Study plan

Name of study plan: Aplikované matematicko-stochastické metody

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Applied Mathematical Stochastic Methods

Type of study: Bachelor full-time

Required credits: 4

Elective courses credits: 176 Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 0

The role of the block: P

Code of the group: BSPAMSM1

Name of the group: BS P_AMSMB 1st year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 12 courses

Credits in the group: 0

Note on the group: Examination in 01MANZ can be taken provided the assessment in 01MAN is

obtained. Examination in 01LALZ can be taken provided the assessment in 01LAL is obtained.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
02ELMA	Electricity and Magnetism Iskender Yalcinkaya, Josef Schmidt, Ji í Hrivnák, Goce Chadzitaskos, Jan Vysoký Jan Vysoký Josef Schmidt (Gar.)	Z,ZK	6	4+2	L	Р
01LAL	Linear Algebra 1 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	2	2P+2C		Р
01LALZ	Linear Algebra 1, exam Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	0P+0C		Р
01LAL2	Linear Algebra 2 Petr Ambrož, Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z,ZK	4	2P+2C		Р
01MAN	Calculus 1 Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.)	Z	4	4+4		Р
01MANZ	Calculus 1, exam Pavel Strachota, Miroslav Kolá, Edita Pelantová Pavel Strachota Pavel Strachota (Gar.)	ZK	4	0P+0C		Р
01MAN2	Calculus 2 Miroslav Kolá, Edita Pelantová, Maksym Dreval Edita Pelantová Maksym Dreval (Gar.)	Z,ZK	8	4P+4C		Р
02MECH	Mechanics David Be Antonín Hoskovec David Be (Gar.)	Z	4	4+2	Z	Р
02MECHZ	Mechanics - Examination Iskender Yalcinkaya, Goce Chadzitaskos, Stanislav Skoupý, Petr Novotný, David B e , Filip Petrásek, Antonín Hoskovec Antonín Hoskovec David B e (Gar.)	ZK	2	-	Z	Р
00PT	Preparatory Week Petr Ambrož, Milan Krbálek Petr Ambrož Petr Ambrož (Gar.)	Z	2	týden	Z	Р
18ZPRO	Basics of Programming Maksym Dreval, Nichita Vatamaniuc, Jan Vondruška, Vladimír Jarý, Miroslav Virius, Jakub Klinkovský, Petr Pauš, František Vold ich, Jan Tomsa, Miroslav Virius Miroslav Virius (Gar.)	Z	4	4C	Z	Р

Characteristics of the courses of this group of Study Plan: Code=BSPAMSM1 Name=BS P_AMSMB 1st year

02ELMA	Electricity and Magnetism	Z,ZK	6
•	b's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric current and circuits, c	•	of the relativity
	forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits. Electromagnetic waves, Maxwell		
01LAL	Linear Algebra 1	Z	2
1. Vector space. 2. Linea	ar dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices o	of linear mappings.	7. Frobenius
theorem.			
01LALZ	Linear Algebra 1, exam	ZK	2
01LAL2	Linear Algebra 2	Z,ZK	4
Outline: 1. Inverse matr	x and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian a	nd quadratic forms	5. Scalar
product and orthogonal	ity. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse n	natrices. 2. Method	s of calculation
of determinants. 3. Calo	ulation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonal	ity. Calculation of c	rthogonal
complements. 6. Geome	etry exercises and examples. 7. Adjoint operators.		
01MAN	Calculus 1	Z	4
Basic calculus (real ana	llysis, functions of one real variable, differential calculus).	'	
01MANZ	Calculus 1, exam	ZK	4
01MAN2	Calculus 2	Z,ZK	8
1. Continuation of differ	ential calculus: Taylor´s Polynomials, Taylor´s formula 2. Infinite series: criteria of convergence, operations on series, absolute	and conditional c	onvergence 3.
Real and complex power	er series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of in	tegrals: primitives,	definite integral
(Riemann definition), te	chniques of integration and application of integrals, Generalized Riemann integral		
02MECH	Mechanics	Z	4
Introduction to physics,	physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dynamics of a particle,	solving equations	of motion for
one-dimensional motior	n, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system of particles, two-body probler	ns, particle collisio	ns. Mechanics
of a rigid body, rotation.			
02MECHZ	Mechanics - Examination	ZK	2
The content of the subje	ct is the examination according to the plan of studies.		
00PT	Preparatory Week	Z	2
18ZPRO	Basics of Programming	Z	4
This course is intended	mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	nming and with the	Python
programming language			

Code of the group: BSPAMSM2

Name of the group: BS P_AMSMB 2nd year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 8 courses

Credits in the group: 0

Note on the group:

Examination in 02TEF1 can be taken only if 02MECHZ in passed.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
12ANM	Applied Numerical Methods Pavel Váchal, Jan Pšikal, Alena Zavadilová Alena Zavadilová Jan Pšikal (Gar.)	KZ	4	2+2	L	Р
01ANB3	Calculus B 3 Miroslav Kolá, Milan Krbálek Milan Krbálek Miroslav Kolá (Gar.)	Z,ZK	8	4P+4C		Р
01ANB4	Calculus B 4 Ji í Mikyška, Miroslav Kolá Ji í Mikyška Milan Krbálek (Gar.)	Z,ZK	6	2P+4C		Р
01SAM	Seminar of Applied Mathematics Milan Krbálek Milan Krbálek (Gar.)	Z	2	0P+2S		Р
02TEF1	Theoretical Physics 1 Petr Novotný Michal Jex Igor Jex (Gar.)	Z,ZK	4	2+2	Z	Р
01UP1	Introduction to Probability 1 Jan Vybíral Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	3	1P+1C		Р
01UP2	Introduction to Probability 2 Milan Krbálek, Michaela Krbálková Michaela Krbálková Milan Krbálek (Gar.)	Z,ZK	3	1P+1C		Р
02VOAF	Waves, Optics and Atomic Physics Josef Schmidt Jan Vysoký Ji í Tolar (Gar.)	Z,ZK	6	4+2	Z	Р

Characteristics of the courses of this group of Study Plan: Code=BSPAMSM2 Name=BS P_AMSMB 2nd year

12ANM Applied Numerical Methods
For English version use code 12YNME1. There are explained the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Methods for solution of tasks very important for physicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computational environment MATLAB is used as a demonstration tool. The seminars are held in computer laboratory and PASCAL is used as a principle programming language and MATLAB is also used.

O1ANB3 | Calculus B 3

1. Functional sequences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional series, power series, Series Expansion, Taylor's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation of variables, homogeneous equation and exact equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coefficients and special right-hand side, Euler differential equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and non-isolated point, boundary of set, completeness of space, Hilbert spaces. Orthogonal polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier series, trigonometric Fourier series and their convergence. 5. Differential calculus of functions of several variables - limit, continuity, partial and directional derivative, gradient, total derivatives and tangent plane, Taylor series, elementary terms of vector analysis, Jacobi matrix. 6. Functions defined implicitly by one or several equations.

01ANB4 Calculus B 4

Z,ZK

[1] Diferenciální po et funkcí více prom nných a funkcionálních vektor . [2] Funkce zadané implicitn . [3] Taylorovy ady funkce více prom nných. [4] Regulární zobrazení, zám na prom nných, nekartézské soustavy sou adnic. [5] Lokální, vázané a globální extrémy funkce více prom nných. [6] Základy teorie míry a obrys konstrukce Lebesgueovy míry. [7] Integrální po et funkce více prom nných - Riemann v a Lebesgue v integrál, základní vlastnosti, Fubiniova v ta, v ta o substituci. Leviho a Lebesgueova v ta. Limita, spojitost a derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.

01SAM Seminar of Applied Mathematics

Z

2

6

1. Defectoscopy and acoustic emission. 2. Machine learning. 3. Traffic flow dynamics. Dynamics of crowd movement. 4. Digital image processing. 5. Dynamic pricing. 6. Statistical predictions in economics, sociology and psychology. 7. Application of random matrix theory.

02TEF1 Theoretical Physics 1

Z,ZK

4

The course is an introduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms as well as different approaches to description of dynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary examples like the two-body problem, the motion of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles of mechanics. The subject is the first part of the course of classical theoretical physics (02TEF1, 02TEF2).

01UP1 Introduction to Probability 1

7.7K

2

1.Random trial with finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and geometry, Bertrands paradox 4.Conditional probability, Bayes theorem, medical diagnosis, Simpsons paradox 5.Random variable with discrete state space, its distribution and mean value 6.Problems involving the calculation of mean value 7.Probabilistic method in graph theory 8.Random algorithms, Morris algorithm and its variants

01UP2 Introduction to Probability 2

Z,ZK

3

1. One-dimensional continuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction of probability and connection to measure theory. 4. Numerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristics. 6. Elementary methods for point estimations. 7. Generating pseudorandom numbers from the selected distribution.

02VOAF Waves, Optics and Atomic Physics

Z,ZK

6

Wave phenomena in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polarization, interference, diffraction, coherence. Geometrical optics. Introduction to quantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Broglie waves, the Schrodinger equation, stationary states and spectra of finite systems.

Code of the group: BSPAMSM3

Name of the group: BS P_AMSMB 3rd year

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 12 courses

Credits in the group: 0

Note on the group:

Examination in 01RMAF can be taken only if all courses in Calculus and Linear Algebra

are passed.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
01BPAM1	Bachelor Thesis 1 Pavel Strachota, Václav K s Pavel Strachota Pavel Strachota (Gar.)	Z	5	0+5		Р
01BPAM2	Bachelor Thesis 2 Pavel Strachota Pavel Strachota (Gar.)	Z	10	0+10		Р
01LIP	Linear Programming Jan Volec Jan Volec (Gar.)	Z,ZK	3	2+1	Z	Р
01MAPR	Markov processes Jan Vybíral Jan Vybíral (Gar.)	Z,ZK	4	2+2		Р
01MAS	Mathematical Statistics Václav K s Václav K s Václav K s (Gar.)	ZK	3	2+0		Р
01MASC	Mathematical Statistics - Seminar Tomáš Hobza Tomáš Hobza Tomáš Hobza (Gar.)	Z	2	0+2		Р
01CAS	Matematics for Particle Systems Milan Krbálek Milan Krbálek Milan Krbálek (Gar.)	Z,ZK	3	2P+1C		Р
01MIP	Measure and Probability Václav K s, Tomáš Hobza Tomáš Hobza Václav K s (Gar.)	Z,ZK	6	4+2		Р
01RMFB	Equations of Mathematical Physics B Václav Klika	Z,ZK	5	2P+2C		Р
01BASE	Bachelor Seminar Pavel Strachota Pavel Strachota (Gar.)	Z	1	0P+2S		Р
01STME	Statistical Methods with Applications Tomáš Hobza Tomáš Hobza Tomáš Hobza (Gar.)	ZK	2	2P+0C		Р
01USU	Introduction to Machine Learning Ji í Franc, Jan Flusser Ji í Franc Jan Flusser (Gar.)	Z,ZK	4	2P+2C		Р

Characteristics of the courses of this group of Study Plan: Code=BSPAMSM3 Name=BS P_AMSMB 3rd year

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01BPAM1	Bachelor Thesis 1	Z	5
	ject on the selected topic under the supervision. Supervision and regular checking of the bachalor project under preparation.		40
)1BPAM2	Bachelor Thesis 2	Z	10
	ject on the selected topic under the supervision. Supervision and regular checking of the bachalor project under preparation.		
)1LIP	Linear Programming	Z,ZK	3
Ve study special prob	lems about constrained extremal problems for multivariable functions, where the function is linear and the constraints are give	n by linear equation	ons and/or line
nequalities.		,	
1MAPR	Markov processes	Z,ZK	4
1MAS	Mathematical Statistics	ZK	3
he subject is devoted	to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of stat	tistical models, find	ding unbiased
stimators with minima	al variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for h	hypothesis testing	using the
leyman-Pearson lemr	na and likelihood ratio, confidence intervals and non-parametric density estimation.		
1MASC	Mathematical Statistics - Seminar	Z	2
he subject is devoted	to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation	n of Fisher informa	ation matrix of
tatistical models, find	ing unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihoo	od, derivation of ci	ritical regions
ypothesis testing usir	ng the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric density estimation.		
1CAS	Matematics for Particle Systems	Z,ZK	3
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	s to study general mathematical properties of one-dimensional stochastic particle systems whose elements are interacting. Espe		_
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alance property are a	s to study general mathematical properties of one-dimensional stochastic particle systems whose elements are interacting. Especianalyzed. For such systems, statistical distributions of headways and multi-headways, interval frequencies, and associate statistical mathematical probability to the introduction to Theory of probability on measure-theoretic level for discrete models, continuous distributions and general apples of distributions including multi-dimensional Gaussian distribution and their properties. Further the (non)+integral character modes (Lp, P, a.s., D) and variants of limit theorems are derived (LLN, CLT). Equations of Mathematical Physics B Equations of Mathematical Physics B Bachelor Seminar eminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal reflected during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the positive during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the positive of methods of statistical data analysis such as: linear regression and correlation, analysis of variance, nonparametric relation is to illustrate the use of statistical procedures on examples. Solutions of concrete examples by use of statistical software as	istical rigidity are e Z,ZK al distributions of ra eristics of random Z,ZK ral transformations Z requirements for b esentations of the c essibilities of improv ZK methods, continge are also included.	sxamined. 6 andom variables (E, 5 s, and solution 1 achelors degreurrent state o ving the studer 2 ncy tables, an
alance property are a D1MIP The subject is devoted We deal with the example. The subject of this coupartial differential equal of the subject	s to study general mathematical properties of one-dimensional stochastic particle systems whose elements are interacting. Especial properties of statistical distributions of headways and multi-headways, interval frequencies, and associate statistical matter and Probability to the introduction to Theory of probability on measure-theoretic level for discrete models, continuous distributions and general apples of distributions including multi-dimensional Gaussian distribution and their properties. Further the (non)+integral character and the condex (Lp, P, a.s., D) and variants of limit theorems are derived (LLN, CLT). Equations of Mathematical Physics B inserting integral equations, theory of generalized functions, classification of partial differential equations, theory of integrations. Bachelor Seminar eminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer. Statistical Methods with Applications of scientifi	istical rigidity are e Z,ZK al distributions of ra eristics of random Z,ZK ral transformations Z requirements for b esentations of the c essibilities of improv ZK methods, continge are also included. Z,ZK	examined. 6 andom variables (E, 5 and solution 1 achelors degreer current state o exing the studer 2 ncy tables, an
palance property are a D1MIP The subject is devoted We deal with the example. O1RMFB The subject of this coupartial differential equal D1BASE In the first part of the subjects at the faculty. The research results accommended. O1STME The course consists of their application. The accommended of this course.	s to study general mathematical properties of one-dimensional stochastic particle systems whose elements are interacting. Especial paralyzed. For such systems, statistical distributions of headways and multi-headways, interval frequencies, and associate statistical material material material distributions of probability to the introduction to Theory of probability on measure-theoretic level for discrete models, continuous distributions and general aples of distributions including multi-dimensional Gaussian distribution and their properties. Further the (non)+integral character modes (Lp, P, a.s., D) and variants of limit theorems are derived (LLN, CLT). Equations of Mathematical Physics Burse is solving integral equations, theory of generalized functions, classification of partial differential equations, theory of integrations. Bachelor Seminar eminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal restricted during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the post-dieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the post-dieved methods of statistical data analysis such as: linear regression and correlation, analysis of variance, nonparametric regression to illustrate the use of statistical procedures on examples. Solutions of concrete examples by use of statistical software at Introduction to Machine Learning is to provide a broad introduction to machine learning, data mining and statistical image recognition. Main attention is paid to the statistical procedures on examples.	istical rigidity are e Z,ZK al distributions of ra eristics of random Z,ZK ral transformations Z requirements for b esentations of the c essibilities of improv ZK methods, continge are also included. Z,ZK the basic methods	sxamined. 6 andom variables (E, 5 s, and solution 1 achelors degreurrent state of current state of current states and solution achelors degreurent states of current states
palance property are a D1MIP The subject is devoted We deal with the example. O1RMFB The subject of this coupartial differential equal D1BASE In the first part of the subjects at the faculty. The research results accommence. O1STME The course consists of their application. The accommence of their application. The accommendation of this course the teacher, cluster and the subject of their application.	s to study general mathematical properties of one-dimensional stochastic particle systems whose elements are interacting. Especial properties of statistical distributions of headways and multi-headways, interval frequencies, and associate statistical matter and Probability to the introduction to Theory of probability on measure-theoretic level for discrete models, continuous distributions and general apples of distributions including multi-dimensional Gaussian distribution and their properties. Further the (non)+integral character and the condex (Lp, P, a.s., D) and variants of limit theorems are derived (LLN, CLT). Equations of Mathematical Physics B inserting integral equations, theory of generalized functions, classification of partial differential equations, theory of integrations. Bachelor Seminar eminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal remainer. Statistical Methods with Applications of scientifi	istical rigidity are e Z,ZK al distributions of ra eristics of random Z,ZK ral transformations Z requirements for b esentations of the c essibilities of improv ZK methods, continge are also included. Z,ZK the basic methods actical applications	examined. 6 andom variables (E, 5 and solution 1 achelors degreurrent state oring the studer 2 ncy tables, ar 4 s of learning w

Minimal number of credits of the block: 4

The role of the block: PV

Code of the group: BSPAMSMPV2

Name of the group: BS P_AMSM Required optional courses 2nd year

Requirement credits in the group: In this group you have to gain at least 4 credits

Requirement courses in the group:

Credits in the group: 4

Note on the group:

Student je povinen z uvedené skupiny předmětů získat alespoň 4 kredity.

	and a second					-
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
18PMTL	Programming in MATLAB Mat j Pokorný, Quang Van Tran, Jaromír Kukal Quang Van Tran Jaromír Kukal (Gar.)	KZ	4	4C	Z	PV
18PPY2	Programming in Python 2 Jakub Klinkovský Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	2S	Z	PV
18PPY3	Programming in Python 3 Rudolf Pecinovský Jakub Klinkovský (Gar.)	Z	2	2C	L	PV
02TSFA	Thermodynamics and Statistical Physics Igor Jex, Jaroslav Novotný Antonín Hoskovec Igor Jex (Gar.)	Z,ZK	4	2+2	L	PV

Characteristics of the courses of this group of Study Plan: Code=BSPAMSMPV2 Name=BS P_AMSM Required optional courses 2nd

18PMTL	Programming in MATLAB	KZ	4
Introducing Matlab envi	ronment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic an	alysis, statistics, a	algorithmization
and geometric represen	tation of results.		

18PPY2 Programming in Python 2
This course introduces students to practical applications of the Python language in scientific as well as commercial fields. The course is a seminar where each presented topic is accompanied by a short demo of a real-world application in the specific field.

18PPY3 Programming in Python 3
Z
2
This advanced course is intended for students who have basic experience with programming in Python and using its libraries. It introduces students to advanced concepts of the Python language and modules they are based on.

2TSFA Thermodynamics and Statistical Physics
Thermodynamics and Statistical Physics
Foundation of thermodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chatelier principle. Statistical entropy. Basics of many body descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical ensemble, Fermi gas, models of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transport phenomena.

Code of the group: BSSPOLVEDY

Name of the group: BS - Social Sciences

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 1 course

Credits in the group: 0

Note on the group:

Only one of these courses is obligatory.

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
00EKOT	Economy in Technology Jana Ková ová	Z	1	2+0		PV
00ETV	Ethics of Science and Technology Jakub Hají ek Jana Ková ová Jakub Hají ek (Gar.)	Z	1	0+2	L	PV
00RET	Rhetoric Jana Ková ová Jana Ková ová Beatriz Vadillo Gonzalo (Gar.)	Z	1	0+2		PV
00UPRA	Introduction to Law Martin ech Jana Ková ová Martin ech (Gar.)	Z	1	0+2		PV
00UPSY	Introduction to Psychology Jakub Hají ek Jana Ková ová Jakub Hají ek (Gar.)	Z	1	0+2		PV

Characteristics of the courses of this group of Study Plan: Code=BSSPOLVEDY Name=BS - Social Sciences

00EKOT	Economy in Technology	Z	1
The course introduces	the basics of micro- and macroeconomics.		
00ETV	Ethics of Science and Technology	Z	1
00RET	Rhetoric	Z	1
The course is focused	on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the	ne composition of	public speech
as well as to its nonver	bal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are ar	n integral part of the	ne course.
00UPRA	Introduction to Law	Z	1
00UPSY	Introduction to Psychology	Z	1

Code of the group: BSPJAZYKYZK Name of the group: BS P languages Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 2 courses

Credits in the group: 0 Note on the group:

Note on the gr	oup.					
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04XAMZK	English for Intermediate Students Examination Jana Ková ová, Slav na Brownová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XAPZK	English for Advanced Students Examination Slav na Brownová, Darren Copeland Jana Ková ová Darren Copeland (Gar.)	ZK	4		Z	PV
04XCESZZK	Czech for Foreigners Beginners - Examination Slav na Brownová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XCESMZK	Czech for Intermediate Students Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XCESPZK	Czech for Foreign Students - Advanced Examination Jana Ková ová Jana Ková ová Jana Ková ová (Gar.)	ZK	4		Z	PV
04XFMZK	French for Intermediate Students Examination V ra Šlechtová V ra Šlechtová V ra Šlechtová (Gar.)	ZK	4		Z	PV
04XFPZK	French for Advanced Students Examination V ra Šlechtová V ra Šlechtová V ra Šlechtová (Gar.)	ZK	4		Z	PV
04XFZZK	French for Beginners Examination V ra Šlechtová V ra Šlechtová V ra Šlechtová (Gar.)	ZK	3		L	PV

04XNMZK	German for Intermediate Students Examination Miloslava echová Miloslava echová (Gar.)	ZK	4	Z	PV
04XNPZK	German for Advanced Students Examination Miloslava echová Miloslava echová (Gar.)	ZK	4	Z	PV
04XRMZK	Russian for Intermediate Students Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4	Z	PV
04XRPZK	Russian for Advanced Students Examination Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	4	Z	PV
04XRZZK	Russian for Beginners Examination Zhanna Isaeva Zhanna Isaeva Zhanna Isaeva (Gar.)	ZK	3	L	PV
04XSMZK	Spanish for Intermediate Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	4	Z	PV
04XSPZK	Spanish for Advanced Students Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	4	Z	PV
04XSZZK	Spanish for Beginners Examination Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	ZK	3	L	PV

The course content is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two parts - written (100 min) and oral (20-30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three English courses. 04XAPZK English for Advanced Students Examination ZK The course content is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability to apply their knowledge obtained in the three AP courses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic from the student's field of study. Czech for Foreigners Beginners - Examination ZK The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04XCESZ1,2,3 courses and can only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher. Czech for Intermediate Students Examination 04XCESMZK 4 The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESM1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. 04XCESPZK Czech for Foreign Students - Advanced Examination The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CESP1,2,3 courses and can only be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher. 04XFMZK French for Intermediate Students Examination 4

Characteristics of the courses of this group of Study Plan: Code=BSPJAZYKYZK Name=BS P languages

English for Intermediate Students Examination

The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The examination consists of a written and oral part and is organized according to Examination Instructions, a document available on the web.

04XFPZK French for Advanced Students Examination ZK 4

The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized according to Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading.

04XFZZK French for Beginners Examination

The content is the examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination is ruled by the document

In a content is the examination as given by the study plan. The course is terminated with an examination consisting of oral and written part. The examination is ruled by the document instruction for examination. Its content covers the levels FZ1 - FZ5.

O4XNMZK

German for Intermediate Students Examination

ZK

4

04XNMZK | German for Intermediate Students Examination | ZK | 4 The course content is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment. More detailed information is to be obtained from the teacher.

04XNPZK German for Advanced Students Examination ZK 4
The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination consisting of two parts - written

and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded assessment. More detailed information is to be obtained from the teacher.

04XRMZK | Russian for Intermediate Students Examination | ZK | 4
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RM1
- RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher.

RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher.

O4XRPZK Russian for Advanced Students Examination ZK 4

The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RP1 - RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions by the teacher.

04XRZZK Russian for Beginners Examination ZK 3
The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RZ1

- RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructions by the teacher.

O4XSMZK Spanish for Intermediate Students Examination ZK 4

The course content is the examination as given by the study plan. XSMZK examination consists of two parts: written and oral; to be eligible for the written part, students will have obtained non-graded assessment for course XSM3. Oral examination follows the written part.

04XSPZK | Spanish for Advanced Students Examination | ZK | 4 The course content is the examination as given by the study plan. Examination XSPZK consists of two parts, namely oral and written. The prerequisite for admission to oral part is having passed the written test. Examination content is based on syllabi of courses XSP1, XSP2, and XSP3 or on an individual study plan of the student.

04XSZZK | Spanish for Beginners Examination | ZK | 3 The course content is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination only if he/she has passed the written examination test.

Name of the block: Elective courses

Minimal number of credits of the block: 0

The role of the block: V

Code of the group: BSPAMSMV

Name of the group: BS P_AMSM Optional courses Requirement credits in the group:

Requirement courses in the group:

Credits in the group: 0 Note on the group.

Note on the gi						
Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
01TA	Algebra and Calculus in Applications Lubomíra Dvo áková, Edita Pelantová Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	2P+0C		V
02DEF1	History of Physics 1 Igor Jex Igor Jex (Gar.)	Z	2	2+0	Z	V
02DEF2	History of Physics 2 Igor Jex Igor Jex (Gar.)	Z	2	2+0	L	V
01DEM	History of Mathematics Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	Z	1	0+2	L	V
01DIM1	Discrete Mathematics 1 Lubomíra Dvo áková, Edita Pelantová, Zuzana Masáková Lubomíra Dvo áková Zuzana Masáková (Gar.)	Z	2	2P+0C	Z	V
01DIM2	Discrete Mathematics 2 Edita Pelantová, Zuzana Masáková Zuzana Masáková (Gar.)	Z	2	2P+0C	L	V
01DIMA3	Discrete Mathematics 3 Lubomíra Dvo áková Lubomíra Dvo áková (Gar.)	ZK	2	2P+0C		V
01FKO	Functions of Complex Variable Severin Pošta, Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	3	2+1		V
01FANA1	Functional Analysis 1 Pavel Š oví ek Pavel Š oví ek (Gar.)	Z,ZK	5	2P+2C		V
02FYS1	Physical Seminar 1 Filip Petrásek (Gar.)	Z	2	0+2	Z	V
B0B36JUL	Julia for optimization and learning Milan Papež, Šimon Soldát, Václav Mácha Milan Papež Milan Papež (Gar.)	KZ	4	1P+3C	Z	V
04AKS	English Conversation Jana Ková ová Jana Ková ová (Gar.)	Z	1	0+2	L	V
00MAM1	Essentials of High School Course 1 David Be	Z	1	0+1		V
00MAM2	Essentials of High School Math Course 2 Lukáš Heriban Severin Pošta Lukáš Heriban (Gar.)	Z	1	0+1		V
18NES1	Neural Networks 1 Zuzana Pet í ková Zuzana Pet í ková	KZ	5	2P+2C	L	V
18NES2	Neural Networks 2 František Vold ich, Zuzana Pet í ková Zuzana Pet í ková (Gar.)	KZ	3	0P+2C	L	V
01NME2	Numerical Methods 2 Michal Beneš Michal Beneš (Gar.)	KZ	2	2+0	L	V
15CH1	General Chemistry 1 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z	3	2+1	Z	V
15CH2	General Chemistry 2 Ond ej Holas, Petr Distler, Václav uba Petr Distler Petr Distler (Gar.)	Z,ZK	3	2+1	L	V
01PGR1	Computer Graphics 1 Pavel Strachota Pavel Strachota (Gar.)	Z,ZK	2	1P+1C		V
01PGR2	Computer Graphics 2 Pavel Strachota Pavel Strachota (Gar.)	Z,ZK	2	1P+1C		V
01PSR	Principles of Statistical Decision Making Václav K s Václav K s Václav K s (Gar.)	ZK	2	2+0	L	V
18PRC1	Programming in C++ 1 Vladimír Jarý, Miroslav Virius Miroslav Virius (Gar.)	Z	4	2+2	Z	V
18PRC2	Programming in C++ 2 Vladimír Jarý, Miroslav Virius, Jakub Klinkovský Miroslav Virius Miroslav Virius (Gar.)	KZ	4	2+2	L	V
18PPY1	Programming in Python 1 Jakub Klinkovský, Matej Mojzeš Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	2C	L	V
18PPY2	Programming in Python 2 Jakub Klinkovský Jakub Klinkovsk ý Jakub Klinkovský (Gar.)	Z	2	2S	Z	V
18PPY3	Programming in Python 3 Rudolf Pecinovský Jakub Klinkovský Jakub Klinkovský (Gar.)	Z	2	2C	L	V

01PSL	LaTeX - Publication Instrument Petr Ambrož Petr Ambrož Petr Ambrož (Gar.)	Z	2	0+2	L	V
01SSM1	Seminar of Contemporary Mathematics 1 Mat j Tušek Edita Pelantová (Gar.)	Z	2	0+2	Z	V
01SOS1	Software Seminar 1 Zden k ulík Zden k ulík (Gar.)	Z	2	0+2	Z	V
01SOS2	Software Seminar 2 Zden k ulík Zden k ulík (Gar.)	Z	2	0+2	L	V
TV-1	Physical Education	Z	1		Z	V
TV-2	Physical Education	Z	1		L	V
TV-3	Physical education	Z	1	0+2	Z	V
TV-4	Physical education	Z	1	0+2	L	V
02TER	Heat and Molecular Physics Filip Petrásek Petr Novotný Petr Jizba (Gar.)	Z,ZK	4	2+2	L	V
14TED	Creating Electronic Documents Aleš Materna, Ji í Martin ík Aleš Materna Aleš Materna (Gar.)	Z	2	26C		V
17UING	Introduction to Engineering Jan Frýbort, Petr Haušild, Radek Mušálek Jan Frýbort Jan Frýbort (Gar.)	KZ	3	2P+1C	Z	V
02UKP1	Introduction to Curves and Surfaces Ladislav Hlavatý Ladislav Hlavatý (Gar.)	Z	2	1P+1C	L	V
18UQI	Introduction to quantum informatics Aleš Wodecki Aleš Wodecki (Gar.)	Z	3	2P	L	V
12UNXAP	Introduction to UNIX Milan Kucha ik Milan Kucha ik (Gar.)	Z	2	1P+1C	L	V
12UVP	Introduction to Scientific Computing Milan Ši or Milan Ši or Milan Ši or (Gar.)	Z	2	1P+1C	L	V
12PYTH	Scientific Programming in Python Pavel Váchal, Jakub Urban Pavel Váchal Pavel Váchal (Gar.)	Z	2	0+2	L	V
18ZALG	Basics of Algorithmization Vladimír Jarý, Miroslav Virius, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet í ková, František Gašpar Vladimír Jarý Miroslav Virius (Gar.)	Z,ZK	4	2+2	L	V

18ZALG	Vladimír Jarý, Miroslav Virius, Petr Pauš, František Vold ich, Jan Tomsa, Zuzana Pet í ková, František Gašpar Vladimír Jarý Miroslav Virius (Gar.)	Z,ZK	4	2+2	L	V
Characteristics o	of the courses of this group of Study Plan: Code=BSPAMSMV Name	=BS P_AMS	M Option	nal course	es	
18PPY2	Programming in Python 2				Z	2
This course introduces	s students to practical applications of the Python language in scientific as well as commercia	I fields. The cours	se is a semi	nar where ea	ch present	ted topic is
accompanied by a sho	ort demo of a real-world application in the specific field.					
18PPY3	Programming in Python 3				Z	2
This advanced course	is intended for students who have basic experience with programming in Python and using its	s libraries. It introd	duces stude	nts to advanc	ed concep	ts of the Pythor
language and module:	s they are based on.					
01TA	Algebra and Calculus in Applications				ZK	2
We illustrate methods	based on combination of (CONtinuous) calculus and discrete (disCRETE) structures, so calle	es concrete mathe	ematics. The	eorems are m	otivated by	y problems fron
informatics and they a	re illustrated on problems from informatics.					
02DEF1	History of Physics 1				Z	2
	in the system of sciences. The relationship of man and nature. Natural sciences in ancient Or	rientand Greece,	Greek natu	1	I	
Helenistic period, Arch	nimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano I	Bruno. Copernicu	s, Kepler, G	alileo, Huyge	ns. The bir	rth of physics
as experimental scien	ce. Newton and his work.					
02DEF2	History of Physics 2				Z	2
Development of classi	cal mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, c	orpuscular and w	ave approa	ch. Electricity	and magr	netism -
•	sm, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its	•			ū	
, 0	s, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherfo	· .				
	concept of Nature and Universe of today.		,	0,7	,	,
01DEM	History of Mathematics				Z	1
-	rm of regular seminars where the members of the department of mathematics, but also invite	d speakers - spe	cialists in the	1	_	n varoius topic
from the history of ma	•			.		
01DIM1	Discrete Mathematics 1				Z	2
-	d to elementary number theory and applications. It includes individual problem solving.				- 1	_
01DIM2	Discrete Mathematics 2				Z	2
*	d to recurrence relations. It includes individual problem solving.				_	2
01DIMA3	Discrete Mathematics 3			-	ZK	2
-	problems and methods of their solving from various parts of discrete mathematics. The semi	nar includes indiv	idual proble	I		_
given literature.	problems and methods of their solving from various parts of discrete mathematics. The semi	nai includes indiv	iduai proble	in solving of	ones own	crioice nom the
	Functions of Compley Veriable			7	71/	3
01FKO	Functions of Complex Variable				,ZK	-
	outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of cand the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point					
•	and the Cauchy-Riemann equations, notomorphic and analytic functions, the index of a point omorphic function, analytic continuation, isolated singularities, the maximum modulus principl	•			•	
theorem.	omorphic function, analytic continuation, isolated singularities, the maximum modulus principi	e, Liouville's tried	rem, me Ca	uchy esimale	3S, Laurem	t series, residue
01FANA1	Functional Analysis 1			7	,ZK	5
					, <u>z</u> r.	
02FYS1	Physical Seminar 1			, ,	-	2
	d to detailed study of interesting physical problems. It should help students to deeper unders	-				course of
iviecnanics. The proble	ems are chosen, studied and presented by the students themselves, with the possibility to us	e PC and physica	ai iaboratory	equipments.		

B0B36JUL Julia for optimization and learning	KZ	4
Julia programming language is increasingly known by the community for its suitability in the field of numerical calculations. The course consists of tw	1	part presents the
basics of Julia. The second part introduces mathematical optimization and its application in machine learning, statistics and optimal control of differences.		
shows the individual concepts of Julia, the second part combines them into longer logical sections of code. We explain each application theoretically	•	
to write simple functions by themselves and compare them with already existing packages. The course ends with a final project. Students can either		-
theses or join a Kaggle competition with real data. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI educ		
with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.		
04AKS English Conversation	Z	1
The course will develop the student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communications acquired throughout their previous studies.	1	•
their vocabulary for various communication situations and will master their communication strategy. They will also practise their listening skills in ord		
in discussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more confident spea		and participate
	Z	1
		I .
Students are introduced to mathematical concepts and methods used in the introductory physics course.	_	
00MAM2 Essentials of High School Math Course 2	Z	1
Review of basics of high school mathematics.		
18NES1 Neural Networks 1	KZ	5
The aim of the course "Neural Networks 1" is to acquaint students with basic models of artificial neural networks, algorithms for their learning, and of	other related mach	ine learning
techniques. The goal is to teach students how to apply these models and methods to solve practical tasks.		
18NES2 Neural Networks 2	KZ	3
The aim of the course "Neural Networks 2" is to acquaint students with basic models of deep neural networks and teach them how to apply these more	dels and methods	to solve practical
tasks.		
01NME2 Numerical Methods 2	KZ	2
The course is devoted to numerical solution of boundary-value problems and intial-boundary-value problems for ordinary and partial differential equations.	1	
boundary-value problems to initial-value problems and finite-difference methods for elliptic, parabolic and first-order hyperbolic partial differential equality	•	anous converting
	Z	3
15CH1 General Chemistry 1	_	-
The most important concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practi	cal use are illustra	ted by examples
solved in exercises.	T	
15CH2 General Chemistry 2	Z,ZK	3
The subject is the continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Us	sing various examp	oles, the fact that
the validity of these principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles	are illustrated by	examples solved
in exercises.		
01PGR1 Computer Graphics 1	Z,ZK	2
The first part of the two-semester "Computer Graphics" course is devoted to the specifics of digital display devices spanning from history up to the sta	ate of the art techn	ologies. Further,
a survey of fundamental problems in 2D computer graphics is given together with their solutions. Focus is put on mathematical description of problems an	nd explanation of th	ne correspondina
	-	
algorithms using knowledge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the applications of course the process of authoring scientific documents and presentations.	-	
algorithms using knowledge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the applications of course the process of authoring scientific documents and presentations.	computer graphics	approaches in
algorithms using knowledge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the applications of course the process of authoring scientific documents and presentations. O1PGR2 Computer Graphics 2	zomputer graphics	approaches in
algorithms using knowledge previously obtained in a variety of subjects available at FNSPE. The final part of the course covers the applications of course the process of authoring scientific documents and presentations. O1PGR2	Z,ZK	approaches in 2 us in computer
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17UING	Introduction to Engineering	KZ	3
This course provide	introduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and be	havior, basics of r	manufacturing
and production, qua	ity assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be included.		
02UKP1	Introduction to Curves and Surfaces	Z	2
The goal of the lectu	re is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts	for the curves are	introduced
Frenets formulae are	explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential page 1.	art of the lecture a	re the examples
calculated by studer	ts.		
18UQI	Introduction to quantum informatics	Z	3
Quantum informatio	n has been on the rise for years. In this course, we explore the basics of quantum information theory with a strong emphasis on	quantum computi	ng. We discuss
some of the most im	portant quantum principles that lead to the so called quantum advantage and discuss many important quantum algorithms with t	he requisite amou	unt of theoretical
underpinning.			
12UNXAP	Introduction to UNIX	Z	2
Computer and oper			
Computer and open	ting systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfa	ce. Hardware and	l software.
	ting systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfang systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working		
Principles of operati		with files. Text ed	ditors: vi, emacs.
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This course is devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of the algorithm complexity.

Z,ZK

Code of the group: BSPJAZYKYZAP Name of the group: BS P jazyky zap Requirement credits in the group: Requirement courses in the group:

Basics of Algorithmization

Credits in the group: 0

18ZALG

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
04XAM1	English for Intermediate Students M1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XAM2	English for Intermediate Students M2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XAM3	English for Intermediate Students M3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XAP1	English for Advanced Students P1 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	Z	٧
04XAP2	English for Advanced Students P2 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	L	V
04XAP3	English for Advanced Students P3 Jana Ková ová Darren Copeland (Gar.)	Z	2	0+2	Z	V
04XCESZ1	Czech for Foreigners - Beginners 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESZ2	Czech for Foreigners - Beginners 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESZ3	Czech for Foreigners - Beginners 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	28	Z	V
04XCESM1	Czech for Foreigners - Intermediate 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESM2	Czech for Foreigners - Intermediate 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESM3	Czech for Foreigners - Intermediate 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP1	Czech for Foreign Students - Advanced 1 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XCESP2	Czech for Foreigners - Advanced 2 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	L	V
04XCESP3	Czech for Foreigners - Advanced 3 Jana Ková ová Jana Ková ová (Gar.)	Z	2	0+2	Z	V
04XFM1	French for Intermediate Students M1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V

04XFM2	French for Intermediate Students M2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFM3	French for Intermediate Students M3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP1	French for Advanced Students P1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFP2	French for Advanced Students P2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	L	V
04XFP3	French for Advanded Students P3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+2	Z	V
04XFZ1	French for Beginners Z1 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ2	French for Beginners Z2 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ3	French for Beginners Z3 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XFZ4	French for Beginners Z4 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	Z	V
04XFZ5	French for Beginners Z5 V ra Šlechtová V ra Šlechtová (Gar.)	Z	2	0+4	L	V
04XNM2	German for Intermediate Students M2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNM1	German for Intermediate Students M1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNM3	German for Intermediate Students M3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP1	German for Advanced Students P1 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XNP2	German for Advanced Students P2 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	L	V
04XNP3	German for Advanced Students P3 Miloslava echová Miloslava echová (Gar.)	Z	2	0+2	Z	V
04XRM1	Russian for Intermediate Students M1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRM2	Russian for Intermediate Students M2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRM3	Russian for Intermediate Students M3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP1	Russian for Advanced Students P1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRP2	Russian for Advanced Students P2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	L	V
04XRP3	Russian for Advanced Students P3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+2	Z	V
04XRZ1	Russian for Beginners Z1 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XRZ2	Russian for Beginners Z2 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	Z	V
04XRZ3	Russian for Beginners Z3 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XRZ4	Russian for Beginners Z4 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	Z	V
04XRZ5	Russian for Beginners Z5 Zhanna Isaeva Zhanna Isaeva (Gar.)	Z	2	0+4	L	V
04XSM1	Spanish for Intermediate Students M1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSM2	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSM3	Spanish for Intermediate Students M3 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSP1	Spanish for Advanced Students P1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	Z	V
04XSP2	Spanish for Advanced Students P2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+2	L	V
04XSP3	Spanish for Advanced Students P3	Z	2	0+2	Z	V
04XSZ1	Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) Spanish for Beginners Z1 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V
04XSZ2	Spanish for Beginners Students Z2 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	Z	V
04XSZ3	Spanish for Beginners Z3	Z	2	0+4	L	V
04XSZ4	Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) Spanish for Beginners Z4 Beatriz Vadillo Gonzalo (Car.)	Z	2	0+4	Z	V
04XSZ5	Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.) Spanish for Beginners Z5 Beatriz Vadillo Gonzalo Beatriz Vadillo Gonzalo (Gar.)	Z	2	0+4	L	V

Characteristics of the courses of this group of Study Plan: Code=BSPJAZYKYZAP Name=BS P jazyky zap		
04XAM1 English for Intermediate Students M1	Z	2
The course is designed for students who have successfully completed the full secondary school English language course at least at the A2 level of the provides an introduction into English for Specific and Academic Purposes (CEEP). It provides an introduction into English for Specific and Academic Purposes (CEEP) is a into fundamental.		
of Reference for Languages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamental professional oral and written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical		
extending the knowledge of grammar issues used in EAP.		
04XAM2 English for Intermediate Students M2	Z	2
The AM2 course expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more		
and lexical items typical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also gu revision is included.	ided writing. If nece	essary, grammar
04XAM3 English for Intermediate Students M3	Z	2
The course develops the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtec	1	
understanding of professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication equivalents. The course also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation.	on and their approp	oriate Czech
student's field.		
04XAP1 English for Advanced Students P1	Z	2
The course is designed for students who have successfully completed the full secondary school English language course (at least the B1 level of the	-	
of Reference for Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundamental grammar, and style typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions)		=
covers professional oral and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writin		
polite request). If necessary, revision of selected grammar topics is included.		
04XAP2 English for Advanced Students P2	Z	2
The AP2 course is based on AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen		_
the students' needs it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetering of descriptions, and, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguistic places.	•	• • • • • • • • • • • • • • • • • • • •
The course extends the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal	•	•
paragraph structure, linking, cohesion and coherence in texts.		
04XAP3 English for Advanced Students P3	Z	2
The AP3 course is based on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text.	_	
communication skills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, wr also preparing a project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal la	-	-
communication.	ngaago boar ar ore	a and willion
04XCESZ1 Czech for Foreigners - Beginners 1	Z	2
The course is designed for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic a	nd grammar featur	es) and they will
acquire basic language and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication exercises, simple social phrases, and oral and written communication.	tion in the most co	mmon everyday
situations. The course covers roughly lessons 1-3 of estina Express (Czech Express) by L. Holá and P. Bo ilová.		
	7	0
04XCESZ2 Czech for Foreigners - Beginners 2 The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and	Z conjugation syste	2 m and practise
04XCESZ2 Czech for Foreigners - Beginners 2 The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová.		_
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and		_
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. O4XCESZ3 Czech for Foreigners - Beginners 3 The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses	conjugation syste	m and practise 2 ic vocabulary,
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. O4XCESZ3 Czech for Foreigners - Beginners 3 The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce the state of the declension and deepening grammar.	conjugation syste Z on building up bas duce simple texts a	m and practise 2 ic vocabulary, and they practise
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. O4XCESZ3	conjugation syste Z on building up bas duce simple texts a	m and practise 2 ic vocabulary, and they practise
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The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. O4XCESZ3	Z on building up bas duce simple texts a lighly lessons 5-7 in	m and practise 2 ic vocabulary, and they practise n eština expres
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The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. O4XCESZ3 Czech for Foreigners - Beginners 3 The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to profere the foliation of the course of dialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers rount. O4XCESM1 Czech for Foreigners - Intermediate 1 The course is focused on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending the social situations. O4XCESM2 Czech for Foreigners - Intermediate 2 The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and refin understanding common abbreviations, abbreviated words, and mathematical terms and formulas. O4XCESM3 Czech for Foreigners - Intermediate 3 The last course revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is espel lexicology and on developing the student's writing skills.	Z on building up bas duce simple texts a ughly lessons 5-7 in Z he student's vocab Z ading skills and tra	m and practise 2 ic vocabulary, and they practise a eština expres 2 bulary for various 2 ains the student
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The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. 04XCESZ3	Z on building up bas duce simple texts a aighly lessons 5-7 in Z he student's vocable adding skills and trained and second and second and specialist texts Z cand specialist texts Z and specialist texts	m and practise 2 ic vocabulary, and they practise a estina expres 2 bulary for various 2 ains the student 2 brit of Reference. are taught the are taught the are practice 2 s placing greater 2 esentation of the
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. AXCESZ3 Czech for Foreigners - Beginners 3 The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to profrequent types of dialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers rounciation are correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending to social situations. Czech for Foreigners - Intermediate 1 The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and rein understanding common abbreviations, abbreviated words, and mathematical terms and formulas. 04XCESM2 Czech for Foreigners - Intermediate 3 The last course revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is espelexicology and on developing the student's writing skills. 04XCESP1 Czech for Foreign Students - Advanced 1 The prerequisite of the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common B its focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies an includes communication with teachers and faculty administrators. 04XCESP2 Czech for Foreigners - Advanced 2 This course extends the	Z on building up bas duce simple texts a ughly lessons 5-7 in Z he student's vocab Z ading skills and tra Z cially focused on s Z European Framewo science. Students d Student Life. Wri Z and specialist texts Z ion, and, finally, pre	m and practise 2 ic vocabulary, and they practise a estina expres 2 pulary for various 2 ains the student 2 ork of Reference. are taught the ten practice 2 s placing greater 2 esentation of the
The language and communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová. 04XCESZ3	Z on building up bas duce simple texts a aighly lessons 5-7 in Z he student's vocable adding skills and trace adding skills an	m and practise 2 ic vocabulary, and they practise a estina expres 2 pulary for various 2 ains the student 2 ork of Reference. are taught the ten practice 2 as placing greater 2 as esentation of the 2 If form. Students
The language and communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holâ and P. Bo ilová. 04XCESZ3 Czech for Foreigners - Beginners 3 The course further develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses fixing correct pronunciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to prot frequent types of dialogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers rot 1. 04XCESM1 Czech for Foreigners - Intermediate 1 The course is focused on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending to social situations. 04XCESM2 Czech for Foreigners - Intermediate 2 The course develops the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and re in understanding common abbreviations, abbreviated words, and mathematical terms and formulas. 04XCESM3 Czech for Foreigners - Intermediate 3 The last course revises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is espelexicology and on developing the student's writing skills. 04XCESP1 Czech for Foreign Students - Advanced 1 The prerequisite of the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common E it is focused partly on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of basics of functional style of engineering and professional communication, both in spoken and written form. The topics include University Studies an includes communication with teachers and faculty administrators. 04XCESP2 Czech for Foreigners - Advanced 3 The course develops the student's knowledge from CESP1 and focu	Z on building up bas duce simple texts a aighly lessons 5-7 in Z he student's vocable adding skills and trace adding skills an	m and practise 2 ic vocabulary, and they practise a estina expres 2 bulary for various 2 ains the student 2 britylistics and 2 britylistics a
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04XFM2	French for Intermediate Students M2	Z	2
	M1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science		
	(passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French scirchitects. Description of an object, device, shapes, dimensions, material.	since and technolog	ogy, French
04XFM3	French for Intermediate Students M3	Z	2
	in improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (
•	mpound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-c specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative w		
	ge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and o		ir renor articles
04XFP1	French for Advanced Students P1	Z	2
	ne objective of this three-semester course is to improve and further develop communication in the French language in both w		
	e in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit gen The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are re		
•	ait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactions		
	dvert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Top		
	istry. Reading of technical and popular science texts, further work with these texts and interpretation.		_
04XFP2 With the link to P1 cont	French for Advanced Students P2 ents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication o	Z	2
	communication are stressed (passive voice, nominalization, word formation).	ii giveii topics. i e	atures typical of
04XFP3	French for Advanded Students P3	Z	2
	n systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in		-
	rter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally cov rk compiled from 3 French sources. Preparation of several set topics for oral examination.	/ers a technical /a	ipplied science
04XFZ1	French for Beginners Z1	Z	2
	ne objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in	_	_
	ench for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able		· 1
	knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdo áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions		·
•	mple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation.	-	
04XFZ2	French for Beginners Z2	Z	2
= :	with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of		
•	Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreem p of France, food, expression of will, wish, order, prohibition, pleasure). Correct pronunciation is practiced. Stress on oral comm	•	
	work? A few expressions concerning the study. Name of University and Faculty.	·	·
04XFZ3	French for Beginners Z3	Z	2
•	FZ2. Basic linguistic knowledge and skills are developed. The contents is given by lessons 14 - 18 of the textbook: Pravda - F tuations are complemented from other materials. Stress is put on oral communication in dialogues and on reading, both for in		-
•	Reading covers short adapted texts of general interest first, and later popular science texts.	normation and loc	id as part or
04XFZ4	French for Beginners Z4	Z	2
•	n FZ3. Basic linguistic knowledge and skills are further developed. Oral communication and reading skills are practiced. The c		
	xtbook French for Beginners, and is expanded with topics and functions from other materials. Reading is developed from the led ourse covers generals and specific topics: health- illness, sport, free time, environment, study, travelling in France, Paris, sho		
	how to write CV, application, topics in mathematics, reading physics - mechanics, informatics, internet.	- pg,,	
04XFZ5	French for Beginners Z5	Z	2
•	n FZ4 are further developed, as well as technical language. Students prepare a paper on a chosen popular science topic. The ered by lessons 24 - 26 of the textbook: Pravda-Pravdova, French for Beginners, and is complemented from other materials.		
•	ched by lessons 24 - 20 of the textbook. Fravda-Fravdova, French for beginners, and is complemented from other materials.		
subjunctive clauses, ge	rund, passive.		
04XNM2	German for Intermediate Students M2	Z	2
	other more complex grammatical structures and their application in communication based on technical texts, such as the relation In g of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
· ·	rmation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	0,	
phenomena important f	or professional discourse (participles, relative clauses).		
04XNM1	German for Intermediate Students M1	Z	2
•	urse is to level off the students´ skills in the German language. The course focuses on revision of more difficult phenomena an ses (e.g. importance of verb prefixes). In the lexical part, it covers topics referring to higher education in both the Czech Repul		
•	ogether with all necessary expressions and phrases, expressions and phrases needed to chemists, mathematicians, physicist		
terminology. It develops	communication on related topics and is aimed at correct pronunciation, grammatical correctness and understandability.		
04XNM3	German for Intermediate Students M3	Z	2
	other more complex grammatical structures and their application in communication based on technical texts, such as the relation Ing of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and		
•	rmation and reading aloud, and appropriate language for various purposes in oral and written communication. The course system	•	
	or professional discourse (participles, relative clauses).		_
04XNP1 This course requires as	German for Advanced Students P1 od grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be le	Z	2
· -	nen focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for		
more difficult grammar s	tructures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on	,	
i.e., telephoning.			_
04XNP2 The course develops the	German for Advanced Students P2	Z ding their general s	2 and subtechnical
•	e students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extend Oduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and		
· -	V, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech).		

04XNP3 The course consists of		,	
The course consists of	German for Advanced Students P3	Z	2
	3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a v Ir accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the v	=	
•	ing, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are use		
•	process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. T		
practice to and from G	rman.		
04XRM1	Russian for Intermediate Students M1	Z	2
_	for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alpha		
•	mmunication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asl		,
-	nmar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievemen he course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable.	nt level of the RZ2 (course. The
04XRM2	Russian for Intermediate Students M2	Z	2
•	the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable.		2
04XRM3	Russian for Intermediate Students M3	Z	2
-	e knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, I		-
in the timetable.			
04XRP1	Russian for Advanced Students P1	Z	2
The entrance requirem	ent for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, processes the course is revision of standard language structures.	racticing more diffi	cult grammar
	ng the fundamentals of technical language and training writing skills.	,	
04XRP2	Russian for Advanced Students P2	Z	2
	RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives,	, verb aspects, spe	cific syntactic
	t on independent oral and written communication.	7	2
04XRP3 The course is based of	Russian for Advanced Students P3 RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphra	Z	2 The RP1 - RP3
	revious knowledge of general language at secondary level (listening, reading, correct communication in everyday situations)	-	
	dy is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and		
develop their subtechn	cal vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write	accurately and wit	h confidence or
technical topics.			
04XRZ1	Russian for Beginners Z1	Z	2
	the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Rus		
•	or both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speal d stress, understand its contents and summarize it.	king). Students will	be able to read
04XRZ2		7	2
-	Russian for Beginners Z2 If the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short s	. – .	_
	sing short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They wil		
	tical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.		, , , , , , , , , , , , , , , , , , , ,
04XRZ3	Russian for Beginners Z3	Z	2
The course is based or	RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training of short compact texts on new subtechnical topics).	ining various forms	of reading skills
	duces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will l	be able to respond	so as to be
	ress their opinion. Writing skills will be trained on guided writing tasks and note-taking.		
04XRZ4	Russian for Beginners Z4	Z	2
	RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts witl tion in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular ve	-	-
	nperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time),		
	e specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e		
forms, look up the info	mation from the timetable, learn about Russian holidays and typical meals.		
04XRZ5			
0 17 (1 (=0	Russian for Beginners Z5	Z	2
	Russian for Beginners Z5 student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understa	1	
The course expects the information from a spe	student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understatialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. C	anding, extracting a Communication skil	nd summarizing Is are trained or
The course expects the information from a spe everyday topics. Study	student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understatialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Cong grammar is based on professional and technical texts and only includes items typically used in professional communication	anding, extracting a Communication skil on (verbal adjective	nd summarizing Is are trained or
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04XSZ1	Spanish for Beginners Z1	Z	2
	e first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental forms of the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental first stage of the students will make the first stage of the students will be students as the first stage of the students will be students as the first stage of the students will be students as the students will be students and the students will be students as the students will	=	
	municate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish a	and will develop it	
04XSZ2	Spanish for Beginners Students Z2	Z	2
	ased on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and		
	derstand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries ar	nd others such as	the Czech
	f Spanish-speaking countries are also included.		
04XSZ3	Spanish for Beginners Z3	Z	2
	upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes		
	kt of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including to imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics.		
	eading and listening activities.	Students are prep	Jaieu ioi tilis
04XSZ4	Spanish for Beginners Z4	Z	2
	Spanish for Degliners 24 ed on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish		
	ntion to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the	-	-
	communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them.	porativo, aira e	, abja
04XSZ5	Spanish for Beginners Z5	Z	2
	are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish fo		
	Spanish course based on the course book will end with a written and oral examination.	,	
	List of courses of this pass:		
	List of courses of this pass:		
Code	List of courses of this pass: Name of the course	Completion	n Credits
	Name of the course		Credit
Code 00EKOT		Completion Z	Credit
00EKOT	Name of the course Economy in Technology The course introduces the basics of micro- and macroeconomics.	Z	Credit
00EKOT 00ETV	Name of the course Economy in Technology The course introduces the basics of micro- and macroeconomics. Ethics of Science and Technology	Z	1
00EKOT	Name of the course Economy in Technology The course introduces the basics of micro- and macroeconomics.	Z	1
00EKOT 00ETV 00MAM1	Name of the course Economy in Technology The course introduces the basics of micro- and macroeconomics. Ethics of Science and Technology Essentials of High School Course 1 Students are introduced to mathematical concepts and methods used in the introductory physics course.	Z Z Z	1 1 1
00EKOT 00ETV	Name of the course Economy in Technology The course introduces the basics of micro- and macroeconomics. Ethics of Science and Technology Essentials of High School Course 1	Z	1
00EKOT 00ETV 00MAM1 00MAM2	Name of the course Economy in Technology The course introduces the basics of micro- and macroeconomics. Ethics of Science and Technology Essentials of High School Course 1 Students are introduced to mathematical concepts and methods used in the introductory physics course. Essentials of High School Math Course 2 Review of basics of high school mathematics.	Z Z Z Z	1 1 1
00EKOT 00ETV 00MAM1 00MAM2 00PT	Reconomy in Technology The course introduces the basics of micro- and macroeconomics. Ethics of Science and Technology Essentials of High School Course 1 Students are introduced to mathematical concepts and methods used in the introductory physics course. Essentials of High School Math Course 2 Review of basics of high school mathematics. Preparatory Week	Z Z Z Z Z Z Z Z Z Z	1 1 1
00EKOT 00ETV 00MAM1 00MAM2 00PT 00RET	Name of the course Economy in Technology The course introduces the basics of micro- and macroeconomics. Ethics of Science and Technology Essentials of High School Course 1 Students are introduced to mathematical concepts and methods used in the introductory physics course. Essentials of High School Math Course 2 Review of basics of high school mathematics.	Z Z Z Z Z Z Z Z Z Z	1 1 1 2 1
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00EKOT 00ETV 00MAM1 00MAM2 00PT 00RET The course is focus as well as to its 00UPRA 00UPSY 01ANB3 1. Functional secus Expansion, Taylor equation and exact side, Euler difference of set, completeness	Reconomy in Technology The course introduces the basics of micro- and macroeconomics. Ethics of Science and Technology Essentials of High School Course 1 Students are introduced to mathematical concepts and methods used in the introductory physics course. Essentials of High School Math Course 2 Review of basics of high school mathematics. Preparatory Week Rhetoric used on the acquisition of speech and voice techniques and on the rules of correct pronounciation. The course is also devoted to the monverbal aspects. Stylistics exercises, strategies for coping with stage-fright and a short excursion into the history of rhetoric are an Introduction to Law Introduction to Psychology Calculus B 3 quences and series - convergence range, criteria of uniform convergence, continuity, limit, differentiation and integration of functional or's theorem. 2. Ordinary differential equations - equations of first order (method of integration factor, equation of Bernoulli, separation te equation) and equations of higher order (fundamental system, reduction of order, variation of parameters, equations with constant coential equation). 3. Metric spaces - metric, norm, scalar product, neighborhood, interior and exterior points, boundary point, isolated and services of the product of the polynomials. Complete orthogonal systems. 4. Fourier series - expansion of functions into Fourier series - expansion of funct	Z Z Z Z Composition of pointegral part of the Z Z Z Z Z Z Z Z Z Z Z Z Z Z N Series, power sen of variables, horefficients and speed non-isolated pointer series, trigonorier series, trigonorier	1 1 1 1 1 1 1 1 1 1 1 1 8 ries, Series mogeneous cial right-har int, boundar metric Fourier
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derivace integrálu podle parametru. [8] Integrály po k ivkách a plochách. Integrální v ty.

01BASE Bachelor Seminar Z 1

In the first part of the seminar, students familiarize themselves with the general principles of publishing and presenting scientific work and the formal requirements for bachelors degree projects at the faculty. The second part is designed as a practical training for the defense of the bachelors degree project. The students give oral presentations of the current state of the research results achieved during the work on their projects. Each presentation is followed by a discussion on scientific matters as well as on the possibilities of improving the students performance.

01BPAM1	Bachelor Thesis 1	Z	5
В	achelor's Degree project on the selected topic under the supervision. Supervision and regular checking of the bachalor project under	preparation.	
01BPAM2	Bachelor Thesis 2	Z	10
В	achelor's Degree project on the selected topic under the supervision. Supervision and regular checking of the bachalor project under	preparation.	
01CAS	Matematics for Particle Systems	Z,ZK	3
The aim of the cour	se is to study general mathematical properties of one-dimensional stochastic particle systems whose elements are interacting. Especial	ly, systems fulfilling	g a so-called
balance proper	ty are analyzed. For such systems, statistical distributions of headways and multi-headways, interval frequencies, and associate statis	stical rigidity are ex	camined.
01DEM	History of Mathematics	Z	1
The subject has the	e form of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the field - q	ive their talks on va	aroius topics

The subject has the form of regular seminars where the members of the department of mathematics, but also invited speakers - specialists in the field - give their talks on varoius topic from the history of mathematics.

O1DIM1

Discrete Mathematics 1

Z
2
2

01DIM1 Discrete Mathematics 1
The seminar is devoted to elementary number theory and applications. It includes individual problem solving.

01DIM2	Discrete Mathematics 2 The seminar is devoted to recurrence relations. It includes individual problem solving.	Z	2
01DIMA3	Discrete Mathematics 3	ZK	2
Students get to kr	now problems and methods of their solving from various parts of discrete mathematics. The seminar includes individual problem solving given literature.	g of ones own ch	oice from the
01FANA1	Functional Analysis 1	Z,ZK	5
01FKO	Functions of Complex Variable	Z,ZK	3
	from outlining the Jordan curve theorem and the Riemann-Stieltjes integral. Then basic results of complex analysis in one variable are ex		
•	tion and the Cauchy-Riemann equations, holomorphic and analytic functions, the index of a point with respect to a closed curve, Cauch		
theorem, roots of	a holomorphic function, analytic continuation, isolated singularities, the maximum modulus principle, Liouville's theorem, the Cauchy esti	mates, Laurent s	eries, residu
041.41	theorem. Linear Algebra 1	7	2
01LAL 1 Vector space	Linear Algebra 1 2. Linear dependence and independence. 3. Basis and dimension. 4. Subspaces of vector spaces. 5. Linear mappings. 6. Matrices of li	_	_
1. Vector space.	theorem.	near mappings. 7	Trobernas
01LAL2	Linear Algebra 2	Z,ZK	4
	rse matrix and operator. 2. Permutation and determinant. 3. Spectral theory (eigenvalue, eigenvector, diagonalization). 4. Hermitian and		
•	ogonality. 6. Metric geometry. 7. Riesz theorem and adjoint operator. Outline of the exercises: 1. Methods for calculation of inverse matri s. 3. Calculation of eigenvalues and eigenvectors. 4. Hermitian and quadratic forms. Canonical form. 5. Scalar product and orthogonalit		
or determinant	complements. 6. Geometry exercises and examples. 7. Adjoint operators.	y. Calculation of t	ortilogoriai
01LALZ	Linear Algebra 1, exam	ZK	2
01LIP	Linear Programming	Z,ZK	3
	problems about constrained extremal problems for multivariable functions, where the function is linear and the constraints are given by	,	_
	inequalities.		
01MAN	Calculus 1	Z	4
	Basic calculus (real analysis, functions of one real variable, differential calculus).		1
01MAN2	Calculus 2	Z,ZK	8
	f differential calculus: Taylor´s Polynomials, Taylor´s formula 2. Infinite series: criteria of convergence, operations on series, absolute ar power series, the Cauchy-Hadamard theorem, expansion of function into power series, summation of infinite series. 4. Theory of integr		-
Real and complex	(Riemann definition), techniques of integration and application of integrals, Generalized Riemann integral	ais: primitives, de	ennite integra
01MANZ	Calculus 1, exam	ZK	4
01MAPR	Markov processes	Z,ZK	4
01MAS	Mathematical Statistics	ZK	3
The subject is de			1
•	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistic	cal models, findir	ng unbiased
•	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistion of maximum likelihood, derivation of critical regions for h	cal models, findir	ng unbiased
estimators with	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistion minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for h Neyman-Pearson lemma and likelihood ratio, confidence intervals and non-parametric density estimation.	cal models, findir	ng unbiased using the
estimators with	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistion of maximum likelihood, derivation of critical regions for h	cal models, findir ypothesis testing Z	ng unbiased using the
estimators with 01MASC The subject is de	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistic in minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for hold Neyman-Pearson lemma and likelihood ratio, confidence intervals and non-parametric density estimation. Mathematical Statistics - Seminar	cal models, findir ypothesis testing Z f Fisher informati	using the 2 on matrix of
estimators with 01MASC The subject is distatistical models,	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistic in minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for honoromaphametric density estimation. Mathematical Statistics - Seminar evoted to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation of finding unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood, on popothesis testing using the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric density.	cal models, findir ypothesis testing Z f Fisher information derivation of critic ty estimation.	ng unbiased using the 2 on matrix of regions for
estimators with 01MASC The subject is distatistical models, 01MIP	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistic in minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for honoromaphametric density estimation. Mathematical Statistics - Seminar evoted to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation of finding unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood, on propothesis testing using the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric densitions.	cal models, findir ypothesis testing Z f Fisher information derivation of criticity estimation. Z,ZK	ang unbiased using the 2 on matrix of al regions for
O1MASC The subject is do statistical models, by O1MIP The subject is developed to the	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistic minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for honormal Neyman-Pearson lemma and likelihood ratio, confidence intervals and non-parametric density estimation. Mathematical Statistics - Seminar evoted to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation of finding unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood, on the opportunity of the Neyman-Pearson lemma and likelihood ratio, calculation of confidence intervals and non-parametric density of the introduction to Theory of probability on measure-theoretic level for discrete models, continuous distributions and general discrete.	cal models, findir ypothesis testing Z f Fisher informati- derivation of critic ty estimation. Z,ZK tributions of rand	on matrix of lal regions for wariables.
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estimators with 01MASC The subject is destatistical models, 01MIP The subject is developed with the one of the course is developed. 01PGR1 The first part of the a survey of fundan algorithms using 01PGR2 The second part graphics. Further rendering. Focus at FNSPE. The algorithms using one of the course is developed. 01PSL 01PSR The subject is developed. 01RMFB The subject of this one of the subject	avoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistic minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for hoveman-Pearson lemma and likelihood ratio, confidence intervals and non-parametric density estimation. Mathematical Statistics - Seminar avoted to practical use of statistical methods studied in the course Mathematical Statistics 01MAS. The tutorial deals with calculation of finding unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood, reporting unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood, reporting unbiased estimators with minimal variance, parameter estimation by method of moments and method of maximum likelihood, reporting to the introduction to Theory of probability on measure-theoretic level for discrete models, continuous distributions and general discrete models (Lp, P, a.s., D) and variants of limit theorems are derived (LLN, CLT). Numerical Methods 2 test to numerical solution of boundary-value problems and initial-boundary-value problems for ordinary and partial differential equations. Adary-value problems and initial-boundary-value problems for ordinary and partial differential entertial problems in 12D computer Graphics is given together with their solutions. Pocus is put on mathematical description of problems and exhowledge previously obtained in a variety of subjects available at FNSPE. The final part of the course were applications of computer graphics is given together with their solutions. Focus is put on mathematical description of problems and exhomential problems in 3D computer graphics is given together with their solutions, from the description of the two-semester "Computer Graphics" course begins with a brief introduction to signal theory in the context of aliasing - a phenom r, a	cal models, finding pothesis testing of the string of the	ang unbiased using the 2 con matrix of all regions for all regions (E, 2 converting 2 co
estimators with 01MASC The subject is destatistical models, 01MIP The subject is developed with the one of the course is developed. 01PGR1 The first part of the a survey of fundan algorithms using 01PGR2 The second part graphics. Further rendering. Focus at FNSPE. The algorithms using one of the course is developed. 01PGR2 The subject is developed. 01PSL 01PSR The subject of this one of the course is developed.	evoted to usage of statistical methods studied in the course of Mathematical statistics. We deal with Fisher information matrix of statistic in minimal variance, parameter estimation by method of moments and method of maximum likelihood, derivation of critical regions for hover the course of the	cal models, finding pothesis testing of the string of the	gunbiased using the 2 2 on matrix of all regions for all regions for 6 om variables. ariables (E, 2 ds converting 2 gies. Further, corresponding opproaches in 2 in computer of its realistic ects available demonstrated 2 2 spect to their 5 and solution of 2

01SOS2	Software Seminar 2	Z	2		
Graphical libraries	GTK+ and Qt. Development of graphical user interface using C and C++ programming languages. Portable applications for Unix like	operating systems,	especially		
	for Linux systems. Portability to Microsoft Windows.				
01SSM1	Seminar of Contemporary Mathematics 1	Z	. 2		
	provides a different approach to those fields of mathematics that are included in curriculum but also to those that are not part of basic		natics.		
01STME The course consis	Statistical Methods with Applications ts of selected methods of statistical data analysis such as: linear regression and correlation, analysis of variance, nonparametric met	ZK hods_contingency:			
	cation. The aim is to illustrate the use of statistical procedures on examples. Solutions of concrete examples by use of statistical softw				
01TA	Algebra and Calculus in Applications	ZK	2		
We illustrate metho	ds based on combination of (CONtinuous) calculus and discrete (disCRETE) structures, so calles concrete mathematics. Theorems a	re motivated by pro	blems from		
	informatics and they are illustrated on problems from informatics.				
01UP1	Introduction to Probability 1	Z,ZK	3		
	vith finite set of possible results, classical probability, independent random events 2.Probability and combinatorics 3.Probability and g ability, Bayes theorem, medical diagnosis, Simpsons paradox 5.Random variable with discrete state space, its distribution and mean				
	calculation of mean value 7.Probabilistic method in graph theory 8.Random algorithms, Morris algorithm and its variants				
01UP2	Introduction to Probability 2	Z,ZK	3		
	al continuous random variable and its statistical description. 2. Distribution function and probability density. 3. Axiomatic introduction of	•			
measure theory. 4.	Numerical characteristics of continuous random variables. 5. Selected variants of continuous distributions and their characteristics. 6.	. Elementary metho	ds for point		
01USU	estimations. 7. Generating pseudorandom numbers from the selected distribution. Introduction to Machine Learning	Z,ZK	4		
	ritioudction to Machine Learning Irse is to provide a broad introduction to machine learning, data mining and statistical image recognition. Main attention is paid to the		-		
	r analysis and dimensionality reduction. The lectures and theory explanation is accompanied by examples of experiments and practic		- 1		
Pytho	n and run in computer labs with emphasis on the implementation and use of machine learning algorithms applied to real data from pro-	ractical problems.			
02DEF1	History of Physics 1	Z	2		
	ace in the system of sciences. The relationship of man and nature. Natural sciences in ancient Orientand Greece, Greek natural philo	•			
neieriistic period,	Archimed. Arabic science, European science in Middle Ages. Renaissance - da Vinci, Giordano Bruno. Copernicus, Kepler, Galileo, I as experimental science. Newton and his work.	nuygeris. The birtin	oi priysics		
02DEF2	History of Physics 2	Z	2		
	f classical mechanics after Newton, Bernoulli's, Euler, Lagrange. Historical development of optics, corpuscular and wave approach. E	lectricity and magr			
_	vanism, electrodynamics and electromagnetism, Faraday and Maxwell. Thermodynamics and its laws, statistical physics, Boltzmann.		-		
and relativistic p	shysics, Planck and Einstein. Discovery of radioaktivity, structure of atom, atomic nucleus, Rutherford and Bohr. The way to nuclear er	nergy, Elementary p	particles,		
02ELMA	standard model. The concept of Nature and Universe of today. Electricity and Magnetism	Z.ZK	6		
-	pulomb's law, electrostatic field, Gauss' law. Electric dipole, polarization. Conductors and dielectrics. Electric current and circuits, conc	, ,	_		
_	Electrodynamic forces, magnetic field. Magnetic dipole, magnetics. Electromagnetic induction, RLC circuits. Electromagnetic waves, I				
02FYS1	Physical Seminar 1	Z	2		
	devoted to detailed study of interesting physical problems. It should help students to deeper understanding of fundamentals of physical	-	course of		
	anics. The problems are chosen, studied and presented by the students themselves, with the possibility to use PC and physical laborates.	atory equipments.	4		
02MECH	Mechanics ysics, physical quantities and units. Kinematics of a particle, basic types of motion and their superposition. Dynamics of a particle, sc	∠ olving equations of a			
	notion, motion in a central force field, forces in non-inertial reference frames. Mechanics of a system of particles, two-body problems,	• .			
	of a rigid body, rotation.				
02MECHZ	Mechanics - Examination	ZK	2		
007554	The content of the subject is the examination according to the plan of studies.	7.71			
02TEF1 The course is an in	Theoretical Physics 1 troduction to analytical mechanics. The students acquire knowledge of the basic concepts of the Lagrange and Hamiltonian formalisms	Z,ZK	4		
	dynamics (Newtons, Lagrange, Hamilton and Hamilton-Jacobi equations). The efficiency of these methods is illustrated on elementary				
problem, the moti	on of a system of constrained mass points, and of a rigid body. Advanced parts of the course cover differential and integral principles	of mechanics. The	subject is		
	the first part of the course of classical theoretical physics (02TEF1, 02TEF2).				
02TER	Heat and Molecular Physics	Z,ZK	4		
· · · · · · · · · · · · · · · · · · ·	n of materials, heat transfer; stationary and non-stationary heat conduction, heat transfer and penetration; 1st and 2nd thermodynami ical systems: dielectric and magnetic materials; Maxwell relations and thermodynamic potentials; kinetic theory: Maxwell's velocity dist		- 1		
02TSFA	Thermodynamics and Statistical Physics	Z,ZK	4		
	nodynamics and statistical physics. Thermodynamic potential, the Joule Thomson effect, conditions of equilibrium, the Braun-Le Chateli		-		
Basics of many bo	dy descriptionfrom a statistical point of view (classical and quasiclassical regime within the frame of a canonical and grand-canonical	ensemble, Fermi g	as, models		
	of crystals and the black body radiation). The Boltzmann equation is used to discusses simple transport phenomena.				
02UKP1	Introduction to Curves and Surfaces	Z	2 traduced		
-	ecture is an introduction to the differential geometry of simple manifolds - curves and two-dimensional surfaces. The basic concepts for explained. In the surface theory we introduce first and second fundamental forms and mean and Gaussian curvature. Essential part				
	calculated by students.				
02VOAF	Waves, Optics and Atomic Physics	Z,ZK	6		
•	a in mechanics and electromagnetism: modes, standing and travelling waves, wave packets indispersive media. Wave optics: polariza				
coherence. Geometrical optics. Introduction to quantum physics: black body radiation, quantum of energy, photoeffect, the Compton effect, the de Broglie waves,the Schrodinger equation, stationary states and spectra of finite systems.					
04AKS	English Conversation	Z	1		
	rights to other student's communication skills acquired throughout their previous studies. It aims to improve all aspects of oral communication studies are communication skills acquired throughout their previous studies.				
their vocabulary for various communication situations and will master their communication strategy. They will also practise their listening skills in order to better follow and participate					
	iscussions. The student will be trained to express their ideas clearly and according to current English usage, and become a more cor				
04XAM1	English for Intermediate Students M1	Z Z	2 Eramowork		
	gned for students who have successfully completed the full secondary school English language course at least at the A2 level of the C anguages (CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into fundamentals of				
of Reference for La	andrades (CELIX). It broades an introduction into English for Specific and Academic Europses (ESF. EAF). I.e., into inframentals or	vocabulal v aliu siv	ie typicai tii i		

professional oral a	nd written communication situations. Thus it covers topics related to the student's life and needs as well as topics of subtechnical inte extending the knowledge of grammar issues used in EAP.	erest. Attention is a	also paid to
04XAM2	English for Intermediate Students M2	Z	2
-	expects the student to have completed the AM1 course. It develops their skills for work with subtechnical texts, focusing also more on	-	1
and lexical items typ	oical of ESP and EAP (e.g., definition, existence and classification of phenomena, object descriptions). Part of the course is also guided revision is included.	writing. If necessa	ry, grammaı
04XAM3	English for Intermediate Students M3	Z	2
	is the skills that enable students to cope with features typical of professional style. Increasing attention is paid to developing subtechnica	al vocabulary and i	l
-	professional texts. Great emphasis is placed on distinguishing different levels of formal and informal oral and written communication	=	-
equivalents. The co	urse also includes studying abstracts and rules for writing them as well as basic rules for preparing and giving a short presentation or student's field.	n a chosen topic re	elated to the
04XAMZK	English for Intermediate Students Examination	ZK	4
	ent is the examination as given by the study plan. The examination covers the AM1, AM2, and AM3 courses and consists of two parts 30 min). The student is expected to master the AM syllabus and demonstrate the ability to apply their knowledge gained in the three E	· ·) and oral
04XAP1	English for Advanced Students P1	Z	2
	gned for students who have successfully completed the full secondary school English language course (at least the B1 level of the Co		
	Languages - CEFR). It provides an introduction into English for Specific and Academic Purposes (ESP, EAP), i.e., into the fundament	-	
	e typical of professional oral and written communication situations (fundamentals of terms in mathematics and physics, definitions, gr oral and written communication on topics related to the undergraduate's life and needs. It develops skills for free professional writing (wr		,
covers professional	polite request). If necessary, revision of selected grammar topics is included.	iting a C v, letter or	аррисацоп
04XAP2	English for Advanced Students P2	Z	2
•	based on AP1, thus extending the student's skills for working with subtechnical texts, and even with professional texts of chosen brar		l
	s it concentrates on chosen grammar topics, but mainly intends to develop understanding of syntactic structures and typical rhetorica		•
	d, if possible, a case study). Increasing emphasis is placed on the undergraduate's independent work with and reading of linguisticall	(0 /	,,
-	s the student's subtechnical vocabulary, and includes fundamental notions of chosen branches of science. It is focused on formal writi	-	_
	paragraph structure, linking, cohesion and coherence in texts.		
04XAP3	English for Advanced Students P3	Z	2
The AP3 course is	pased on AP2 and expects the student to work without any guidance with authentic professional materials and to interpret the text. It in	cludes training ora	and writter
communication sk	ills and functions (e.g., expressing an opinion, agreement, and objections; taking part in discussion, note-taking; summarizing, writing	an abstract) and,	if possible,
also preparing a	project on a given or chosen topic and presenting it. The course places emphasis on distinguishing levels of formal and informal langu	age both in oral a	nd written
	communication.		
04XAPZK	English for Advanced Students Examination	ZK	4
The course content	is the examination as given by the study plan. The student is supposed to demonstrate mastering the AP3 syllabus and the ability to a	pply their knowled	ge obtained
	courses. The examination consists of 2 parts - written (100 min) and oral (30 min) and includes also oral presentation of a topic from		
04XCESM1	Czech for Foreigners - Intermediate 1	Z	2
The course is focus	ed on correct pronunciation, important morphological phenomena, prepositional phrases, and verb forms as well as on extending the st social situations.	udent's vocabular	y for various
04XCESM2	Czech for Foreigners - Intermediate 2	Z	2
	ps the topics covered in CESM1 and is then focused on more difficult grammar phenomena. It practices writing, speaking, and reading		
041/050140	in understanding common abbreviations, abbreviated words, and mathematical terms and formulas.	7	
04XCESM3	Czech for Foreigners - Intermediate 3	Z	2
The last course i	evises morphological topics covered earlier and extends the student's knowledge of more difficult language phenomena. It is especia lexicology and on developing the student's writing skills.	illy locused on sty	iistics and
04XCESMZK	Czech for Intermediate Students Examination	ZK	4
	t is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CES		
The course conten	be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.	vii,2,3 courses ai	id carr offig
04XCESP1	Czech for Foreign Students - Advanced 1	Z	2
The prerequisite of	the course is very good knowledge of the Czech language, i.e., communicative competences at least at level B2 of the Common Europ	ean Framework of	Reference
It is focused partly	on revision of standard language structures, but mainly on practising more complex grammatical structures typical of the style of science	ence. Students are	taught the
basics of function	al style of engineering and professional communication, both in spoken and written form. The topics include University Studies and S	tudent Life. Writte	n practice
	includes communication with teachers and faculty administrators.		
04XCESP2	Czech for Foreigners - Advanced 2	Z	2
This course extend	s the student's knowledge acquired in CESP1 and focuses on difficult language phenomena. It practises working with technical and semphasis on individual work.	specialist texts pla	cing greate
0470E6B3		Z	2
04XCESP3	Czech for Foreigners - Advanced 3 sthe student's knowledge from CESP2. It includes working with authentic specialist materials, their interpretation and presentation, a	-	_
The course develop	student's knowledge from 02.51 2.11 includes working with additional specialist materials, their interpretation and presentation, of student's project. Writing skills necessary for professional communication are trained.	ina, imany, presen	tation of the
04XCESPZK	Czech for Foreign Students - Advanced Examination	ZK	4
	t is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the CES		1
The course conte	be taken after successful completion of the 3 courses. Detailed information is to be obtained from the teacher.	1 1,2,5 courses ar	id can only
04XCESZ1	Czech for Foreigners - Beginners 1	Z	2
	pned for students of the English programme. Students will become acquainted with the main characteristics of Czech (phonetic and gr	-	
_	lage and speaking skills. The course focuses on pronunciation exercises, simple social phrases, and oral and written communication	·	-
	situations. The course covers roughly lessons 1-3 of eština Express (Czech Express) by L. Holá and P. Bo ilová.		, ,
04XCESZ2	Czech for Foreigners - Beginners 2	Z	2
	communication competences acquired in CESZ1 are further developed. Students deepen their knowledge of the declension and cor		l
	basic communication topics. The course covers roughly lessons 3-5 in Czech Express by L. Holá and P. Bo ilová.	= •	
04XCESZ3	Czech for Foreigners - Beginners 3	Z	2
	r develops the language and communication competences acquired in the XCESZ1 and XCESZ2 courses. The teaching focuses on l	-	1
	nciation and deepening grammar, features through practice, as well as introducing the Czech culture. Students are asked to produce		-
fixing correct pronu	inclation and deepering grantinal, leadures through practice, as well as introducing the ozech culture. Students are asked to produce	simple texts and t	ncy practise
	alogue. They also practise understanding texts in terms of main ideas or looking for specific details in texts. The course covers roughly	•	

04XCESZZK Czech for Foreigners Beginners - Examination ZK	4
The course content is the examination as given by the study plan. The examination consisting of a written and oral part covers all the topics of the 04XCESZ1,2,3 courses an	nd can
only be taken after successful completion of all three courses. Detailed information is to be obtained from the teacher.	
04XFM1 French for Intermediate Students M1 Z	2
French - intermediate FM The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. St	
will be able to communicate in social interaction and in academic, scientific and professional environment. They will be able to use the language to transmit general and tech	nical
information and to solve problems. FM1 The course builds on and further develops linguistic competence acquired at secondary school. It revises, systemizes and expands lar	nguage
skills gained in previous study. The following topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal statement, request,	answer
to an advert, French culture and geography, Paris. Topics of specialization: mathematics, physics. Reading technical and popular science texts, work based on these texts	s.
04XFM2 French for Intermediate Students M2 Z	2
Course FM2 builds on FM1. Linguistic structures and competence acquired in previous study are systemized and expanded. Reading popular science texis, features typical for te	echnical
and scientific language (passives, nominalization, word formation). Topics: physics, power engineering, environment, Internet, success of French science and technology, French science and technology.	ench
scientists, artists and architects. Description of an object, device, shapes, dimensions, material.	
04XFM3 French for Intermediate Students M3 Z	2
The course is focused on improvement and further development of linguistic competence acquired during the follow-up courses. Syntactic structures (subordinate and infinitive c	lauses,
participle structures, compound tenses). Text summaryStudents prepare a written paper which will be delivered in form of an oral presentation in-class. The paper is linked to	to the
ield of students' future specialisation or to their interest and generally covers a technical /applied science topic. It is not a translation but a creative work compiled from French	articles
and one's own knowledge/experienceLonger monologues on topics /situations set for the examination are prepared. Text structure, cohesion and coherence.	
04XFMZK French for Intermediate Students Examination ZK	4
The content is the examination as given by the study programme. The whole French programme is ended with an examination covering the contents of FM1-FM3. The examination	nation
consists of a written and oral part and is organized according to Examination Instructions, a document available on the web.	
04XFP1 French for Advanced Students P1 Z	2
FP advanced course The objective of this three-semester course is to improve and further develop communication in the French language in both written and oral form. Studer	nts will
be able to communicate in social interaction and in academic, scientific and work environment. They will be able to use the language to transmit general and technical informati	ion and
o solve problems. FP1 The course builds on and further develops linguistic competence acquired at secondary school. Difficult grammar topics are repeated and expanded: sub	bjonctif,
passé composé-imparfait, pronouns. The following specific topics are covered: University studies in our country and in France, writing of transactional letters, CV, personal stat	tement,
equest, answer to an advert, environmental issues, success of French science and technology, chosen topics from French regional culture, Paris. Topics of specialization: mathe	matics,
internet, physics, chemistry. Reading of technical and popular science texts, further work with these texts and interpretation.	
04XFP2 French for Advanced Students P2 Z	2
With the link to P1 contents, the course further develops language skills. Focus is put on reading popular science texts and on oral communication on given topics. Features ty	pical of
technical and scientific communication are stressed (passive voice, nominalization, word formation).	
04XFP3 French for Advanded Students P3 Z	2
The course is focused on systemization and improvement of acquired linguistic competence, skills and knowledge, and their use for communication in engineering environment.	Special
skill - translation of shorter texts (both from and into the language). Writing of a paper and making oral presentation in-class. The paper generally covers a technical /applied so	cience
topic. It is a creative work compiled from 3 French sources. Preparation of several set topics for oral examination.	
04XFPZK French for Advanced Students Examination ZK	4
04XFPZK French for Advanced Students Examination ZK The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord	
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord	
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading.	ding to
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. O4XFZ1 French for Beginners Z1 Z	ding to 2 anal life.
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. O4XFZ1 French for Beginners Z1 Z French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life , in socializing and in profession	2 onal life.
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. O4XFZ1 French for Beginners Z1 Z French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in socializing and in profession The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at eleminately using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners Francouzština pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, personal information, aski	2 onal life. entary ers
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. O4XFZ1 French for Beginners Z1 Z French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in socializing and in profession The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at eleminatively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners.	2 onal life. entary ers
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. O4XFZ1 French for Beginners Z1 Z French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in socializing and in profession The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at eleminately using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners Francouzština pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, personal information, aski	2 onal life. entary ers
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. O4XFZ1 French for Beginners Z1 Z French for Beginners Z1 S The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at elementer level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners at elementary language. The contents is roughly outlined by lessons 1 - 4: introductions, personal information, asking giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grammar. O4XFZ2 French for Beginners Z2 The course is linking up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook: Pravda - Pr	2 pnal life. pentary ers ing and 2 vdová :
The whole French program is ended with an examination covering the contents of FP1-FP3. The examination consists of a written and/or an oral part and is organized accord Examination Instructions, a document available on the web. Assessment of the presentation is included into the examination grading. O4XFZ1 French for Beginners Z1 Z French for beginners The objective of this 5-level course is to be able to communicate in French orally and in writing in situations of everyday life, in socializing and in profession The course includes French for specific / technical communication and reading of popular science and scientific texts. FZ1 The objective is to be able to communicate at elementer level, actively using the knowledge of chosen elementary language. The contents is roughly outlined by lessons 1 - 7 of the textbook Pravda - Pravdová, French for beginners Francouzština pro za áte ky). It is extended with situations of communication and functions from the textbook Espaces I, lessons 1-4: introductions, personal information, asking giving the directions, simple instructions and questions. Special attention is paid to pronunciation. Spelling is explained in connection with pronunciation and grammar. O4XFZ2 French for Beginners Z2 Z The course is linking up with FZ1. Elementary linguistic knowledge and communication skills are expanded. The scope is given by lessons 8 - 13 of the textbook: Pravda - Prav French for Beginners . Additional topics and skills are filled in from the textbook Espaces I, lesson 1 - 5 (introductions, invitation, welcoming, agreement - disagreement, apo	2 ponal life. eentary ers ing and 2 vdová:
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04XNM2 German for Intermediate Students M2 The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses). 04XNM3 German for Intermediate Students M3 The course introduces other more complex grammatical structures and their application in communication based on technical texts, such as the relation between technology and society, the world at the beginning of the 21st century, linguistically more demanding texts on the environment, the language of mathematics, computers and car technology etc. Students practise reading for information and reading aloud, and appropriate language for various purposes in oral and written communication. The course systematically revises other grammatical phenomena important for professional discourse (participles, relative clauses). 04XNMZK German for Intermediate Students Examination The course content is the examination as given by the study plan. The whole German for Intermediate Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NM1 - NM3. The oral part follows after passing the written part successfully and after obtaining the 04NM3 assessment. More detailed information is to be obtained from the teacher. 04XNP1 German for Advanced Students P1 This course requires good grammar knowledge, extended general vocabulary, and good communication skills acquired at secondary school to be levelled off at the beginning of the course. The course is then focused on working with technical and scientific texts and practising reading techniques (skimming, scanning, reading for detail). It revises and develops more difficult grammar structures necessary for understanding a subtechnical text (passive voice, participles, participle structures) and it also focuses on practical everyday communication, i.e., telephoning. 04XNP2 German for Advanced Students P2 Ζ 2 The course develops the students' skills in working with professional scientific texts (understanding, summarising, note-taking, interpreting) while extending their general and subtechnical vocabulary range. It introduces mathematical expressions and texts of nuclear power engineering. Increasing emphasis is placed on understanding and practising formal communication, both written and oral (CV, letter of application, interview, scholarship), and more complex grammatical structures (i.e., subjunctive, indirect speech). 04XNP3 German for Advanced Students P3 The course consists of 3 main parts (general communicative situations, grammar and technical topics). Students will develop their vocabulary in a variety of less common situations (traffic problems and car accidents, accident report, filling in a form, complaints). Based on presentations and technical and subtechnical texts, the vocabulary range in fields such as nuclear power engineering, the environment, computer science, and car technology, will also be extended. Only authentic professional texts are used. By means of a presentation. students are trained to process information gained from their reading of complex and difficult texts and present it to the class in a simplified oral form. The course also includes translation practice to and from German. 04XNPZK German for Advanced Students Examination The course content is the examination as given by the study plan. The whole German for Advanced Students Course is completed by an examination consisting of two parts - written and oral, which cover the courses NP1 - NP3. The oral part follows after passing the written part successfully and after obtaining the 04NP3 ungraded assessment. More detailed information is to be obtained from the teacher. Russian for Intermediate Students M1 04XRM1 The course is designed for students with previous knowledge of Russian from secondary schools. Students are supposed to know the Russian alphabet (both printed and handwritten), basic vocabulary for communication in everyday situations (introductions, socializing, greetings, shopping for food and objects of everyday need, asking the way and giving directions), they can use basic grammar structures (verbal and nominal forms, irregular verbs, pronouns). The initial knowledge corresponds to the achievement level of the RZ2 course. The contents and scope of the course correspond approximately to the RZ3 course, but for half of the time allotted in the timetable. 04XRM2 Russian for Intermediate Students M2 Ζ 2 The course is based on the RM1 course, its contents and scope correspond roughly to RZ4, however, for half of the time allotted in the timetable. 04XRM3 Russian for Intermediate Students M3 Ζ 2 The course develops the knowledge and skills acquired in RM1 and RM2 and its contents and scope are roughly at the same level as those of RZ5, however, for half of the time allotted in the timetable. 04XRMZK Russian for Intermediate Students Examination ZK The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RM1 - RM3. Students are eligible for the oral examination only after a prior pass in RM3 and a successful written examination. Students are given instructions by the teacher. 2 04XRP1 Russian for Advanced Students P1 The entrance requirement for the course is to achieve the B1 CEFR level. The objective of the course is revision of standard language structures, practicing more difficult grammar structures, understanding the fundamentals of technical language and training writing skills. 04XRP2 Russian for Advanced Students P2 Ζ 2 The course is based on RP1. It expands grammatical structures important for understanding technical texts (verbal adjectives, participles, passives, verb aspects, specific syntactic structures). Stress is put on independent oral and written communication. Russian for Advanced Students P3 The course is based on RP2 and is mainly focused on working with technical and scientific texts (reading comprehension, oral and written paraphrasing, translation). The RP1 - RP3 courses require good previous knowledge of general language at secondary level (listening, reading, correct communication in everyday situations). The courses develop and expand these skills. Further study is aimed at professional and technical skills (reading technical literature according to the students' specialization, oral and written interpretation). Students develop their subtechnical vocabulary and practice quick and correct communication in professional situations. They will be able to both speak write accurately and with confidence on technical topics. 04XRPZK Russian for Advanced Students Examination 7K 4 The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RP1 - RP3. Students are eligible for the oral examination only after a prior pass in RP3 and a successful written examination. Students are given instructions by the teacher. 04XRZ1 Russian for Beginners Z1 The course represents the first stage of the five-semester programme, its final aim being reading and understanding professional texts written in Russian. Thus it begins with mastering the Russian alphabet (for both reading and writing skills) and fundamentals of grammar necessary for everyday communication (listening and speaking). Students will be able to read a short text with marked stress, understand its contents and summarize it. 04XRZ2 Russian for Beginners Z2 7 The second semester of the programme is designed to teach skills for basic communication in everyday situations and for reading easy and short subtechnical texts. Students will be able to communicate using short sentences and appropriate structures, and read aloud with confidence a short text without marked stress. They will also develop their vocabulary and master further grammatical structures. They will have mastered with confidence the Russian alphabet and will be able to use it in writing.

04XRZ3 Russian for Beginners Z3 The course is based on RZ2 and includes further everyday topics, develops understanding of short compact texts on new subtechnical topics (for training various forms of reading skills and listening) and introduces new grammar. Students will be trained to distinguish intonation patterns while listening to spoken language. They will be able to respond so as to be understood, and to express their opinion. Writing skills will be trained on guided writing tasks and note-taking. 04XRZ4 Russian for Beginners Z4 Z 2 The course is based on RZ3. It improves and expands the knowledge of general language in all four skills (reading and understanding longer texts with a certain percentage of unfamiliar words, oral communication in everyday situations, writing longer texts). Students are trained to use grammar structures effectively (e.g., irregular verbs, differences in verb patterns from Czech, modality, imperatives, conditionals). They practice and develop communication skills for everyday situations (food, travelling, free time), and practice oral and written communication on more specific topics (environment, addictions, the green movement). They become acquainted with various geographical data (e.g., Siberia), learn how to fill in forms, look up the information from the timetable, learn about Russian holidays and typical meals. 04XRZ5 Russian for Beginners Z5 The course expects the student to have completed RZ4. It concentrates predominantly on reading skills (working with professional texts, i.e. understanding, extracting and summarizing information from a specialized text) and speaking, and to a certain extent, writing about the professional information obtained by reading the texts. Communication skills are trained on everyday topics. Studying grammar is based on professional and technical texts and only includes items typically used in professional communication (verbal adjectives, participles, passive voice). Students develop their technical and economic vocabulary, and are also trained in some professional skills (writing a CV, polite request, etc.) 04XRZZK Russian for Beginners Examination 3 The course content is the examination as given by the study plan. The course is completed by taking a written and oral examination testing the knowledge and skills acquired in RZ1 - RZ5. Students are eligible for the oral examination only after a prior pass in RZ5 and a successful written examination. Students are given instructions by the teacher. Spanish for Intermediate Students M1 The course is designed for students whose competence is at level B1 of CEFR, i.e. those who studied Spanish in the secondary school. The 3-semester course develops standard vocabulary and pays attention to further grammar topics (e.g., perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive), to written and oral communication on a given everyday or easy subtechnical topic, for which the students are trained by reading texts or listening to them. Spanish for Intermediate Students M3 The course develops the students' knowledge from the previous course (SM1). Students are gradually acquainted with fundamentals of Spanish for specific purposes in order to be able to work with specialized texts on the Internet. 04XSM3 Spanish for Intermediate Students M3 2 The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with the peculiarities of academic style. They will be competent enough to use the Internet in Spanish and search for information of their specialization or field of interest. Students will use the information to write short articles and summaries. The final part of the programme, general Spanish course based on course books, covers presentations and, finally, a written and oral examination Spanish for Intermediate Students Examination 04XSM7K 4 The course content is the examination as given by the study plan. XSMZK examination consists of two parts: written and oral; to be eligible for the written part, students will have obtained non-graded assessment for course XSM3. Oral examination follows the written part. 7 04XSP1 2 Spanish for Advanced Students P1 Course concentrates on more difficult grammar topics, revision of vocabulary, basics of Spanish for specific purposes as well as written communication. Course prerequisites: level B2 of CEFR. Spanish for Advanced Students P2 Z Course XSP2 is the second part of the advanced Spanish course, extending Spanish for specific purposes topics. It comprises more grammar and syntax and focuses on independent written communication. 04XSP3 Spanish for Advanced Students P3 7 2 Course XSP3 is the final part of the advanced Spanish course. It is based on texts chosen by the students according to their future specialization. It is focused on written communication based on what students will need in their career. 04XSPZK Spanish for Advanced Students Examination The course content is the examination as given by the study plan. Examination XSPZK consists of two parts, namely oral and written. The prerequisite for admission to oral part is having passed the written test. Examination content is based on syllabi of courses XSP1, XSP2, and XSP3 or on an individual study plan of the student. 04XSZ1 Spanish for Beginners Z1 2 Course XSZ1 is the first stage of the five-semester programme of Spanish studies; during the first stage the students will master phonetics and fundamental grammar structures and will be able to communicate at an elementary level on topics of everyday life. They will acquire and extend fundamental vocabulary of general Spanish and will develop it. Spanish for Beginners Students Z2 Course XSZ2 is based on course XSZ1, and expects students to develop and extend the knowledge and skills acquired so far. Grammar structures and lexis will be chosen so as to enable them to understand short adapted written texts and speech. Attention is also paid to cultural differences between Spanish-speaking countries and others such as the Czech Republic. Realia of Spanish-speaking countries are also included. 2 04XS73 Spanish for Beginners Z3 7 This course builds upon the foundations established in course XSZ2 and further develops students vocabulary and grammatical competence. It includes an introduction to the realia and cultural context of Spanish-speaking countries, with a primary focus on Spain. Particular attention is given to key grammatical structures, including the pretérito perfecto, pretérito indefinido, pretérito imperfecto, the gerund, and the imperative. The course also focuses on both written and spoken communication on general topics. Students are prepared for this through targeted reading and listening activities. Spanish for Beginners Z4 The course is based on course XSZ3. It develops the student's vocabulary and extends the knowledge of the culture and social customs of the Spanish speaking countries, mainly of Spain. It pays attention to further grammar topics (perifrasis verbales, futuro imperfecto, direct object and indirect object pronouns, negative form of the imperative, and subjunctive), to written and oral communication on a given general or subtechnical topic, for which the student is trained by reading texts or listening to them. Spanish for Beginners Z5 The course books are supplemented with additional subtechnical materials, so the students will be gradually acquainted with peculiarities of Spanish for specific purposes. In its final part, the general Spanish course based on the course book will end with a written and oral examination. 04XSZZK Spanish for Beginners Examination ZK 3 The course content is the examination as given by the study plan. Examination consists of two parts - written and oral. Student can register for oral examination only if he/she has passed the written examination test. ΚZ 12ANM **Applied Numerical Methods** For English version use code 12YNME1. There are explained the basic principles of numerical mathematics important for numerical solving of problems important for physics and technology. Methods for solution of tasks very important for physicists (ordinary differential equations, random numbers) are included in addition to the basic numerical methods. Integrated computational environment MATLAB is used as a demonstration tool. The seminars are held in computer laboratory and PASCAL is used as a principle programming language and MATLAB is also used.

12PYTH	Scientific Programming in Python	Z	2					
	rse is to learn the fundamentals of the modern Python programming language with a focus on scientific computing. Emphasis is place	ed on effective solu						
	ourse is performed in an interactive form of practical exercises, whose topics can be tailored to the content of other subjects or studer							
involved in ongoing research. In the introductory part of the course, students learn the basic features of Python? from basic types to object oriented or functional programming. The								
greater part of the course focuses on specific features of Python for scientific programming. Presented are the main numerical libraries NumPy, SciPy and the Matplotlib graphics								
	library. We show how to generate efficient code, how to combine Python with other languages, what tools are available.							
12UNXAP	Introduction to UNIX	Z	2					
1	perating systems. Personal computer, workstation and supercomputers. Processor, memory, bus, devices, hard disk, network interfac	ce. Hardware and s						
1	Principles of operating systems. Operating system UNIX. Basic principles, kernel, kernel services. Documentation. File system, file atributes, working with files. Text editors: vi, emacs.							
	eter (shell) bash and its programming (scripts). Controlling processes, process status, computer load a process priorities. Standard to							
1	nputer networks. Local computer networks. Global computer networks. Addresses and protocols TCP/IP. Network configutation of a c	•						
	hardware sharing, mail, scp, etc. Network applications	·						
12UVP	Introduction to Scientific Computing	Z	2					
	d Introduction to scientific computing. Constituent part of the course is realized in computer classroom. Students get acquinted with s	_						
l radiidany drienid	and technicval computing, data analysis, data visualisation and algorithm development.	511.6 Buois (55.5 io						
14TED	Creating Electronic Documents	Z	2					
	ting and presenting student theses. Individual exercises focus on creating and formatting texts, equations, charts, tables, presentation	_						
Dasic skills for crea	office suite.	ris and entire docu	illelits ill all					
450114		-						
15CH1	General Chemistry 1	Z	3					
The most importan	t concepts, quantities and units used in chemistry are introduced in the course General Chemistry I. Their significance and practical units used in chemistry are introduced in the course General Chemistry I.	ise are illustrated b	by examples					
	solved in exercises.							
15CH2	General Chemistry 2	Z,ZK	3					
The subject is the o	continuation of the course General chemistry I. The main attention is paid to general principles governing chemical processes. Using	various examples,	the fact that					
the validity of these	principles is not restricted only to chemical processes is documented. The significance and practical use of explained principles are	illustrated by exam	nples solved					
	in exercises.							
17UING	Introduction to Engineering	KZ	3					
	des introduction to engineering skills. Students should gain general engineering skills at basic level (e.g. material properties and beha		nufacturing					
	and production, quality assurance, environmental impacts,). In addition, the introduction to scientific work and technical drawing will be		· ·					
18NES1	Neural Networks 1	KZ	5					
	purse "Neural Networks 1" is to acquaint students with basic models of artificial neural networks, algorithms for their learning, and oth							
The ann or the oc	techniques. The goal is to teach students how to apply these models and methods to solve practical tasks.	ici relatea maemin	cicaring					
18NES2		V7	3					
	Neural Networks 2	KZ	_					
The aim of the cour	se "Neural Networks 2" is to acquaint students with basic models of deep neural networks and teach them how to apply these models	and methods to so	ive practical					
	tasks.							
18PMTL	Programming in MATLAB	KZ	4					
Introducing Matlab	environment as efficient tool for computation in complex arrays and symbolic variables, namely for linear algebra, mathematic analysts	sis, statistics, algoi	rithmization					
	and geometric representation of results.							
18PPY1	Programming in Python 1	Z	2					
This course introdu	ces students to advanced features of the Python language and common scientific packages. The course covers both object-oriented as v	well as functional p	rogramming					
paradigms. The follo	owing part of the course describes the use of Python in the fields of scientific and technical computing (NumPy and SciPy packages), dat	a processing and v	isualization.					
18PPY2	Programming in Python 2	Z	2					
This course intro	duces students to practical applications of the Python language in scientific as well as commercial fields. The course is a seminar wh	nere each presente	d topic is					
	accompanied by a short demo of a real-world application in the specific field.	·	.					
18PPY3	Programming in Python 3	Z	2					
	rse is intended for students who have basic experience with programming in Python and using its libraries. It introduces students to adv	_						
Tillo davarioca cou	language and modules they are based on.	various correspie o	raio i yaion					
18PRC1	Programming in C++ 1	Z	4					
1011101	This course covers mainly the C programming language and non-object oriented features of the C++ language.	_	1 7					
400000		1/7						
18PRC2	Programming in C++ 2	KZ	4					
	ourse covers the object oriented programming and othesr advanced constructs in the C+;+ programming language and the Standard							
18UQI	Introduction to quantum informatics	Z	3					
	on has been on the rise for years. In this course, we explore the basics of quantum information theory with a strong emphasis on quantum information theory with a strong emphasis of quantum information the strong emphasis of quantum information in the strong emphas							
some of the most in	mportant quantum principles that lead to the so called quantum advantage and discuss many important quantum algorithms with the	requisite amount o	f theoretical					
	underpinning.							
18ZALG	Basics of Algorithmization	Z,ZK	4					
This course is	devoted to selected algorithms and methods for algorithm design. This course intruduces selected methods for the determination of	the algorithm com	plexity.					
18ZPRO	Basics of Programming	Z	4					
	ntended mainly for students with little or no experience in programming. It familiarizes the students with the basic concepts in program	nming and with the	Python					
	programming language.	-						
B0B36JUL	Julia for optimization and learning	KZ	4					
	Julia programming language is increasingly known by the community for its suitability in the field of numerical calculations. The course consists of two parts. The first part presents the							
basics of Julia. The second part introduces mathematical optimization and its application in machine learning, statistics and optimal control of differential equations. While the first part shows the individual concepts of Julia, the second part combines them into longer logical sections of code. We explain each application theoretically. Students are encouraged both								
shows the individual concepts of Julia, the second part combines them into longer logical sections of code. We explain each application theoretically. Students are encouraged both to write simple functions by themselves and compare them with already existing packages. The course ends with a final project. Students can either choose a topic connected to their								
theses or join a Kaggle competition with real data. This course is also part of the inter-university programme prg.ai Minor. It pools the best of AI education in Prague to provide students								
with a deeper and broader insight into the field of artificial intelligence. More information is available at https://prg.ai/minor.								
T\ / 4			4					
TV-1	Physical Education	Z	1					
TV-2	Physical Education	Z	1					
TV-3	Physical education	Z	1					
TV-4	Physical education	Z	1					

For updated information see http://bilakniha.cvut.cz/en/FF.html Generated: day 2025-09-03, time 17:25.