examiner´s obligation is to enter immediately the result/grade into the CTU electronic information system, within 5 days at the latest, and the department´s non-electronic registers independent of the CTU´s electronic system. If student requests recognition of a course on the list of some other degree course or in cases given by notices concerning student on Bachelor or Continuation Master Courses, such entries may be the responsibility of the Study Office.
8. The succession of courses is stated in the recommended time schedule of the programme and student will adhere to it for course registrations. Provided the courses run for more semesters or in succession, student cannot obtain an end-of-unit assessment only (“samostatný zápočet“) or take an examination in a course scheduled for a later semester unless they have satisfied the requirements of the previous course. The eligibility requirements are specified by the head of the department responsible for the course.
9. Courses marked A or B are understood to comprise one course, as given by the Academic and Examination Statute of CTU.

Section 6

Languages

1. As part of the Bachelor Programme, student will register for and pass examinations in two of the foreign languages offered in the curriculum. Foreign students – with the exception

of Slovak students and those who passed an examination in Czech as part of their school-leaving examination - will register for Czech as their second foreign language.

2. Language courses, according to Par. 1, are offered in three to five semester cycles, the exception being students of Applied Information Technology. The time schedule of these courses is part of the curriculum.
3. According to Par. 2, each semester is a self-contained unit concluded by a "zápočet". If student is re-admitted to the Bachelor Course (i.e. registers for it a second time), they do not have to re-register for the parts of cycle they had already passed. Semesters of the cycle follow the course sequence stated in Section 5, Par.8. Each semester of the cycle is concluded by a "zápočet" only if student has obtained a "zápočet" for the previous semester course. The language programme cycle is concluded by an examination.
4. Language courses can be offered in several groups according to student´s language competence. The level of course to be chosen rests with the student and takes into account their previous language training and results achieved. Transfers between courses are possible solely on tutor´s recommendation or student´s application, within two weeks of language course commencement, but not later.
5. Applied Information Technology programme follows an extended language programme targeted at professional oral and written communication and includes also a second foreign language course of student´s choice. The time schedule of these courses is part of this study programme curriculum. The bachelor project in this study programme is submitted and defended in English. Supposing they have satisfied criteria defined by the Department of Humanities and Languages, and having completed 5 semesters of the Applied Informatics programme, student can register for a State Language Examination.
6. Exceptions to compulsory training in more than two foreign languages are judged by the Department of Humanities and Languages on individual basis. Student can choose and register for a third language only if they had concluded the cycle of two languages as stated in Par.1 of this Section.
7. Details for language training are given in the binding regulations for language courses issued by the Department of Humanities and Languages.

Section 7

Bachelor Project, Research Project, and Master Thesis

1. A compulsory part of the Bachelor´s Degree Course is the Bachelor Project defended by student as part of the State Final Examination. A compulsory part of the Continuation Master Course is a Research Project and Master Thesis. Student may not register for them while still registered for the Bachelor Course. The Research Project is defended before the board nominated by the respective department. Defence of the Master Thesis is part of the State Final Examination. The Research Project can be assigned only after student has defended their Bachelor Project. The degree thesis can be assigned only after student has completed and successfully defended Research Project 2.
2. The administrators (guarantors) will announce the topics of Bachelor Projects, Research Projects, and Master Theses no later than end of the previous academic year. Bachelor

Projects and Master Theses are assigned to students by the Dean; Research Projects are assigned to students by the Head of Department.

3. The Bachelor Project, Research Project, as well as Master Thesis will be written in Czech, Slovak, or English.
4. The Bachelor Project, Research Project as well as Master Thesis can be assigned in Czech or in English. The Czech version of these assignments will include the title (both in Czech and English). The outline, recommended literature, supervisor´s name and affiliation, date of assignment, and date of submission will be written in Czech. If the Bachelor Project, Research Project, or Master Thesis is assigned in English, a Czech version of the assignment must be also prepared. The topic of the assignment must be in agreement with the domain of education to which the study programme belongs. The assignment is valid for two years.
5. The Bachelor Project, Research Project, and Master Thesis are assigned to student at the beginning of the winter and/or summer semester. It is the student‘s obligation to receive the work assignment within 40 days from the beginning of semester. If student fails to do so, the assignment is postponed until the next semester. Assignment of the Bachelor Project and Master Thesis at an extraordinary term is a prerogative of the Dean, whereas assignment of the research project at an extraordinary term is a prerogative of the Head of Department.
6. The Bachelor Project and Master Thesis will include items required for bibliography (in Czech: the title, author’s name, study programme (or its specialization), type of work, supervisor, consulting tutor (if assigned), abstract, and key words; in English: the title, author‘s name, abstract, key words, as well as work assignment in compliance with the principle of public access to Bachelor Projects and Master Theses according to the given standard.
7. Student will submit the Bachelor Project or Master Thesis to the respective department electronically via the KOS component. If a proposal is presented to postpone public access to the Bachelor Project or Master Thesis (pursuant to Sec. 47b, par. 4 of Act N.111 1998 Coll. on Higher Education as altered and amended), student will also submit one bound hard copy.
8. If justified, on the supervisor´s suggestion public access to the project or thesis may be postponed for 1, 2, or 3 years. An application to do so justifying postponement (and signed by the Head of Department) must be submitted along with the Bachelor Project and Master Thesis, but no later than 30 days prior to submission.
9. The Bachelor Project and Master Thesis are evaluated by the supervisor and reviewed by at least one reviewer. In their reviews they also suggest the final grade.
10. Bachelor Projects and Master Theses are submitted by the date given in the time schedule of the academic year, taking also into account the dates of the State Final Examination, i.e. at least three weeks prior to the first day of the State Final Examination of the given field of study or specialization.
11. If student fails to submit the Bachelor Project or the Master Thesis at the time agreed, the assignment can still be used for the time period it is valid. If, however, student fails to observe the scheduled deadline and the Bachelor Project or Master Thesis is submitted after the assignment validity has come to an end, a new assignment has to be given.

12. Supervisor´s and reviewer´s reports must be made available to student at least 5 working days prior to the date of the State Final Examination.
13. Academic degree status of the person supervising the Bachelor Project or Master Thesis is expected to be at least a level above the level of the degree programme to be achieved by student. Exceptions are subject to decision of the Scientific Board of FNSPE.
14. In case the supervisor is a professional not affiliated with the university, a requisite for nominating a consulting co-supervisor is employment relationship with CTU.
15. Reviewer of the Master Thesis may not be nominated from the same place of work (e.g. the department, division) as the supervisor, which, however, does not refer to the Bachelor Project. An exception may be made on application submitted to the Department of Student Affairs and assessed by the Dean.
16. The peer-review must include

    - Type of review (written by the supervisor / the reviewer).
    - Title of the reviewed work.
    - Author´s name, surname and titles/degrees, as applicable.
    - Final grade, written in full and in letter form.
    - Details on the reviewer´s place of work.
    - Review date.

17. Technicalities of submitting the Research Project and defending it, as well as conditions for administering the "zápočet" are within responsibility of the Head of Department and so is the defence of the Research Project, usually held at two ordinary dates - namely after end of the winter/summer semester courses of the academic year. In case student fails to defend their Research Project at an ordinary date, they can defend it (within the same registration) at an extraordinary date during the prolonged examination period of the academic year.

18. Bachelor Project 1, Research Project 1 and Master Thesis 1 courses run for two semesters. Thus, student cannot register for Bachelor Project 1 and Bachelor Project 2, Research Project 1 and Research Project 2 courses in the same semester, and, likewise, for Master Thesis 1 and Master Thesis 2 courses. These courses can be passed provided student meets the requirements given in the valid work assignment. The students obtains the assignment in the semester first registering for the first part of the course. Student may not register for the Master Thesis 1 course before the semester following their successful defence of Research project 2.

Section 8

Study Visits Abroad

1. As part of their Bachelor and Continuation Master Programme, student may spend some time on a study visit or bilateral agreement exchange programme abroad. These activities, as e.g. ERASMUS+ programme or ATHENS, are organized by the International Office at the CTU Rector´s Office.

2. All study visits of Bachelor and Continuation Master Programme students follow the rules and regulations of CTU and are recorded by the Department of Student Affairs of FNSPE CTU in Prague. These rules also include the following conditions for study visits of CTU students:
    a. student on any type of degree course is eligible for 2 long-term visits abroad not exceeding 2 semesters
    b. under extraordinary conditions the visit may be extended on application addressed to the Department of Student Affairs
    c. MCP student´s intention to work on some part of the Master Thesis or complete it abroad within their visit is to be confirmed by the consent given in writing by the respective Head of Department and also including the name of the assigned deputy supervisor of the thesis from the respective host institution. The statement confirms that both parties agreed on details concerning thesis supervision, and the supervisor gave a written consent to the procedures agreed. The same refers to a research project.
    d. student staying abroad can be signed in for the semester without being registered for a specific course; in well-founded cases they may apply for exception on a standard application addressed to the Department of Student Affairs.

3. In compliance with the CTU‘s rules, arrangements for a study visit or exchange programme abroad comprise:
    a. student´s study schedule approved of by the respective department and submitted to the Department of Student Affairs of FNSPE CTU prior to the visit
    b. assessment and evaluation of the study visit and programme taken abroad, credit and course transfer approved by the respective department and FNSPE Department of Student Affairs
    c. fulfilment of general requirements set by the CTU Academic and Examination Statute (i.e. gaining at least 20 credits per semester transferred from the host university)

Section 9

Completion of Study Programme

1. In compliance with the Academic and Examination Statute of the CTU in Prague, student will conclude their studies by having finished their curriculum and passed the State Final Examination including defence of the Master Thesis or Bachelor Project.
2. To complete the Bachelor Degree Programme curriculum, student must have passed examinations in all compulsory courses of their respective curriculum (see Sections 4 and 5), having gained at least 180 credits.
3. To complete the Continuation Master Programme (MCP), student must have passed examinations in all compulsory and core-elective courses as stated in the respective curriculum (see Sec. 4 and 5 with respect to Sec. 2, Par. 1) and gained at least 120 credits.

Section 10

State Final Examination

1. Student is eligible to take the State Final Examination only if they have completed their curriculum, gained the required number of credits, and submitted by the given date their Bachelor Project or Master Thesis.
2. State Final Examinations of the Bachelor´s Degree Programme may be held at two terms: usually in September or in February, which is in accordance with the time schedule of the Academic Year or at an extraordinary date subject to the respective department´s request.
3. State Final Examinations of the Continuation Master Programme are held at two terms (usually in June or February) according to the time schedule of the Academic Year, or on an extraordinary term subject to the respective department´s request.
4. Student's application for admission to the State Final Examination will include the optional subjects chosen for the examination. Applications for the February term are accepted by the end of November of the previous calendar year, for June term by the end of March, and for the September term by the end of May, or no later than two months prior to the extraordinary term of State Final Examinations. The examination terms are given in the time schedule of the Academic Year. Applications submitted after the given date will not be considered.
5. If student did not take the State Final Examination in the Academic Year they had submitted the Bachelor Project or Master Thesis, the respective review reports are no longer valid.
6. The examination follows the Rules of Procedure of the State Final Examination issued by the Dean.
7. The oral part of the State Final Examination in the Bachelor Programme or Continuation Master Programme consists of a core subject or subjects out of the package of specialization courses (with a possible option) and a subject or subjects of more detailed specialization (with a possible option). The number of subjects in a respective category (common core, specialization), as well as option are defined according to the definition of the State Final Examination included in the accreditation materials of the respective field of study.
8. In accordance with the CTU Academic and Examination Statute, student must take the State Final Examination, and, if such is the case, retake it, within one year and a half of the date they have satisfied all the other requirements of the study programme. The date is understood to be the last day of examination period of the last semester student was registered for courses of their personal curriculum. Afterwards, this student still remains enrolled as a student until they have passed the last part of the State Final Examination; however, this period must not exceed one and a half year.

Section 11

Termination of Studies

1. By virtue of Sec. 56, Par. 1, Letter b) of Act No. 111/19898 of Coll., as amended, and Sec. 34, Par. 7, Letter b) of the Academic and Examination Statute of CTU, these documents state the following conditions for terminating studies due to failure to satisfy

the requirements and academic obligations following from the study programme and Academic and Examination Statute of CTU:

- failure to fulfil academic responsibilities and gain 15 credits after the first semester on the Bachelor Programme and 20 credits after the first semester on the Master Programme
- failure to gain "zápočet" after second registration for a compulsory course
- failure to pass examination on last retake after second registration for a compulsory course
- failure to pass examination by the end of Academic Year after second registration for a compulsory course
- failure to satisfy eligibility conditions to register for the next Academic Year (semester)
- failure to pass the State Final Examination within one and a half year of completing studies
- failure to pass the State Final Examination within the maximum study period
- failure to pass the retaken State Final Examination

2. Other reasons for terminating studies:

- failure to register for academic year within a given period without accepted apology or failure to perform electronic registration within the given period of time
- failure to register after the end-date of discontinued studies
- failure to register for courses after period of deferral
- transfer to other faculty
- withdrawal from studies
- expulsion from the CTU

Dean of the Faculty

EXPLANATORY NOTES

for notations in the curriculum

The curriculum contains in each row

- course name
- shortcut used in the university database KOS
- name of the lecturer
- extent in the winter and summer semester
- credits in the winter and summer semester

In case the course spans over two semesters with different parts denoted by numbers, they can be contained in one row.

The extent of the course is indicated by number of teaching hours of the lecture + number of teaching hours of the lecture together with the indication of the grading (see later in this text). In case the teaching hours of the lecture and exercise are not distinguished, the course extent is indicated by one number.

LANGUAGE COURSES IN THE ENGLISH BACHELOR PROGRAMME IN PRAGUE:

It is obligatory for a student to attain a pass in the Czech language course as well as in a second foreign language course of his/her choice, i.e. English (advanced course), German, French, Russian, or Spanish. The student qualifies for the examination only after he/she has been awarded all the required assessments ("zápočet" in Czech) in the respective language course. Beginners courses of English and German are not offered.

Czech language course – duration: **beginners course:** 3 semesters - 2 classes per week, opening in the 1st semester of the Bachelor Programme

English - advanced language course - duration: 3 semesters – 2 classes per week, opening in the 3rd semester of the Bachelor Programme

Other language courses (French, Russian, Spanish) - duration: **beginners course:** 5 semesters - 4 classes per week, opening in the 2nd semester of the Bachelor Programme

Other language courses (French, German, Russian, Spanish) - duration: **intermediate and advanced course:** 3 semesters - 2 classes per week, opening in the 3rd semester of the Bachelor Programme

1st year				
Semester	winter	summer	credits	
Czech language for foreigners - beginners	0+2 z	0+2 z	2	2
Second foreign language - beginners	-	0+4 z	-	2

2nd year				
Semester	winter	summer	credits	
Czech language for foreigners - beginners	0+2 z, zk	-	2/4	-
Second foreign language - English language - advanced	0+2 z	0+2 z	2	2
Second foreign language - beginners	0+4 z	0+4 z	2	2
Second foreign language – intermediate /advanced	0+2 z	0+2 z	2	2

3rd year				
Semester	winter	summer	credits	
English language - advanced	0+2 z, zk	-	2/4	-
Second foreign language - beginners	0+4 z	0+4 z, zk	2	2/3
Second foreign language – intermediate /advanced	0+2 z, zk	-	2/4	-

HOW TO REGISTER FOR FOREIGN LANGUAGE COURSES - DETAILS FOR EVERY YEAR OF THE BACHELOR PROGRAMME

Czech:		
beginners (Z)		
04XCESZ1	0+2 z	WS
04XCESZ2	0+2 z	SS
04XCESZ3	0+2 z	WS
04XCESZZK	zk	
z (zápočet) - assessment – 2 credits		
zk (zkouška) - examination – 4 credits		

Second foreign language:

English:		
advanced (P)		
04XAP1	0+2 z	WS
04XAP2	0+2 z	SS
04XAP3	0+2 z	WS
04XAPZK	zk	
z (zápočet) - assessment – 2 credits		
zk (zkouška) - examination – 4 credits		

German:				
intermediate (M)			*advanced (P)*	
04XNM1	0+2 z	WS	04XNP1	0+2 z
04XNM2	0+2 z	SS	04XNP2	0+2 z
04XNM3	0+2 z	WS	04XNP3	0+2 z
04XNMZK	zk		04XNPZK	zk
z (zápočet) - assessment – 2 credits			z (zápočet) - assessment – 2 credits	
zk (zkouška) - examination – 4 credits			zk (zkouška) - examination – 4 credits	

French:		
beginners (Z)		
04XFZ1	0+4 z	SS
04XFZ2	0+4 z	WS
04XFZ3	0+4 z	SS
04XFZ4	0+4 z	WS
04XFZ5	0+4 z	SS
04XFZZK	zk	
z (zápočet) - assessment – 2 credits		
zk (zkouška) - examination - 3 credits		

French:				
intermediate (M)			*advanced (P)*	
04XFM1	0+2 z	WS	04XFP1	0+2 z
04XFM2	0+2 z	SS	04XFP2	0+2 z
04XFM3	0+2 z	WS	04XFP3	0+2 z
04XFMZK	zk		04XFPZK	zk
z (zápočet) - assessment – 2 credits			z (zápočet) - assessment – 2 credits	
zk (zkouška) - examination – 4 credits			zk (zkouška) - examination – 4 credits	

Spanish:		
beginners (Z)		
04XSZ1	0+4 z	SS
04XSZ2	0+4 z	WS
04XSZ3	0+4 z	SS
04XSZ4	0+4 z	WS
04XSZ5	0+4 z	SS
04XSZZK	zk	
z (zápočet) - assessment – 2 credits		
zk (zkouška) - examination – 3 credits		

Spanish:					
intermediate (M)				*advanced (P)*	
04XSM1	0+2 z	WS		04XSP1	0+2 z
04XSM2	0+2 z	SS		04XSP2	0+2 z
04XSM3	0+2 z	WS		04XSP3	0+2 z
04XSMZK	zk			04XSPZK	zk
z (zápočet) - assessment – 2 credits				z (zápočet) - assessment – 2 credits	
zk (zkouška) - examination – 4 credits				zk (zkouška) - examination – 4 credits	

Russian:		
beginners (Z)		
04XRZ1	0+4 z	SS
04XRZ2	0+4 z	WS
04XRZ3	0+4 z	SS
04XRZ4	0+4 z	WS
04XRZ5	0+4 z	SS
04XRZZK	zk	
z (zápočet) - assessment – 2 credits		

zk (zkouška) - examination – 3 credits

Russian:					
intermediate (M)				*advanced (P)*	
04XRM1	0+2 z	WS		04XRP1	0+2 z
04XRM2	0+2 z	SS		04XRP2	0+2 z
04XRM3	0+2 z	WS		04XRP3	0+2 z
04XRMZK	zk			04XRPZK	zk
z (zápočet) - assessment – 2 credits				z (zápočet) - assessment – 2 credits	
zk (zkouška) - examination – 4 credits				zk (zkouška) - examination – 4 credits	

For detailed information on language courses see Art. 6 of the Policies and Regulations for Bachelor´s and Master´s Degree Programmes at FNSPE and also Rules for Language Study available on the web pages of the Department of Humanities and Languages.

Bachelor´s Degree Programme

Physical Engineering

Specialization Physical Engineering of Materials 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
History of Physics 1	02DEF1	Jex	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Preparatory week	00PT	FJFI	1 week z	-	2	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Electricity and Magnetism	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Introduction to Engineering	17UING	Frýbort, Haušild, Mušálek	2+1 kz	-	3	-
Language Courses (3)	04.	KHVJ	-	-	-	-
Optional courses:						
Minimum in Mathematics 1	00MAM1	Břeň	0+1 z	-	1	-
Minimum in Mathematics 2	00MAM2	Pošta	0+1 z	-	1	-
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Fundamentals of Physical Measurements 1, 2	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Creation of Electronic Documents	14TED	Materna	0+2 z	-	2	-
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
General Chemistry 1, 2 (4)	15CH12	Distler	2+1 z	2+1 z, zk	3	3

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken provided the assessment in 01LAL is obtained.
(3) Enrollment in language courses follows the rules given separately.
(4) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Physical Engineering

Specialization Physical Engineering of Materials 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus B 3, 4	01ANB34	Krbálek, Kolář	4+4 z, zk	2+4 z, zk	8	6
Numerical Methods 1	12YNME1	Váchal	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Teoretická fyzika 1(1)	02TEF1	Hrivnák, Novotný P.	2+2 z, zk	-	4	-
Engineering Mechanics	14TEM	Kunz	2+2 z, zk	-	4	-
Dynamics of Linear Systems	14DYLS	Kunz	-	1+1 z, zk	-	2
Electron Microscopy	14ELM	Karlík	-	2+0 kz	-	2
Language Courses (2)	04..	KHVJ	-	-	-	-
Required optional courses (3)						
Materials Characterization	14CHMA	Haušild, Tesař	2+1 kz	-	4	-
Experimental Laboratory 1, 2	02PRA12	Bielčík, Rojas	0+4 kz	0+4 kz	6	6
Practicum in Materials	14PMA	Karlík, Tesař	-	0+2 kz	-	3
Social Sciences						
Rhetoric	00RET	Vadillo	0+2 z	-	1	-
Optional courses:						
Experimental Physics	02EXF	Křížková-Gajdošová, Trzeciak	2+0 zk	-	2	-
Introduction to Probability 1, 2	01UP12	Krbálek, Vybíral	1+1 z, zk	1+1 z, zk	3	3
Seminar on Mathematical Physics	02SMF	Hlavatý	0+2 z	-	2	-
Basic Electronics 1, 2	12ZEL12	Pavel	2+1 z, zk	2+1 z, zk	3	3
Computer Algebra Systems	12PAS	Šiňor	1+1 z	-	2	-
Introduction to Scientific Computing	12UVP	Šiňor	-	1+1 z	-	2
Seminar on Solid State Physics	11SFIPL	Kalvoda	1+1 kz	-	2	-
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1

(1) Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(2) Enrollment in language courses follows the rules given separately.
(3) To obtain 6 credits at least is obligatory.

Bachelor´s Degree Programme

Physical Engineering

Specialization Physical Engineering of Materials 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Fundamentals of Solid State Physics	11ZFP	Kalvoda, Mihóková	2+0 zk	-	3	-
Bachelor Project 1, 2	14BPFI12	Kalvoda, Kunz	0+5 z	0+10 z	5	10
Bachelor Seminar	11BSEM	Kalvoda, Havlíková	-	0+2 z	-	1
Quantum Physics	02KF	Jizba	2+1 z, zk	-	3	-
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Elasticity 1	14EM1	Materna, Oliva	2+2 z, zk	-	5	-
Numerical Methods 2	01NME2	Beneš	-	2+0 kz	-	2
Metal Physics	14FKO	Čech, Karlík	-	4+2 z, zk	-	6
Practicum in Finite Elements Methods	14PMKOP	Materna	-	0+2 zk	-	3
Testing and Processing of Metals and Alloys	14ZZKOS	Lauschmann, Mušálek	-	2+2 z, zk	-	4
Language Courses (2)	04...	KHVJ	-	-	-	-
Optional courses:						
Instrumentation and Measurement	11ELEA	Jiroušek	-	2+0 z, zk	-	2
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1
Structure of Solid State	11SPL	Kolenko, Kraus	2+2 z, zk	-	4	-
Applications of Group Theory in Solid State Physics	11APLG	Potůček	2+0 zk	-	2	-
Nanotechnology	12NT	Hulicius, Proška	2+0 zk	-	2	-
Programming in MATLAB	18PMTL	Kukal	0+4 kz	-	4	-
Fundamentals of Optics	12ZAOP	Kwiecien	2+0 z, zk	-	2	-

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Physical Engineering

Specialization Plasma Physics and Thermonuclear Fusion 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Preparatory week	00PT	FJFI	1 week z	-	2	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Electricity and Magnetism	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Introduction to Laser Technology	12ULTB	Jelínková, Němec, Šulc	-	2+1 kz	-	3
Seminar on Plasma Physics	02SFP	Svoboda	-	0+2 z	-	2
Language Courses (3)	04..	KHVJ	-	-	-	-
Optional courses:						
Minimum in Mathematics 1	00MAM1	Břeň	0+1 z	-	1	-
Minimum in Mathematics 2	00MAM2	Pošta	0+1 z	-	1	-
History of Physics 1	02DEF1	Jex	2+0 z	-	2	-
Discrete Mathematics 1, 2 (4)	01DIM12	Masáková	2+0 z	2+0 z	2	2
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Fundamentals of Physical Measurements 1, 2 (4)	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Introduction to Solid State Physics	11UFP	Kolenko	-	2+0 zk	-	3
Physical Seminar 1	02FYS1	Petrásek	0+2 z	-	2	-
Fundamentals of Algorithmization	18ZALG	Virius, Jarý	-	2+2 z, zk	-	4
General Chemistry 1, 2 (5)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
Introduction to Photonics and Nanostructures	12UFN	Kwiecien, Richter, Proška	-	2+1 kz	-	3

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken provided the assessment in 01LAL is obtained.
(3) Enrollment in language courses follows the rules given separately.
(4) The indicated courses can be scheduled simultaneously.
(5) Enrollment of 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Physical Engineering

Specialization Plasma Physics and Thermonuclear Fusion 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus B 3, 4	01ANB34	Krbálek, Kolář	4+4 z, zk	2+4 z, zk	8	6
Numerical Methods 1	12YNME1	Váchal	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Theoretical Physics 1(1)	02TEF1	Hrivnák, Novotný P.	2+2 z, zk	-	4	-
Experimental Laboratory 1, 2	02PRA12	Bielčík, Rojas	0+4 kz	0+4 kz	6	6
Experimental Physics	02EXF	Křížková-Gajdošová, Trzeciak	2+0 zk	-	2	-
Laboratory of Plasma Diagnostics	02UPP	Brotánková, Svoboda	-	0+2 kz	-	3
Language Courses (2)	04..	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	0+2 z	-	1	-
Optional courses:						
Theoretical Physics 2 (3)	02TEF2	Hrivnák, Novotný P.	-	2+2 z, zk	-	4
Discrete Mathematics 3	01DIMA3	Dvořáková	2+0 zk	-	2	-
Introduction to Probability 1, 2	01UP12	Krbálek, Vybíral	1+1 z, zk	1+1 z, zk	3	3
Introduction to Elementary Particle Physics	02UFEC	Matas	2+0 z	-	2	-
Introduction to Curves and Surfaces 1	02UKP1	Hlavatý	-	1+1 z	-	2
Seminar on Mathematical Physics	02SMF	Hlavatý	0+2 z	-	2	-
Special Theory of Relativity	02STR	Břeň	-	2+0 zk	-	2
Basic Electronics 1, 2 (4)	12ZEL12	Pavel	2+1 z, zk	2+1 z, zk	3	3
Selected Topics in Modern Physics (4)	12VPMF	Pšikal	-	2+1 z	-	3
Programming in C++ 1, 2	18PRC12	Virius, Jarý	2+2 z	2+2 kz	4	4
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1

(1) Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(2) Enrollment in language courses follows the rules given separately.
(3) Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed.
(4) The indicated courses can be scheduled simultaneously.

Bachelor´s Degree Programme

Physical Engineering

Specialization Plasma Physics and Thermonuclear Fusion 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Fundamentals of Solid State Physics	11ZFP	Kalvoda, Mihóková	2+0 zk	-	3	-
Bachelor Project 1, 2	02BPTF12	Svoboda	0+5 z	0+10 z	5	10
Bachelor Seminar	11BSEM	Kalvoda, Havlíková	-	0+2 z	-	1
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Quantum Physics	02KF	Jizba, Petrásek	2+1 z, zk	-	3	-
Vacuum Technology	12VKT	Petráček, Švejkar	2+2 kz	-	4	-
Fundamentals of Electrodynamics	12ZELD	Šiňor	1+1 z, zk	-	2	-
Fundamentals of Nuclear Physics	02ZJFY	Wagner	3+2 z, zk	-	5	-
Introduction to Computational Physics 1	12UPF1	Kuchařík, Liska	1+1 z, zk	-	2	-
Introduction to Nuclear Fusion	02UFU	Brotánková, Ficker	-	2+2 z, zk	-	4
Principles of Plasma Physics	12ZFP	Limpouch, Jirka	-	3+1 z, zk	-	4
Power Engineering	17ENER	Novák, Tichý	-	2+0 zk	-	2
Language Courses (2)	04...	KHVJ	-	-	-	-
Optional courses:						
Introduction to Curves and Surfaces 2	02UKP2	Hlavatý	1+1 z	-	2	-
Transport Phenomena/Nonequilibrium Systems	02TJNS	Jex	-	2+0 kz	-	2
Atomic and Molecular Spectroscopy	02AMS	Civiš	2+2 z, zk	-	4	-
Basic Optical Laboratory	12ZPOP	Jančárek	-	0+4 kz	-	6
Basic Laser Technology Laboratory (3)	12ZPLT	Blažej	-	0+4 kz	-	6
Measurement and Data Processing	12ZMDT	Blažej, Procházka	1+1 z, zk	-	2	-
Engineering Mechanics	14TEM	Kunz	2+2 z, zk	-	4	-
Fundamentals of Ionizing-Radiation Metrology	16MEZB	Čechák, Novotný P.	2+1 z, zk	-	4	-
Fundamentals of Radiation Dosimetry 1, 2	16ZDOZ12	Trojek	2+2 z, zk	2+0 zk	4	2
Fundamentals of Electronics	17ZEL	Kropík	2+2 kz	-	3	-
Molecular Physics	12MOF	Michl, Proška	-	2+0 zk	-	2
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.
(3) Enrollment in 12ZPLT is possible only after passing 12ULTB.

Bachelor´s Degree Programme

Physical Engineering

Specialization Solid State Engineering 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
History of Physics 1	02DEF1	Jex	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Preparatory week	00PT	FJFI	1 week z	-	2	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Electricity and Magnetism	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Introduction to Solid State Physics	11UFP	Kolenko	-	2+0 zk	-	3
Language Courses (3)	04.	KHVJ	-	-	-	-
Optional courses:						
Minimum in Mathematics 1	00MAM1	Břeň	0+1 z	-	1	-
Minimum in Mathematics 2	00MAM2	Pošta	0+1 z	-	1	-
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Fundamentals of Physical Measurements 1, 2	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
General Chemistry 1, 2 (4)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
Introduction to Photonics and Nanostructures	12UFN	Kwiecien, Richter, Proška	-	2+1 kz	-	3
Fundamentals of GNU Plot	11GPL	Dráb	0+2 z	-	2	-
Basics of Algorithmization	18ZALG	Virius, Jarý		2+2 z, zk		4
Programming in Python 1	18PPY1	Klinkovský, Mojzeš		2 z		2

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken provided the assessment in 01LAL is obtained.
(3) Enrollment in language courses follows the rules given separately.
(4) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Physical Engineering

Specialization Solid State Engineering 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus B 3, 4	01ANB34	Krbálek, Kolář	4+4 z, zk	2+4 z, zk	8	6
Numerical Methods 1	12YNME1	Váchal	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Structure of Solid State	11SPLA	Kolenko, Kraus	2+2 z, zk	-	4	-
Seminar on Solid State Physics	11SFIPL	Kalvoda	1+1 kz	-	2	-
Theoretical Physics 1(1), 2 (2)	02TEF12	Hrivnák, Novotný P.	2+2 z, zk	2+2 z, zk	4	4
GNU Programming	11GNU	Dráb	-	2+2 kz	-	4
Language Courses (3)	04..	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	0+2 z	-	1	-
Optional courses:						
Experimental Physics	02EXF	Křížková-Gajdošová, Trzeciak	2+0 zk	-	2	-
Introduction to Probability 1, 2	01UP12	Krbálek, Vybíral	1+1 z, zk	1+1 z, zk	3	3
Experimental Laboratory 1, 2	02PRA12	Bielčík, Rojas	0+4 kz	0+4 kz	6	6
Seminar on Mathematical Physics	02SMF	Hlavatý	0+2 z	-	2	-
Basic Electronics 1	12ZEL1	Pavel	2+1 z, zk	-	3	-
Seminar on Computer Simulations	11SPS	Drahokoupil	-	0+2 z	-	2
Computer Algebra Systems	12PAS	Šiňor	1+1 z	-	2	-
Introduction to Scientific Computing	12UVP	Šiňor	-	1+1 z	-	2
Electron Microscopy	14ELM	Karlík	-	2+0 kz	-	2
Programování v Pythonu 2, 3	18PPY23	Klinkovský, Pecinovský	2 z	2 z	2	2
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1

(1) Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(2) Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed.
(3) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Physical Engineering

Specialization Solid State Engineering 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Fundamentals of Solid State Physics	11ZFP	Kalvoda, Mihóková	2+0 zk	-	3	-
Bachelor Project 1, 2	11BPFI12	Kalvoda	0+5 z	0+10 z	5	10
Bachelor Seminar	11BSEM	Kalvoda, Havlíková	-	0+2 z	-	1
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Quantum Mechanics 1, 2	02KM12	Štefaňák	4+2 z, zk	4+2 z, zk	6	6
Diffraction Analysis of Solid State	11DAPL	Čapek, Ganev	2+0 zk	-	2	-
Practical Training in Solid State Physics	11CZF	Kučeráková	0+2 z	-	2	-
Applications of Group Theory in Solid State Physics	11APLG	Potůček	2+0 zk	-	2	-
Continuum in Solid State Physics	11KFPL	Seiner	-	2+0 zk	-	2
Solid State Physics – Applications and Analytical Methods	11MAPL	Kratochvílová	-	2+2 z, zk	-	4
Introduction to Condensed Matter Simulations	11ZSKL	Drahokoupil, Kalvoda	-	1+1 kz	-	2
Language Courses (2)	04...	KHVJ	-	-	-	-
Optional courses:						
Linear Circuit Analysis	11ANEL	Jiroušek, Levinský	4+0 z, zk	-	4	-
Logical Circuits and Microprocessors	11MIK	Jiroušek, Levinský	-	4+0 z, zk	-	4
Structure and Function of Bio-Molecules	11SFBM	Koval	2+1 z, zk	-	3	-
Atomic and Molecular Spectroscopy	02AMS	Civiš	2+2 z, zk	-	4	-
Transport Phenomena/Nonequilibrium Systems	02TJNS	Jex	-	2+0 kz	-	2
Molecular Physics	12MOF	Michl, Proška	-	2+0 zk	-	2
Basic Optical Laboratory	12ZPOP	Jančárek	-	0+4 kz	-	6
Fundamentals of Optics	12ZAOP	Kwiecien	2+0 z, zk	-	2	-
Fundamentals of Photonic Structures	12ZFS	Čtyroký, Richter	-	2+0 z, zk	-	2
Nanotechnology	12NT	Hulicius, Proška	2+0 zk	-	2	-
Programming in MATLAB	18PMTL	Kukal	0+4 kz	-	4	-
Vacuum Technology	12VKT	Petráček,Švejkar	2+2 kz	-	4	-
Principles of Plasma Physics	12ZFP	Limpouch	-	3+1 z, zk	-	4
Functions of Complex Variable	01FKO	Šťovíček	-	2+1 z, zk	-	3
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Physical Engineering

Specialization Laser Technology and Photonics 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
History of Physics 1	02DEF1	Jex	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Preparatory week	00PT	FJFI	1 week z	-	2	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Electricity and Magnetism	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Language Courses (3)	04..	KHVJ	-	-	-	-
Required optional courses (4)						
Introduction to Laser Technology	12ULTB	Jelínková, Němec, Šulc	-	2+1 kz	-	3
Introduction to Photonics and Nanostructures	12UFN	Kwiecien, Richter, Proška	-	2+1 kz	-	3
Optional courses:						
Minimum in Mathematics 1	00MAM1	Břeň	0+1 z	-	1	-
Minimum in Mathematics 2	00MAM2	Pošta	0+1 z	-	1	-
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Physical Seminar 1	02FYS1	Petrásek	0+2 z	-	2	-
Fundamentals of Physical Measurements 1, 2	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Creation of Electronic Documents	14TED	Materna	0+2 z	-	2	-
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
General Chemistry 1, 2 (5)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
Introduction to Solid State Physics	11UFP	Kolenko	-	2+0 zk	-	3
Fundamentals of Algorithmization	18ZALG	Virius, Jarý	-	2+2 z, zk	-	4

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken provided the assessment in 01LAL is obtained.
(3) Enrollment in language courses follows the rules given separately.
(4) At least one course is compulsory.
(5) Enrollment in15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Physical Engineering

Specialization Laser Technology and Photonics 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus B 3, 4	01ANB34	Krbálek, Kolář	4+4 z, zk	2+4 z, zk	8	6
Numerical Methods 1	12YNME1	Váchal	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Theoretical Physics 1(1), 2 (2)	02TEF12	Hrivnák, Novotný P.	2+2 z, zk	2+2 z, zk	4	4
Experimental Laboratory 1, 2	02PRA12	Bielčík, Rojas	0+4 kz	0+4 kz	6	6
Measurement and Data Processing	12ZMDT	Blažej, Procházka	1+1 z, zk	-	2	-
Laser Technology 1	12LTB1	Jelínková, Němec, Šulc	-	2+1 z, zk	-	3
Language Courses (3)	04..	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	0+2 z	-	1	-
Optional courses:						
Introduction to Scientific Computing	12UVP	Šiňor	-	1+1 z	-	2
Introduction to Probability 1, 2	01UP12	Krbálek, Vybíral	1+1 z, zk	1+1 z, zk	3	3
Computer Algebra Systems	12PAS	Šiňor	1+1 z	-	2	-
Basic Electronics 1, 2	12ZEL12	Pavel	2+1 z, zk	2+1 z, zk	3	3
Microprocessors 1, 2	12MPR12	Čech	4+0 zk	2+0 zk	4	2
Microprocessor Practicum 1, 2	12MPP12	Vyhlídal	0+3 kz	0+3 kz	4	2
Electron Microscopy	14ELM	Karlík	-	2+0 kz	-	2
Programming in C++ 1, 2	18PRC12	Virius, Jarý	2+2 z	2+2 kz	4	4
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1
Selected Parts of Modern Physics	12VPMF	Pšikal	-	2+1 z	-	3
Scientific and Technical Calculation	12VTV	Procházka	-	1+1 z	-	2
Molecular Physics	12MOF	Michl, Proška	-	2+0 zk	-	2
Display of Physical Data	12ZFD	Blažej	1+1 kz	-	2	-

(1) Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(2) Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed.
(3) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Physical Engineering

Specialization Laser Technology and Photonics 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Fundamentals of Solid State Physics	11ZFP	Kalvoda, Mihóková	2+0 zk	-	3	-
Bachelor Project 1, 2	12BPFI12	Havlíková	0+5 z	0+10 z	5	10
Bachelor Seminar	11BSEM	Kalvoda, Havlíková	-	0+2 z	-	1
Quantum Mechanics 1	02KM1	Štefaňák	4+2 z, zk	-	6	-
Fundamentals of Electrodynamics	12ZELD	Šiňor	1+1 z, zk	-	2	-
Fundamentals of Optics	12ZAOP	Kwiecien	2+0 z, zk	-	2	-
Laser Technology 2	12LTB2	Kubeček, Šulc, Jelínek	2+1 z, zk	-	3	-
Fundamentals of Photonic Structures	12ZFS	Čtyroký, Richter	-	2+0 z, zk	-	2
Basic Optical Laboratory	12ZPOP	Jančárek	-	0+4 kz	-	6
Basic Laser Technology Laboratory (2)	12ZPLT	Blažej	-	0+4 kz	-	6
Language Courses (3)	04...	KHVJ	-	-	-	-
Optional courses:						
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Functions of Complex Variable	01FKO	Šťovíček	-	2+1 z, zk	-	3
Numerical Methods 2	01NME2	Beneš	-	2+0 kz	-	2
Introductory Practicum in Electronics 1, 2 (4)	12EPR12	Procházka	0+2 kz	0+2 kz	3	3
Vacuum Technology	12VKT	Švejkar, Petráček	2+2 kz	-	4	-
Quantum Mechanics 2	02KM2	Štefaňák	-	4+2 z, zk	-	6
Nanotechnology	12NT	Hulicius, Proška	2+0 zk	-	2	-
Operating Systems	12OSY	Čech	3+0 zk	-	3	-
Regulation and Sensors	12RSEN	Vyhlídal	4 z, zk	-	4	-
High Frequency and Pulse Technology	12VFT	Pavel	-	2+0 z, zk	-	2
Laser Systems	12LAS	Kubeček	-	2+1 z, zk	-	3
Application of Lasers	12APL	Jančárek, Jelínková	2+0 z, zk	-	2	-
Principles of Plasma Physics	12ZFP	Limpouch, Jirka	-	3+1 z, zk	-	4
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) For enrollment in 12ZPLT by students of other specializations, 12ULTB or 12LTB1 is a prerequisite.
(3) Enrollment in language courses follows the rules given separately.
(4) For enrollment in 12EPR12, 12ZEL12 is a prerequisite.

Bachelor´s Degree Programme

Physical Engineering

Specialization Computational Physics 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
History of Physics 1	02DEF1	Jex	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Preparatory week	00PT	FJFI	1 week z	-	2	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Electricity and Magnetism	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
Language Courses (3)	04.	KHVJ	-	-	-	-
Optional courses:						
Minimum in Mathematics 1	00MAM1	Břeň	0+1 z	-	1	-
Minimum in Mathematics 2	00MAM2	Pošta	0+1 z	-	1	-
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Fundamentals of Physical Measurements 1, 2	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Creation of Electronic Documents	14TED	Materna	0+2 z	-	2	-
General Chemistry 1, 2 (4)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
Fundamentals of Algorithmization	18ZALG	Virius, Jarý	-	2+2 z, zk	-	4
Introduction to Laser Technology	12ULTB	Jelínková, Němec, Šulc	-	2+1 kz	-	3
Introduction to Photonics and Nanostructures	12UFN	Kwiecien, Richter, Proška	-	2+1 kz	-	3

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken the assessment in 01LAL is obtained.
(3) Enrollment in language courses follows the rules given separately.
(4) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Physical Engineering

Specialization Computational Physics 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus B 3, 4	01ANB34	Krbálek, Kolář	4+4 z, zk	2+4 z, zk	8	6
Numerical Methods 1	12YNME1	Váchal	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Theoretical Physics 1 (1), 2 (2)	02TEF12	Hrivnák, Novotný P.	2+2 z, zk	2+2 z, zk	4	4
Computer Algebra Systems	12PAS	Šiňor	1+1 z	-	2	-
Measurement and Data Processing	12ZMDT	Blažej, Procházka	1+1 z, zk	-	2	-
Programming in C++ 1, 2	18PRC12	Jarý, Virius	2+2 z	2+2 kz	4	4
Introduction to Scientific Computing	12UVP	Šiňor	-	1+1 z	-	2
Selected Topics in Modern Physics	12VPMF	Pšikal	-	2+1 z	-	3
Language Courses (3)	04..	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	0+2 z	-	1	-
Optional courses:						
Experimental Laboratory 1, 2	02PRA12	Bielčík, Rojas	0+4 kz	0+4 kz	6	6
Seminar on Mathematical Physics	02SMF	Hlavatý	0+2 z	-	2	-
Basic Electronics 1, 2	12ZEL12	Pavel	2+1 z, zk	2+1 z, zk	3	3
Software Seminar 1, 2 (4)	01SOS12	Čulík	0+2 z	0+2 z	2	2
Introduction to Probability 1, 2	01UP12	Krbálek, Vybíral	1+1 z, zk	1+1 z, zk	3	3
Seminar on Solid State Physics	11SFIPL	Kalvoda	1+1 kz	-	2	-
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1
Scientific and Technical Calculation	12VTV	Procházka	-	1+1 z	-	2
Molecular Physics	12MOF	Michl, Proška	-	2+0 zk	-	2
Display of Physical Data	12ZFD	Blažej	1+1 kz	-	2	-

(1) Examination in 02TEF1 can be taken only if 02MECHZ is passed.
(2) Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed.
(3) Enrollment in language courses follows the rules given separately.
(4) Contains fundamentals of JAVA.

Bachelor´s Degree Programme

Physical Engineering

Specialization Computational Physics 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Fundamentals of Solid State Physics	11ZFP	Kalvoda, Mihóková	2+0 zk	-	3	-
Bachelor Project 1, 2	12BPFI12	Havlíková	0+5 z	0+10 z	5	10
Bachelor Seminar	11BSEM	Kalvoda, Mika Havlíková	-	0+2 z	-	1
Quantum Mechanics 1	02KM1	Štefaňák	4+2 z, zk	-	6	-
Fundamentals of Electrodynamics	12ZELD	Šiňor	1+1 z, zk	-	2	-
Computer Algebra	12POAL	Liska, Šiňor	1+1 kz	-	2	-
Introduction to Computational Physics 1, 2	12UPF12	Kuchařík, Liska	1+1 z, zk	1+1 z, zk	2	2
Fundamentals of Optics	12ZAOP	Kwiecien	2+0 z, zk	-	2	-
Principles of Plasma Physics	12ZFP	Limpouch, Jirka	-	3+1 z, zk	-	4
Scientific Programming in Python	12PYTH	Váchal	-	0+2 z	-	2
Introduction to Continuum Dynamics	01DYKO	Fučík, Strachota	-	2+1 z, zk	-	3
Language Courses (2)	04...	KHVJ	-	-	-	-
Optional courses:						
Administration of UNIX System	12AUX	Šiňor	-	2+0 kz	-	2
Nanotechnology	12NT	Hulicius, Proška	2+0 zk	-	2	-
Nuclear Physics B	02ZJFB	Wagner	3+0 kz	-	3	-
Programming in Java	18PJ	Virius	2+2 z, zk	-	5	-
LaTeX - Publication Instrument	01PSL	Ambrož	-	0+2 z	-	2
Fundamentals of Photonic Structures	12ZFS	Čtyroký, Richter	-	2+0 z, zk	-	2
Computer Graphics 1, 2	01PGR12	Strachota	1+1 z, zk	1+1 z, zk	2	2
Computer Networks 1, 2 (3)	01SITE12	Minárik	1+1 z	1+1 z	2	2
Introduction to Computer Security 1	01ZPB1	Vokáč	-	1+1 z	-	2
Practical Classes of Programming	18PROP	Klinkovský	0+2 kz	-	3	-
Machine Learning in Julia	00FEL	Adam, Mácha	1+2 kz	-	3	-
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1
Quantum Mechanics 2	02KM2	Štefaňák	-	4+2 z, zk	-	6

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.
(3) Both parts must be enrolled.

Bachelor´s Degree Programme

Nuclear and Particle Physics

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
Fundamentals of Physical Measurements 1, 2	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Preparatory week	00PT	FJFI	1 week z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Electricity and Magnetism	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Language Courses (3)	04..	KHVJ	-	-	-	-
Optional courses:						
Minimum in Mathematics 1	00MAM1	Břeň	0+1 z	-	1	-
Minimum in Mathematics 2	00MAM2	Pošta	0+1 z	-	1	-
History of Physics 1	02DEF1	Jex, Myška	2+0 z	-	2	-
General Chemistry 1, 2 (4)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Physical Seminar 1	02FYS1	Petrásek	0+2 z	-	2	-
Introduction to Engineering	17UING	Frýbort, Haušild, Mušálek	2+1 kz	-	3	-
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
Basics of Algorithmization	18ZALG	Virius, Jarý	-	2+2 z, zk	-	4

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken provided the assessment in 01LAL is obtained.
(3) Enrollment in language courses follows the rules given separately.
(4) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Nuclear and Particle Physics

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus B 3, 4	01ANB34	Krbálek, Kolář	4+4 z, zk	2+4 z, zk	8	6
Numerical Methods 1	12YNME1	Váchal	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Theoretical Physics 1(1), 2 (2)	02TEF12	Hrivnák, Novotný P.	2+2 z, zk	2+2 z, zk	4	4
Experimental Physics	02EXF	Křížková-Gajdošová, Trzeciak	2+0 zk	-	2	-
Experimental Laboratory 1, 2	02PRA12	Bielčík, Rojas	0+4 kz	0+4 kz	6	6
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Language Courses (3)	04..	KHVJ	-	-	-	-
Social Sciences (4)						
Rhetoric	00RET	Vadillo	0+2 z	-	1	-
Optional courses:						
Introduction to Elementary Particle Physics	02UFEC	Matas	2+0 z	-	2	-
Introduction to Probability 1, 2	01UP12	Krbálek, Vybíral	1+1 z, zk	1+1 z, zk	3	3
Introduction to Curves and Surfaces 1	02UKP1	Hlavatý	-	1+1 z	-	2
Introduction to Quantum Theory	02UKT	Štefaňák	-	2+0 z	-	2
Special Theory of Relativity	02STR	Břeň	-	2+0 zk	-	2
Programming in C++ 1, 2	18PRC12	Jarý, Virius	2+2 z	2+2 kz	4	4
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1

(1) Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(2) Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed.
(3) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Nuclear and Particle Physics

3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Subatomic Physics	02SF	Karpenko	4+2 z, zk	-	6	-
Quantum Mechanics 1, 2	02KM12	Štefaňák	4+2 z, zk	4+2 z, zk	6	6
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Detectors and Detection Principles 1, 2	02DPD12	Contreras, Rojas	2+0 zk	4+0 zk	2	4
Workshop 1 (3)	02VS1	Bielčík	1 týden z	-	1	-
Bachelor Thesis 1, 2	02BPJC12	Bielčík	0+5 z	0+10 z	5	10
Subatomic Physics 2	02SF2	Óbertová	-	4+2 z, zk	-	6
Language Courses (2)	04...	KHVJ	-	-	-	-
Optional courses:						
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Numerical Methods 2	01NME2	Beneš	-	2+0 kz	-	2
Fundamentals of Electronics	17ZEL	Kropík	2+2 kz	-	3	-
Introduction to Curves and Surfaces 2	02UKP2	Hlavatý	1+1 z	-	2	-
Tools for Simulation and Data Analysis 1	02NSAD1	Hubáček	2+0 z	-	2	-
Simulations and Data Analysis Tools 2	02NSAD2	Hubáček	-	2+0 z	-	2
Introduction to the Standard Model of Microworld	02ZSM	Hubáček	-	2+0 zk	-	2
Seminar on Quark-Gluon Plasma 1, 2	02ROZ12	Bielčík, Bielčíková, Tomášik	2+0 z	2+0 z	2	2
Scientific and Technical Computing	12VTV	Procházka	-	1+1 z	-	2
Functions of Complex Variable	01FKO	Šťovíček	-	2+1 z, zk	-	3
Scientific Programming in Python	12PYTH	Váchal	-	0+2 z	-	2
Vacuum Technology	12VKT	Švejkar, Petráček	2+2 kz	-	4	-
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.
(3) The course is intended for students of this programme only.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Physics 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus 1	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics - Examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
History of Physics 1	02DEF1	Jex	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Preparatory Week	00PT	FJFI	1 week z	-	2	-
Electricity and Magnetism (3)	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Language Courses (4)	04..	KHVJ	-	-	-	-
Optional courses:						
Essentials of High School Course 1	00MAM1	Břeň	0+1 z	-	1	-
Essentials of High School Math Course 2	00MAM2	Pošta	0+1 z	-	1	-
Discrete Mathematics 1, 2 (5)	01DIM12	Masáková	2+0 z	2+0 z	2	2
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Physical Seminar 1	02FYS1	Petrásek	0+2 z	-	2	-
Foundations of Physical Measurements 1, 2 (5)	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Introduction to Solid State Physics	11UFP	Kolenko	-	2+0 zk	-	3
Creating Electronic Documents	14TED	Materna	0+2 z	-	2	-
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
General Chemistry 1, 2 (6)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
Basics of Algorithmization	18ZALG	Virius, Jarý	-	2+2 z, zk	-	4

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken the assessment in 01LAL is obtained.
(3) Enrollment in 02ELMA can be taken provided the assessment in 02MECH is obtained.
(4) Enrollment in language courses follows the rules given separately.
(5) The indicated courses can be scheduled simultaneously.
(6) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Physics 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Mathematical Analysis A 3, 4	01ANA34	Štampach	4+4 z, zk	4+4 z, zk	9	9
Numerical Mathematics 1	01NMA1	Oberhuber	4+0 zk	-	4	-
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Differential Equations	01DIFR	Beneš, Strachota	-	2+2 z, zk	-	4
Theoretical Physics 1 (1), 2 (2)	02TEF12	Hrivnák, Novotný P.	2+2 z, zk	2+2 z, zk	4	4
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Language Courses (3)	04..	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	-	0+2 z	-	1
Optional courses:						
Seminar of Mathematical Physics	02SMF	Hlavatý	0+2 z	-	2	-
Introduction to Curves and Surfaces	02UKP1	Hlavatý	-	1+1 z	-	2
Special Theory of Relativity	02STR	Břeň	-	2+0 zk	-	2
Introduction to Quantum Theory	02UKT	Štefaňák	-	2+0 z	-	2
Introduction to Elementary Particle Physics	02UFEC	Matas	2+0 z	-	2	-
Experimental Laboratory 1, 2	02LCF12	Bielčík	0+2 z	0+2 z	2	2
Seminar of Contemporary Mathematics 1	01SSM1	Tušek	0+2 z	-	2	-
Algebra and Calculus in Applications	01TA	Dvořáková, Pelantová	-	2 z	-	2
Discrete Mathematics 3	01DIMA3	Dvořáková	2+0 zk	-	2	-
Selected Topics in Modern Physics	12VPMF	Pšikal	-	2+1 z	-	3
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1

(1) Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(2) Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed.
(3) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Physics 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Quantum Mechanics 1, 2	02KM12	Štefaňák	4+2 z, zk	4+2 z, zk	6	6
Functional Analysis 1	01FANA1	Šťovíček	2+2 z, zk	-	5	-
Functional Analysis 2	01FAN2	Šťovíček	-	2+2 z, zk	-	5
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Geometric Methods in Physics 1	02GMF1	Šnobl	2+2 z, zk	-	4	-
Introduction to Particle Physics	02UCF	Hubáček	2+2 z, zk	-	4	-
General Relativity	02OR	Tomášik, Semerák	-	3+0 zk	-	3
Functions of Complex Variable	01FKO	Šťovíček	-	2+1 z, zk	-	3
Bachelor Seminar	01BASE	Strachota	-	0+2 z	-	1
Bachelor Thesis 1, 2	02BPMI12	Šnobl	0+5 z	0+10 z	5	10
Language Courses (2)	04..	KHVJ	-	-	-	-
Optional courses:						
Differential Equations, Symmetries and Groups	02DRG	Šnobl	-	2+2 z	-	4
Introduction to Curves and Surfaces 2	02UKP2	Hlavatý	1+1 z	-	2	-
Simulations and Data Analysis Tools 1	02NSAD1	Hubáček	2+0 z	-	2	-
Algebra	01ALGE	Masáková	4+1 z, zk	-	6	-
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Topology	01TOP	Burdík	2+0 zk	-	2	-
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Informatics 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus 1	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Discrete Mathematics 1, 2	01DIM12	Masáková	2+0 z	2+0 z	2	2
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics - Examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
Electricity and Magnetism (3)	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
History of Physics 1	02DEF1	Jex	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Basics of Algorithmization	18ZALG	Virius, Jarý	-	2+2 z, zk	-	4
Preparatory Week	00PT	FJFI	1 week z	-	2	-
Language Courses (4)	04..	KHVJ	-	-	-	-
Optional courses:						
Essentials of High School Course 1	00MAM1	Břeň	0+1 z	-	1	-
Essentials of High School Course 2	00MAM2	Pošta	0+1 z	-	1	-
General Chemistry 1, 2 (5)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken the assessment in 01LAL is obtained.
(3) Enrollment in 02ELMA can be taken provided the assessment in 02MECH is obtained.
(4) Enrollment in language courses follows the rules given separately.
(5) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Informatics 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Mathematical Analysis A 3, 4	01ANA34	Štampach	4+4 z, zk	4+4 z, zk	9	9
Numerical Mathematics 1	01NMA1	Oberhuber	4+0 zk	-	4	-
Differential Equations	01DIFR	Beneš, Strachota	-	2+2 z, zk	-	4
Discrete Mathematics 3	01DIMA3	Dvořáková	2+0 zk	-	2	-
Linear Programming	01LIP	Volec	2+1 z, zk	-	3	-
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Programování v C++ 1, 2	18PRC12	Virius, Jarý	2+2 z	2+2 kz	4	4
Algebra and Calculus in Applications	01TA	Dvořáková	-	2+0 zk	-	2
Language Courses (1)	04..	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	-	0+2 z	-	1
Optional courses:						
Neural Networks 1	18NES1	Petříčková	-	2+2 kz	-	5
Theoretical Physics 1(2), 2 (3)	02TEF12	Hrivnák, Novotný P.	2+2 z, zk	2+2 z, zk	4	4
Seminar of Contemporary Mathematics 1	01SSM1	Tušek	0+2 z	-	2	-
Seminar of Applied Mathematics	01SAM	Krbálek	-	0+2 z	-	2
Software Seminar 1, 2	01SOS12	Čulík	0+2 z	0+2 z	2	2
Basic Electronics 1, 2	12ZEL12	Pavel	2+1 z, zk	2+1 z, zk	3	3
Introduction to Scientific Computing	12UVP	Šiňor	-	1+1 z	-	2
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1

(1)Enrollment in language courses follows the rules given separately.
(2)Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(3)Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Informatics 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Functions of Complex Variable	01FKO	Šťovíček	-	2+1 z, zk	-	3
Algebra	01ALGE	Masáková	4+1 z, zk	-	6	-
Programming in Java	18PJ	Virius	2+2 z, zk	-	5	-
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Computer Graphics 1, 2	01PGR12	Strachota	1+1 z, zk	1+1 z, zk	2	2
Theory of Codes	01TKO	Pelantová, Volec	-	2+0 zk	-	2
Introduction to Operating Systems	01ZAOS	Čulík	-	2+0 z, zk	-	2
Numerical Mathematics 2	01NMA2	Beneš, Oberhuber	-	2+1 z, zk	-	3
Bachelor Seminar	01BASE	Strachota	-	0+2 z	-	1
Bachelor project 1, 2	01BPMI12	Strachota	0+5 z	0+10 z	5	10
Language Courses (1)	04..	KHVJ	-	-	-	-
Optional courses:						
Introduction to Machine Learning	01USU	Flusser, Franc	2+2z,zk	-	4	-
Windows Programming	01PW	Čulík	2+0 z	-	2	-
Computer Networks 1, 2 (2)	01SITE12	Minárik	1+1 z	1+1 z	2	2
Simple Compilers	01JEPR	Čulík	-	2 z	-	2
Programming of Peripherals Devices	01PERI	Čulík	2+0 z	-	2	-
Introduction to Computer Security 1	01ZPB1	Vokáč	-	1+1 z	-	2
Principles of Statistical Decision Making	01PSR	Kůs	-	2+0 zk	-	2
Functional Analysis 1	01FANA1	Šťovíček	2+2 z, zk	-	5	-
Functional analysis 2	01FAN2	Šťovíček	-	2+2 z, zk	-	5
LaTeX - Publication Instrument	01PSL	Ambrož	-	0+2 z	-	2
Programming in MATLAB	18PMTL	Kukal	0+4 kz	-	4	-
Computer Algebra	12POAL	Liska, Šiňor	1+1 kz	-	2	-
Development of internet applications	18INTA	Majerová, Klinkovský	-	2+2 kz	-	4
History of Mathematics (3)	01DEM	Dvořáková	-	0+2 z	-	1
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1
Web environment and markup languages	18PW	Majerová, Eichler	0+2 kz	-	2	-

(1) Enrollment in language courses follows the rules given separately.
(2) Can only be enrolled as a full-year course.
(3) The course runs only once every 2 years.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Modelling 1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus 1	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination (1)	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination (2)	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
Electricity and Magnetism (3)	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
History of Physics 1	02DEF1	Jex, Myška	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Basics of Algorithmization	18ZALG	Virius, Jarý	-	2+2 z, zk	-	4
Preparatory Week	00PT	FJFI	1 week z	-	2	-
Language Courses (4)	04..	KHVJ	-	-	-	-
Optional courses:						
Essentials of High School Course 1	00MAM1	Břeň	0+1 z	-	1	-
Essentials of High School Course 2	00MAM2	Pošta	0+1 z	-	1	-
Discrete Mathematics 1, 2	01DIM12	Masáková	2+0 z	2+0 z	2	2
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Creating Electronic Documents	14TED	Materna	0+2 z	-	2	-
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
General Chemistry 1, 2 (5)	15CH12	Distler	2+1 z	2+1 z, zk	3	3

(1) Examination in 01MANZ can be taken provided the assessment in 01MAN is obtained.
(2) Examination in 01LALZ can be taken provided the assessment in 01LAL is obtained.
(3) Enrollment in 02ELMA can be taken provided the assessment in 02MECH is obtained.
(4) Enrollment in language courses follows the rules given separately.
(5) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Modelling 2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Mathematical Analysis A 3, 4	01ANA34	Štampach	4+4 z, zk	4+4 z, zk	9	9
Numerical Mathematics 1	01NMA1	Oberhuber	4+0 zk	-	4	-
Differential Equations	01DIFR	Beneš, Strachota	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Theoretical Physics 1(1)	02TEF1	Hrivnák, Novotný P.	2+2 z, zk	-	4	-
Linear Programming	01LIP	Volec	2+1 z, zk	-	3	-
Introduction to Continuum Dynamics	01DYKO	Fučík, Strachota	-	2+1 z, zk	-	3
Language Courses (2)	04..	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	-	0+2 z	-	1
Optional courses:						
Seminar of Contemporary Mathematics 1	01SSM1	Tušek	0+2 z	-	2	-
Seminar of Applied Mathematics	01SAM	Krbálek	-	0+2 z	-	2
Discrete Mathematics 3	01DIMA3	Dvořáková	2+0 zk	-	2	-
Algebra and Calculus in Applications	01TA	Dvořáková	-	2+0 zk	-	2
Software Seminar 1, 2 (3,4)	01SOS12	Čulík	0+2 z	0+2 z	2	2
Introduction to Curves and Surfaces 1 (4)	02UKP1	Hlavatý	-	1+1 z	-	2
Introduction to Scientific Computing	12UVP	Šiňor	-	1+1 z	-	2
Computer Algebra Systems	12PAS	Šiňor	1+1 z	-	2	-
Programming in C++ 1, 2	18PRC12	Jarý, Virius	2+2 z	2+2 kz	4	4
Introduction to quantum informatics	18UQI	Wodecki	-	2+0 z	-	3
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1

(1) Examination in 02TEF1 can be taken only if 02MECHZ in passed.
(2) Enrollment in language courses follows the rules given separately.
(3) Contains fundamentals of JAVA.
(4) The indicated courses can be scheduled simultaneously.

Bachelor´s Degree Programme

Mathematical Engineering

Specialization Mathematical Modelling 3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Algebra	01ALGE	Masáková	4+1 z, zk	-	6	-
Functional Analysis 1	01FANA1	Šťovíček	2+2 z, zk	-	5	-
Functional Analysis 2	01FAN2	Šťovíček	-	2+2 z, zk	-	5
Equations of Mathematical Physics (1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Measure and Probability	01MIP	Hobza, Kůs	4+2 z, zk	-	6	-
Mathematical Statistics	01MAS	Kůs	-	2+0 zk	-	3
Numerical Mathematics 2	01NMA2	Beneš, Oberhuber	-	2+1 z, zk	-	3
Functions of Complex Variable	01FKO	Šťovíček	-	2+1 z, zk	-	3
Geometric Theory of Ordinary Differential Equations	01GTDR	Beneš	0+2 z	-	2	-
Bachelor Seminar	01BASE	Strachota	-	0+2 z	-	1
Bachelor project 1, 2	01BPMI12	Strachota	0+5 z	0+10 z	5	10
Language Courses (2)	04..	KHVJ	-	-	-	-
Optional courses:						
Topology	01TOP	Burdík	2+0 zk	-	2	-
Differential Equations, Symmetries and Groups	02DRG	Šnobl	-	2+2 z	-	4
Mathematical Models of Groundwater Flow	01MMPV	Mikyška	-	2+0 kz	-	2
Markov processes	01MAPR	Vybíral	-	2+2 z, zk	-	4
Simple Compilers	01JEPR	Čulík	-	2 z	-	2
Computer Graphics 1, 2	01PGR12	Strachota	1+1 z, zk	1+1 z, zk	2	2
Principles of Statistical Decision Making	01PSR	Kůs	-	2+0 zk	-	2
Practical training in programming	18PROP	Klinkovský	0+2 kz	-	3	-
Introduction to Operating Systems	01ZAOS	Čulík	-	2+0 z, zk	-	2
Theory of Codes	01TKO	Pelantová, Volec	-	2+0 zk	-	2
Programming in MATLAB	18PMTL	Kukal	0+4 kz	-	4	-
Programming in Java	18PJ	Virius	2+2 z, zk	-	5	-
Scientific Programming in Python	12PYTH	Váchal	-	0+2 z	-	2
LaTeX - Publication Instrument	01PSL	Ambrož	-	0+2 z	-	2
History of Mathematics (3)	01DEM	Dvořáková	-	0+2 z	-	1
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.
(3) The course runs only once every 2 years.

Bachelor´s Degree Programme

Quantum Technologies

1st year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus	01MAN	Strachota, Pelantová	4+4 z	-	4	-
Calculus 1, examination	01MANZ	Strachota, Pelantová	- zk	-	4	-
Linear Algebra 1	01LAL	Ambrož, Dvořáková	2+2 z	-	2	-
Linear Algebra 1, examination	01LALZ	Ambrož, Dvořáková	- zk	-	2	-
Mechanics	02MECH	Břeň, Yalcinkaya	4+2 z	-	4	-
Mechanics, examination	02MECHZ	Břeň, Yalcinkaya	- zk	-	2	-
History of Physics 1	02DEF1	Jex, Myška	2+0 z	-	2	-
Basics of Programming	18ZPRO	Virius, Klinkovský, Petříčková, Jarý	4 z	-	4	-
Preparatory week	00PT	FJFI	1 week z	-	2	-
Fundamentals of Physical Measurements 1, 2	02ZM12	Chaloupka, Škoda, Rojas	2+0 zk	0+4 kz	2	4
Calculus 2	01MAN2	Pelantová, Pošta	-	4+4 z, zk	-	8
Linear Algebra 2	01LAL2	Dvořáková, Ambrož	-	2+2 z, zk	-	4
Electricity and Magnetism	02ELMA	Chadzitaskos, Yalcinkaya	-	4+2 z, zk	-	6
Heat and Molecular Physics	02TER	Petrásek	-	2+2 z, zk	-	4
Language Courses (1)	04.	KHVJ	-	-	-	-
Optional courses:						
Minimum in Mathematics 1	00MAM1	Břeň	0+1 z	-	1	-
Minimum in Mathematics 2	00MAM2	Pošta	0+1 z	-	1	-
History of Physics 2	02DEF2	Jex, Myška	-	2+0 z	-	2
Physical Seminar 1	02FYS1	Petrásek	0+2 z	-	2	-
Introduction to Solid State Physics	11UFP	Kolenko	-	2+0 zk	-	3
Introduction to Photonics and Nanostructures	12UFN	Kwiecien, Richter, Proška	-	2+1 kz	-	3
Introduction to UNIX	12UNXAP	Kuchařík	-	1+1 z	-	2
Creation of Electronic Documents	14TED	Materna	0+2 z	-	2	-
Introduction to Engineering	17UING	Frýbort, Haušild, Mušálek	2+1 kz	-	3	-
General Chemistry 1, 2 (2)	15CH12	Distler	2+1 z	2+1 z, zk	3	3
Programming in Python 1	18PPY1	Klinkovský, Mojzeš	-	2 z	-	2

(1) Enrollment in language courses follows the rules given separately.
(2) Enrollment in 15CH2 is possible only after passing 15CH1.

Bachelor´s Degree Programme

Quantum Technologies

2nd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Calculus B 3, 4	01ANB34	Krbálek, Kolář	4+4 z, zk	2+4 z, zk	8	6
Numerical Methods 1	12YNME1	Váchal	-	2+2 z, zk	-	4
Waves, Optics and Atomic Physics	02VOAF	Novotný P., Schmidt	4+2 z, zk	-	6	-
Introduction to Laser Technology	12ULAT	Jelínková, Šulc	2 kz	-	2	-
Theoretical Physics 1(1), 2 (2)	02TEF12	Hrivnák, Novotný P.	2+2 z, zk	2+2 z, zk	4	4
Experimental Laboratory 1, 2	02PRA12	Bielčík, Rojas	0+4 kz	0+4 kz	6	6
Thermodynamics and Statistical Physics	02TSFA	Jex, Novotný J.	-	2+2 z, zk	-	4
Language Courses (3)	04	KHVJ	-	-	-	-
Social Sciences						
Rhetoric	00RET	Vadillo	0+2 z	-	1	-
Optional courses:						
Special Theory of Relativity	02STR	Břeň	-	2+0 zk	-	2
Introduction to Elementary Particle Physics	02UFEC	Matas	2+0 z	-	2	-
Introduction to Quantum Theory	02UKT	Štefaňák	-	2+0 z	-	2
Experimental Physics	02EXF	Křížková-Gajdošová, Trzeciak	2+0 zk	-	2	-
Selected Topics in Modern Physics	12VPMF	Pšikal	-	2+1 z	-	3
Introduction to Scientific Computing	12UVP	Šiňor	-	1+1 z	-	2
Basic Electronics 1, 2	12ZEL12	Pavel	2+1 z, zk	2+1 z, zk	3	3
Programming in C++ 1, 2	18PRC12	Jarý, Virius	2+2 z	2+2 kz	4	4
Programming in Python 2, 3	18PPY23	Klinkovský, Pecinovský	2 z	2 z	2	2
Neural networks 1	18NES1	Petříčková	-	2+2 kz	-	5
Seminar on Solid State Physics	11SFIPL	Kalvoda	1+1 kz	-	2	-
Physical Training 1, 2	TV-12	ČVUT	- z	- z	1	1
Scientific and Technical Calculation	12VTV	Procházka	-	1+1 z	-	2
Molecular Physics	12MOF	Michl, Proška	-	2+0 zk	-	2

(1) Examination in 02TEF1 can be taken only if 02MECHZ is passed.
(2) Examination in 02TEF2 can be taken only if 02ELMA and 02TEF1 are passed
(3) Enrollment in language courses follows the rules given separately.

Bachelor´s Degree Programme

Quantum Technologies

3rd year

Course	code	lecturer	win. sem.	sum. sem.	cr	cr
Compulsory courses:						
Equations of Mathematical Physics(1)	01RMAF	Klika, Tušek	4+2 z, zk	-	7	-
Probability and Statistics	01PRST	Hobza	3+1 z, zk	-	4	-
Quantum Laboratory 1	11KPRA1	Kalvoda, Šulc	0+4 kz	-	4	-
Quantum Mechanics 1, 2	02KM12	Štefaňák	4+2 z, zk	4+2 z, zk	6	6
Fundamentals of Classical Optics and Electrodynamics	12KOE	Kwiecien, Richter, Šiňor	-	4+0 zk	-	4
Quantum Laboratory 2	02KPRA2	Čepila	-	0+4 kz	-	4
Bachelor Project 1, 2	02BPQT12	Hamrle, Štefaňák, Šulc	0+5 z	0+10 z	5	10
Language Courses (1)	04...	KHVJ	-	-	-	-
Optional courses:						
Tools for Simulations and Data Analysis 12	02NSAD12	Hubáček	2+0 z	2+0 z	2	2
Detectors and Detection Principles 1, 2	02DPD12	Contreras, Rojas	2+0 zk	4+0 zk	2	4
Functions of Complex Variable	01FKO	Šťovíček	-	2+1 z, zk	-	3
Vacuum Technology	12VKT	Švejkar, Petráček	2+2 kz	-	4	-
Scientific Programming in Python	12PYTH	Váchal	-	0+2 z	-	2
Scientific and Technical Computing	12VTV	Procházka	-	1+1 z	-	2
Fundamentals of Solid State Physics	11ZFP	Kalvoda, Mihóková	2+0 zk	-	3	-
Basic Laser Technology Laboratory	12ZPLT	Blažej	-	0+4 kz	-	6
Fundamentals of Photonic Structures	12ZFS	Čtyroký, Richter	-	2+0 z, zk	-	2
Laser Systems	12LAS	Kubeček	-	2+1 z, zk	-	3
Neural networks 2	18NES2	Petříčková	-	2+2 kz	-	5
Physical Training 3, 4	TV-34	ČVUT	- z	- z	1	1

(1) Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra are passed.
(2) Enrollment in language courses follows the rules given separately.

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	-	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	-
Monte Carlo Method	18MEMC	Jarý, Virius	2+2 z, zk	-	4	-
Radiation Protection	16RAO	Trojek	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 lonizing 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 lonizing Radiation 2	17APIZ2	Miglierini, Štefánik	-	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	Nikl	-	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	Čtyroký, Jirka, Kwiecien	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, Němec, Jelínek	-	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	11SIK	Kalvoda, Sedlák, Drahokoupil	2+2 z, zk	-	5	-
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	Jex I., Ficker, Mácha	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	02PRPLA12	Brotánková, Svoboda	0+3 z	0+3 kz	5	5
Research Project 1, 2	02VUTF12	Brotánková, Klimo	0+6 z	0+8 kz	6	8
Optional courses:						
Topics in Magnetic Confinement Fusion	02PMCF	Ficker	-	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, Váchal	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
Experimental data analysis in plasma physics	02EADP	Seidl, Tomeš	-	0+2 z	-	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	12PFTF2	Klimo, Kuchařík	2+0 z, zk	-	2	-
Seminar FPTF 1, 2	02STFU12	Čeřovský	0+2 z	0+2 z	2	2
ITER and the Accompanying Programme	02ITERA	Ďuran	-	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	Ficker, Klimo	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, Ledinský	4+0 zk	-	4	-
Seminar and Educational Trips 1	11SAE1	Drahokoupil, Kolenko	2+2 z	-	5	-
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, Aubrechtová	-	2+0 zk	-	2
Physics of Magnetic Materials	11FMGL	Hamrle, Zajac	-	2+0 zk	-	2
Seminar and Educational Trips 2	11SAE2	Drahokoupil, Kolenko	-	2+2 z	-	5
Research Project 2	11VUIP2	Kalvoda	-	0+8 kz	-	8
Required optional courses (1)						
Practical Training in Solid State Structure Analysis	11PSP	Čapek, Kučeráková	0+4 kz	-	6	-
Practical Training in Electronics	11EPR	Jiroušek	0+4 kz	-	6	-
Laboratory Trainings in Solid State Physics	11PFPL	Levinský	-	0+4 kz	-	6
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
Physical Optics	12FOPT	Kwiecien	3+0 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

(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	11SIK	Kalvoda, Sedlák, Drahokoupil	2+2 z, zk	-	5	-
Optical Properties of Solids	11OPTX	Bryknar, Mihóková	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	11SAE3	Drahokoupil, Kolenko	2+2 z	-	5	-
Master Thesis 1	11DPIP1	Kalvoda	0+10 z	-	10	-
Seminar and Educational Trips 4	11SAE4	Drahokoupil, Kolenko	-	2+2 z	-	5
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	-
Physics of Detection and Detectors of Optical Radiation	12FDD	Pína	2+0 zk	-	2	-
Physics of Graphene Described by Dirac Equation	02FG	Jakubský	-	2+0 z	-	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)						
Physics of Ultrarelativistic Nuclear Collisions (2)	02FUJS	Křížíková Gajdošová	2+0 zk	-	2	-
Selected Topics on Relativistic Nucleus-Nucleus Collisions (2)	02VPJRS	Karpenko, Trzeciak	-	2+1 z, zk	-	3
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	-
Extreme States of Matter	02EXSH	Bielčík, Šumbera	2+0 zk	-	2	-
Object Oriented Programming	18OOP	Virius	0+2 z	-	2	-
Application of Data Science	01ADS	Franc	1+2 kz	-	4	-
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	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	-	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	Nývlt	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, Nývlt, 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	Čtyroký, Jirka, Kwiecien	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, Frank	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, Němec, Jelínek	-	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 (1)	12EP12	Pavel	0+2 kz	0+2 kz	3	3

(1) Enrollment on12EP12 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:						
Solvable Models of Mathematical Physics (2)	02RMMF	Hlavatý	-	2+0 z	-	2
Introduction to Strings 1, 2 (2)	02UST12	Vysoký	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
Quantum Information and Communication	02QIC	Gábris, Štefaňák	3+1 z, zk	-	4	-
Quantum Programming	02QPRGA	Gábris, Yalcinkaya	-	1+1 z	-	3
Advanced Topics of Quantum Theory	02PPKT	Exner	-	2+0 zk	-	2
Numerical relativity	02NGR	Schmidt	-	2 zk	-	2
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	-
Graph Theory	01TG	Volec, Pelantová	4+0 zk	-	5	-

(1) For students of this field only.
(2) These courses alternate with each other. In the academic year 2024/2025 the course 02UST12 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	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 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	Vysoký	2+1 z	2+1 z	3	3
Coxeter Groups	02COX	Hrivnák	2+0 z	-	2	-
Seminar on Quantum Field Theory 1, 2	02SKTPE12	Jizba	2+1 z	2+1 z	3	3
Numerical relativity	02NGR	Schmidt	-	2 zk	-	2
Symmetry Groups of Quantum Systems	02GSKS	Tolar	2+0 zk	-	2	-
Quantum Groups 1	01KVGR1	Burdík	2+0 z	-	2	-
Mathematical Modelling of Non-linear Systems	01MMNS	Beneš	1+1 zk	-	3	-
Geometrical Aspects of Spectral Theory	01SPEC	Krejčiřík	-	2+0 zk	-	2
Asymptotical Methods	01ASY	Mikyška	2+1 z, zk	-	3	-

(1) These courses alternate according to regulations of the department. In the academic year 2024/2025 the course 02UST12 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	Čtyroký, Jirka, Kwiecien	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, Váchal	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	Virius	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	Cintula	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	Virius	-	2+2 z, zk	-	4
Object Oriented Programming	18OOP	Virius	0+2 z	-	2	-
Monte Carlo Method	18MEMC	Jarý, Virius	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 1, 2	02SKTPE12	Jizba	2+1 z	2+1 z	3	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, Frank	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	Kwiecien, 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	-	3+2 z, zk	-	6
Fundamentals of Electroweak Theory	02ZELW	Bielčíková	3+2 z, zk	-	6	-
Computer Simulation of Condensed Matter	11SIK	Kalvoda, Sedlák, Drahokoupil	2+2 z, zk	-	5	-
Physics of Surfaces and Interfaces	11FPOR	Kalvoda	2+0 zk	-	2	-
Optical Properties of Solids	11OPTX	Bryknar, Mihóková	2+0 zk	-	2	-
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-

Master´s Degree Programme

Decommissioning of Nuclear Facilities

1st year

Předmět	kód	učitel	zim. sem.	let. sem.	kr	kr
Předměty povinné:						
Nuclear Facilities Decommissioning	16VJZ	Thinová, Trojek	3+1 z, zk	-	4	-
Contamination and Methods of Decontamination 1, 2	15KMD12	Čubová, Semelová	2+0 zk	3+0 zk	2	3
Data Processing - Prognoses and Risk Assessment	16RISK	Pilařová, Štěpán	3+2 z, zk	-	5	-
Equipment of Nuclear Power Plants	17ZAJE	Kobylka	3+0 zk	-	3	-
Chemistry of Problematic Radionuclides	15CHPR	Němec	2+0 zk	-	2	-
Structures and Properties of Materials	14SAVM	Lauschmann	2+1 zk	-	3	-
Research Project 1, 2	17VUV12	Kobylka	0+6 z	0+8 kz	6	8
Radioactive Waste and Spent Nuclear Fuel Management 1	15NRO1	Čubová, Losa	-	3+0 zk	-	3
Laboratory Exercises 1	15LAC1	Čubová, Němec	-	0+5 kz	-	4
Monte Carlo Method in Radiation Physics	16MCRF	Klusoň, Urban	-	2+2 z, zk	-	4
Fuel Cycle of Nuclear Facilities	17PCJZ	Losa, Sklenka, Starý	-	2+0 zk	-	2
Chemistry Programme of Nuclear Power Plants	15PCJE	Drtinová	3+0 z, zk	–	3	–
Excursion 4	16EXK4	Thinová	-	1 týden z	-	2
Předměty volitelné:						
Instrumentation for Radiation Measurements	16MER	Průša	2+0 zk	-	2	-
Modelling and Simulation of Radionuclide Migration in the Environment	15MSZP	Vetešník, Vopálka	2+1 z, zk	-	3	-
New Nuclear Sources	17NJZ	Bílý	3+0 zk	-	3	-
Monte Carlo Method	18MEMC	Virius, Gašpar	2+2 z, zk	-	4	-
Separation Methods in Nuclear Chemistry 1	15SMJ1	Němec	3+0 zk	-	3	-
Separation Methods in Nuclear Chemistry 2	15SMJ2	Němec	-	2+0 zk	-	2
Nuclear Research Installations	17VYRE	Sklenka, Matoušková	2+2 zk	-	4	-
Methods of Analytical Measurement	16AMMN	Pilařová, Průšová	-	2+0 kz	-	2
Radiation Chemistry	15RACH	Čuba	3+0 zk	-	4	-
Materials Science for Reactors	14NMR	Haušild	-	2+0 zk	-	2
Determination of Radionuclides in Environment	15SRZP	Němec	-	2+0 zk	-	2

Master´s Degree Programme

Decommissioning of Nuclear Facilities

2nd year

Předmět	kód	učitel	zim. sem.	let. sem.	kr	kr
Předměty povinné:						
Methods of Monitoring and Metrology	16MEMO	Možnar, Novotný P.	2+1 z, zk	-	3	-
Radioactive Waste and Spent Nuclear Fuel Management 2	15NRO2	Čubová, Losa	3+0 zk	-	3	-
Economics of Nuclear Facilities	17EK	Starý	2+0 zk	-	2	-
Safety Analyses	17BAL	Frýbort, Rataj	2+0 zk	-	2	-
Laboratory Exercises 2	17LAC2	Rataj, Štefánik	0+4 kz	-	4	-
Legislation	16LEG	Martinčík, Trojek	2+0 zk	-	2	-
Internship	15PAX	Čuba	1 týden z	-	2	-
Master Thesis 1, 2	15DPV12	Němec	0+10 z	0+20 z	10	20
Expert Seminar	16SEMO	Pilařová	-	0+3 kz	-	3
Communication with Public	16KVR	Fojtíková	-	0+2 z	-	2
Předměty volitelné:						
Spectrometry in Dosimetry	16SPD	Čechák, Novotný P.	2+0 zk	-	2	-
Mathematical Methods and Modelling	16MMM	Klusoň, Urban	0+2 z	-	2	-
Neutron Dosimetry	16DNEU	Ploc	2+0 zk	-	2	-
Radiation Effects in Matter	16REL	Pilařová	2+0 zk	-	2	-
Aplication of Radionuclides 1	15NUK1	Mizera	2+0 zk	-	3	-
Aplication of Radionuclides 2	15NUK2	Mizera	-	2+0 zk	-	3
Dosimetry of Internal Radiation Sources	16DZAR	Musílek	-	2+0 zk	-	2
Application of Radiation Methods	15APRM	Múčka	-	2+0 zk	-	2
Start-up Project	01SUP	Rubeš	2+0 kz	-	2	-
Waste Management in Decommissioning Projects (1)	15WMD	Němec, Čubová	2+2	-	6	-
Planning and Implementation of Decommissioning Projects (1)	15PID	Němec, Čubová	4+0	-	6	-
Decommissioning Technologies (1)	16DETE	Trojek, Kořistka	2+2	-	6	-
Installation Charactherization (1)	17CHAIN	Rataj, Frýbortová	2+2	-	6	-
Policy, Strategy and Licencing Process for Decommissioning (1)	17POSTLIP	Sklenka, Martinčík	4+0	-	6	-

(1) Enrolment in these courses is subject to completion of the previous courses in the ERASMUS Mundus "Decommissioning and Environmental Remediation Courses" programme.