### Study plan

## Name of study plan: 09 54 59 00 DSTR 2012 A - prezen ní anglicky

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch:

Program of study: Bachelor of Mechanical Engineering

Type of study: Bachelor full-time

Required credits: 64

Elective courses credits: 115 Sum of credits in the plan: 179

Note on the plan: SP12BSTR--A # t etí pokus

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: 12DSA1P-KMEN

Name of the group: 00 2012 D kmenové 1. semestr STR anglicky

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

12B\*A1P-KMEN # Note on the group:

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
E182019	Chemistry Jaromír Štancl Jaromír Štancl (Gar.)	KZ	3	2P+1C	*	Р
E372041	Computer Support for Study Vladimír Hlavá Vladimír Hlavá (Gar.)	KZ	3	1P+1C	*	Р
E011021	Constructive Geometry Ivana Linkeová	Z,ZK	6	3P+2C	Z	Р
E132001	Engineering Design I.	KZ	2	1P+2C	1	Р
E333038	Fundamentals of Technology I.	Z	3	1P+1C	*	Р
E131005	History of Technology František Lopot	ZK	3	2P+0C	Z	Р
E011056	Mathematics I.	Z,ZK	8	4P+4C	Z	Р

COL I DI OLI JORGAJO MATRIALI	=00 2012 D kmenové 1. semestr STR anglicky

E182019	Chemistry	KZ	3
General chemistry	r from the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure	and properties of matter, thermo	odynamics,
phase equilibrium,	, chemical reactions, reaction engineering), the remaining 1/3 is devoted to organic chemistry (hydrocarbons, polyme	ers) and biochemistry. Laboratory	practice is
oriented upon the r	material properties measurement.		
E372041	Computer Support for Study	KZ	3
The course introdu	uces students into creating technical and professional documents on computers or Web and into realizing technical co	mputations with the use of compu	ıters. Student
gain practical skills	s by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creat	ting and presenting a web page.	
E011021	Constructive Geometry	Z,ZK	6
The subject is focu	used on geometric objects in the space - curves, surfaces and solids and their properties and mutual relations.	1	
E132001	Engineering Design I.	KZ	2
The course is focus	ised on building up the ability of future designers to express their ideas through common communication language -	technical drawing. During the cou	rse students
train and improve t	their skills in spatial imagination and engineering way of thinking.		
E333038	Fundamentals of Technology I.	Z	3
The study of manu	ufacturing processes forms a core subject area for a majority of mechanical enginnering stdents. It contains basic cor	ncept of three manufacturing tech	nologies suc
as casting, forming	g and welding, including basic terms, methods and materials.		
	History of Technology	ZK	3
E131005	History or recrimology	<u>∠</u> ı\	3

E011056 Mathematics I.

In the course, greater emphasis is placed on the theoretical basis of the concepts discussed and on the derivation of basic relationships and connections between concepts. Students will also get to know the procedures for solving problems with parametric input. In addition, students will gain extended knowledge in some thematic areas: eigennumbers and eigenvectors of a matrix, Taylor polynomial, integral as a limit function, integration of some special functions

Code of the group: 12DSA2P-KMEN

Name of the group: 00 2012 D kmenové 2. semestr STR anglicky

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

12B\*A2P-KMEN #

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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
E012037	Computer Graphics Nikola Pajerová, Ivana Linkeová Ivana Linkeová (Gar.)	KZ	3	1P+1C	*	Р
E131002	Engineering Design II  Martin Dub	Z,ZK	4	2P+3C	2	Р
E333038	Fundamentals of Technology I.	Z	3	1P+1C	*	Р
E322029	Materials Science I.  Veronika Mazá ová, Jana Sobotová, Jakub Horník Jana Sobotová Jana Sobotová (Gar.)	KZ	3	2P+0C+1L	L	Р
E011062	Mathematics II Stanislav Kra mar	Z,ZK	8	4P+4C	*	Р
E021041	Physics I.	Z,ZK	7	4P+1C	*	Р

Characteristics of the courses of this group of Study Plan: Code=12DSA2P-KMEN Name=00 2012 D kmenové 2. semestr STR anglicky

E333038 Fundamentals of Technology I.

The study of manufacturing processes forms a core subject area for a majority of mechanical enginnering stdents. It contains basic concept of three manufacturing technologies such as casting, forming and welding, including basic terms, methods and materials.

F012037 Computer Graphics K7

Z,ZK

3 The subject is focused on the mathematical theory of the curves and surfaces in computer graphics and their visualisation. The Rhinoceros - NURBS modelling for Windows is used

to demonstrate the geometrical properties of the curves and surfaces. F131002 Engineering Design II

Theoretical fundamentals of GPS (Geometrical Product Specification). Students will get critical knowledge about ISO system of limits and fits, tolerancing, surface texture, geometrical tolerance, dimensional loops, tolerancing of angles and cones, tolerancing of threads. Integral part of course is a project where students apply and practice their knowledge from lectures

E322029 Materials Science I.

History and present state of materials engineering, overview of technical materials, internal structure of metals, crystal lattices and their defects, deformation, recrystallization and fracture of materials, structure and properties of materials and their testing, fundamentals of thermodynamics, phases and phase transformations, iron-carbon phase diagram.

F011062 Mathematics II

Open and closed set, boundary in E^k. Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Differential operators div (divergence) and curl (rotation). Function given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, Fubini theorem. Transformation of integrals to polar, cylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green's theorem. A potential vector field, independence of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector field through a surface. The Gauss-Ostrogradskii theorem.

E021041 Physics I. Z,ZK

Kinematics and dynamics of a particle motion. Principle of conservation of energy. System of particles, centre of mass. Rigid body. Continuum, elastic properties of bodies. Oscillations, waves. Fluid mechanics. Temperature and heat transfer. Kinetic theory of gases. Thermodynamics. Electric field, current, conductivity, resistance. Conductors, semiconductors, insulators. Magnetic field. Magnetic materials. Electromagnetic field. Laboratories - accuracy of measurements, systematic and random errors, uncertainty of direct and indirect measurements, regression, measurements of 11 various experiments related to the lectures.

Code of the group: 12DSA3P-KMEN

Name of the group: 00 2012 D kmenové 3. semestr STR anglicky

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

12B\*A3P-KMFN #

Tiole on the group	J.					
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
E012035	Algorithmization and Programming Petr Svá ek, Marta ertíková, David Trdli ka Marta ertíková Petr Svá ek (Gar.)	KZ	4	1P+2C	*	Р
E133013	Engineering Design III. František Lopot, Jan Hoidekr Jan Hoidekr (Gar.)	Z	2	0P+2C	*	Р

E321039	Materials Science II. Jana Sobotová, Jakub Horník Jana Sobotová Jakub Horník (Gar.)	Z,ZK	4	2P+2L	*	Р
E011009	Mathematics III. Olga Majlingová, Stanislav Kra mar Stanislav Kra mar (Gar.)	Z,ZK	5	2P+2C	*	Р
E311101	Mechanics I. Pavel Bastl, Václav Bauma, Petr Beneš, Ivo Bukovský, Martin Ne as, Zden k Neusser, Jan Pelikán, Pavel Steinbauer, Zbyn k Šika, Michael Valášek Michael Valášek (Gar.)	Z,ZK	4	2P+2C	*	Р
E021025	Physics II.	Z,ZK	4	1P+2C	*	Р
E121023	Thermomechanics	Z,ZK	5	3P+2C	*	Р

Characteristics of the courses of this group of Study Plan: Code=12DSA3P-KMEN Name=00 2012 D kmenové 3. semestr STR anglicky

E012035 Algorithmization and Programming	NZ	4
Programming in MATLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Ma	trices, vectors an	d operations.
Writting M-script. Input and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Sy	stems of linear e	quations. Scripts

and functions. Structure of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Structures. Algorithmization of simple programs: minimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of systems of linear equations.

E133013	Engineering Design III.	Z	2
E321039	Materials Science II.	Z,ZK	4
Fundamentals of motal	llurgy iron parkan alloys and influence of other elements, phase transformations, thermal, combined shamisel and thermal and	d +b = ==== =====	

technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materials.

E011009	Mathematics III.	<u>∠,∠</u> r\	) J
An introductory course	in ordinary differential equation and infinite series.		
E311101	Mechanics I.	Z,ZK	4

Modeling of mechanical systems. Determination of force. Constraints and equilibrium of a point. Moment and Torque. Body constraints in 2D. Replacement and balance of general planar system of forces. The balance of the body in the plane - numerically. Body constraints in 3D. Replacement and general spatial equilibrium of a system of forces. The balance of the body in 3D. MBS - Multi Body Systems. Static determinancy and mobility, composition. Analytical solution of equilibrium for MBS systems. Truss systems. Center of gravity. Internal forces. The balance of the body and of multibody systems with friction. Mechanical work. Power. Efficiency. Equilibrium position.

E021025 Physics II. Z.ZK Faraday's law of electromagnetic induction. Maxwell's equations, electromagnetic waves. Light, wave optics, geometrical optics. Quantum properties of electromagnetic waves. Interaction

of radiation with matter. Photoelectric effect. Wave-particle mature of matter. Quantum-mechanical description of particle's motion. Hydrogen atom and periodic system of elements. Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.

E121023 Thermomechanics Z.ZK Subject covers fundamental knowledge in thermodynamics, heat tranfer and gas dynamics

Code of the group: 12DSA4P-KMEN

Name of the group: 00 2012 D kmenové 4. semestr STR anglicky

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

E311102

12B\*A4P-KMEN #

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
E133014	Engineering Design IV. František Lopot, Jan Hoidekr Jan Hoidekr (Gar.)	Z	2	0P+2C+0L	*	Р
E121500	Fluid Dynamics	Z,ZK	5	3P+2C	*	Р
E311102	Mechanics II. Pavel Bastl, Václav Bauma, Petr Beneš, Ivo Bukovský, Martin Ne as, Zden k Neusser, Jan Pelikán, Pavel Steinbauer, Zbyn k Šika, Michael Valášek Michael Valášek (Gar.)		4	2P+2C	*	Р
E011049	Numerical Mathematics Marta ertíková, David Trdli ka <b>Marta ertíková</b>	Z,ZK	4	2P+2C	*	Р
E331068	Technology I.	Z,ZK	5	2P+2C	*	Р

#### Characteristics of the courses of this group of Study Plan: Code=12DSA4P-KMEN Name=00 2012 D kmenové 4. semestr STR anglicky

E133014	Engineering Design IV.	Z	2			
Information about general principles of a new technical product design, stages of development of a new product, the designer fundamental assignment is to propose a rivalrous product						
including. Designing of a dribling jig. A drilling jig is a device by means of which holes on many duplicate parts may be drilled exactly alike.						
E121500	Fluid Dynamics	Z,ZK	5			
The first course in Fluid Mechanics designed to provide the fundamental tools necessary to analyse a fluid systems and predict its behaviour.						

Mechanics II. Z,ZK Kinematics of point and of rigid bodies. Transformation matrix. Kinematics of concurrent movements. Motion: translation, rotation, general planar motion, spherical motion, screw motion, general spatial motion. Composition of mechanisms. Basic planar mechanisms. Analytical methods in kinematics of mechanisms - Trigonometric and vector method. Graphical methods in kinematics. Basic theory of gearing, Transmition mechanisms with geers. Strutting and seezing in mechanisms. Cable mechanisms.

	, gg		
E011049	Numerical Mathematics	Z,ZK	4
E331068	Technology I.	Z,ZK	5

Foundry properties of metals. Treatment. Pouring. Casting solidification. Moulding and core making. Thermal treatment. Plastic deformation. Division of forming processes. Semi-products, heating-up. Cutting. Cold and hot forming. Welds. Weldability. Weldment testing. Thermal cutting. Brazing. Surface treatments.

Code of the group: 12DSA5P-KMEN

Name of the group: 00 2012 D kmenové 5. semestr STR anglicky

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

12B\*A5P-KMEN # Note on the group:

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
E141504	Electrical Circuits and Electronics Jan Chyský, Martin Novák Martin Novák Jan Chyský (Gar.)	Z,ZK	4	2P+0C+2L	*	Р
E153005	Fundamentals of Energy Conversions Lukáš Pila , Tomáš Dlouhý, Michal Kolovratník, Ond ej Bartoš, Pavel Zácha, Jan Hrdli ka, Pavel Skopec <b>Ond ej Bartoš</b> Tomáš Dlouhý (Gar.)	Z	1	1P+1C	*	Р
E131512	Machine Elements and Mechanisms I. František Lopot, Daniel Hadraba František Lopot František Lopot (Gar.)	Z,ZK	6	3P+2C	*	Р
E372083	Measurement in Engineering Martin Novák Martin Novák Martin Novák (Gar.)	KZ	3	1P+0C+2L	*	Р
E311108	Mechanics III. Pavel Bastl, Václav Bauma, Petr Beneš, Ivo Bukovský, Martin Ne as, Zden k Neusser, Jan Pelikán, Pavel Steinbauer, Zbyn k Šika, Michael Valášek Michael Valášek (Gar.)	Z,ZK	6	2P+2C	*	Р
E341014	Technology II.	Z,ZK	5	2P+2L	*	Р

#### Characteristics of the courses of this group of Study Plan: Code=12DSA5P-KMEN Name=00 2012 D kmenové 5. semestr STR anglicky

E141504 **Electrical Circuits and Electronics** 7.7K Introduction into theory of electrical circuits, analysis special types of electrical circuits as DC and AC. Transient states in circuits with accumulators of energy. Using Symbolic-Complex method and Fourier transformation for analysis AC circuits supplied with harmonic signal. El. Power and Energy. Introduction into electronics. Principle and typical parameters of basic semiconductor components. Application in electronic circuits (rectifier, stabilizer, power control, operational amplifier). Analogue and digital circuits. Principle of analogue and digital

E153005 Fundamentals of Energy Conversions

The subject FEC clarify the reasons, procedures and consequences of energy conversions from sources to applications. 1. Introduction. Energy, forms and transformations of energy. Structure of primary sources to cover world energy consumption. World reserves, advances and depletion of primary energy sources. Situation on the World, EU and Czechia 2. Fossil fuels, their types and properties. Secondary fuels. Combustion of fossil fuels. Combustion equipment and their efficiency. Ecological consequences of combustion. 3. I. and II. TD law. Thermal cycles. Carnot's comparison cycle. Thermal efficiency. 4. Rankine steam cycle, thermal and real efficiency. Steam circulation carnotization. Survey of steam turbines. 5 Brighton cycle, application. Internal heat transfer, carnotization. thermal and real efficiency. Combine cycle power plant. 6. Cooling cycles, heat pumps, organic Rankine cycles. Types, working

fluid, efficiency x CoF. 7. Engines with internal combustion (Otto, Diesel, Atkinson, Miller, etc...), Stirling cycle, Family of Kalina cycles. 8. Renewable sources, application, importance, problems). Direct transformation (heat->Electr.). Special applications.

E131512 Machine Elements and Mechanisms I. Z,ZK

Joints and joining elements (screwed, clamped, splined, welded, riveted, soldered and adhesive joints; joints with use of feathers, pins, tenons, cotters, keys). Mechanical transmissions (belt, chain, friction, gear drives). Seminars are devoted to practical individual solution of simple design projects - tasks with motion screws, preloaded connecting bolts, clamped, pressed, splined and key joints between shafts and hubs and tasks with welded and riveted joints. Sketching of machine elements and their simple assembly units is also indispensable seminar work.

E372083 Measurement in Engineering

signal processing. Logical circuits, converters, microprocessor.

K7

Overview of sensor principles for measurement of non-electrical variables (temperature, position, force, speed, acceleration, torque). Calibration and verification of measurement instruments

E311108 Mechanics III. Z,ZK

Modeling. Dynamics of systems of particles. Dynamics of body. Mass distribution in a body. Inertia tensor. D'Alembert principle. Inertial effects of motion. Balancing of rotating bodies. Free body diagram method. Newton-Euler equations. Dynamics of multibody systems. Vibrations of systems with 1 DOF. Free oscillations. Forced oscillations excited by harmonic force and rotating unbalanced mass. Kinematic excitation. Oscillation of systems with two DOFs, torsional oscillation. Hertz theory of impact.

E341014 Technology II. Z,ZK

5

Mechanics of chip formation, cutting processes, finishing operations, non-traditional machining processes. Production rates calculation, machining economics. Automation of processes, programming of manufacture. Engineering metrology. Assembly techniques. Introduction to process planing.

Code of the group: 12DSA6P-KMEN

Name of the group: 00 2012 D kmenové 6. semestr STR anglicky

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group.

12B\*A6P-KMFN #

Note on the grou	P					
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
E371047	Automatic Control Jaromír Fišer Jaromír Fišer (Gar.)	Z,ZK	5	3P+15C+05L	Z,L	Р

E133025	<b>Design</b> František Lopot, Daniel Hadraba <b>František Lopot</b> František Lopot (Gar.)	Z	4	0P+4C	*	Р
E141505	Electrical Machines and Drives Jan Chyský, Martin Novák Martin Novák Jan Chyský (Gar.)	Z,ZK	4	2P+0C+2L	*	Р
E131026	Machine Elements and Mechanisms II. František Lopot, Daniel Hadraba František Lopot František Lopot (Gar.)	ZK	3	3P+0C+0L	*	Р
E131517	Machine Elements and Mechanisms II.	Z,ZK	7	3P+4C	*	Р
E381054	Management and Economics of the Enterprise  Michal Kavan Michal Kavan (Gar.)	Z,ZK	4	2P+2C	*	Р
E181026	Momentum, Heat and Mass Transfer  Martin Dostál, Vojt ch B lohlav	Z,ZK	5	3P+1C	*	Р

Characteristics of the courses of this group of Study Plan: Code=12DSA6P-KMEN Name=00 2012 D kmenové 6. semestr STR anglicky

E3/104/	Automatic Control	Z,ZN	ן ס ו	L
Automatic controllers ar	e important part of many industrial processes. The goal of this course is to introduce students into basic knowledge of autom	natic control theor	y and practice	l
like transfer functions, o	pen versus closed loop control, design of controllers and frequency based analysis of control systems. The course also conce	ntrates on logic co	ntrol and control	
via programmable logic	controllers. Some seminaries are arranged in laboratories where practical skills and control engineering methods are trained	Students begin	to work with	
MATLAB software as a	common platform of control engineers (MATLAB is used on all including most of the laboratory classes).		ŀ	l

E133025	Design	Z	4
Design, design calcula	tions and their aplications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft couplings and	clutches.	
E141505	Floatrical Machines and Drives	フフレ	1

AC el. curcuits. Electrical power and energy. Calculation, measurement, power factor. Magnetic circuit, materials, hysteresis loop. Electromagnet. Transformer, principle, construction, 3-phase transformer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed-torque characteristic, speed control. Synchronous machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characteristic. Low-voltage instruments. Low-voltage distribution system.

E131026	Machine Elements and Mechanisms II.	ZK	3

Preliminary design, design calculations and aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.

E131517 Machine Elements and Mechanisms II. Preliminary design, design calculations and aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism, pipelines and their accessories and fittings.

E381054 Management and Economics of the Enterprise Z.ZK

The study subject is intended for a wide range of students from all over the world who have successfully studied it for many previous years. The teaching goal is to acquaint technically educated foreign students with the basic procedures, methodologies and practice of management and economics of a modern, especially engineering company. The teaching concerns both the areas of finance, marketing and operational-production management and economics. The focus is on a prosperous enterprise operating within the framework of Lean Six Sigma and Industry 4.0. In addition to lectures and exercises, students also learn to be independent in their individual presentations, dedicated to the assigned professional topics of advanced business management.

E181026 Momentum, Heat and Mass Transfer

Z,ZK Fundamentals of transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanical energy equation. Residence time distributions in continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and thermal radiation. Multicomponent systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 32

The role of the block: PV

Code of the group: 12B\*A4Q-BZJ

Name of the group: 06 2012 bakalá ské zkoušky z jazyk anglicky

Requirement credits in the group: In this group you have to gain 2 credits

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

Credits in the group: 2 Note on the group:

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
2041061	English-Bachelor Exam Michele Le Blanc, Eliška Vítková, Michaela Schusová, Ilona Šimice, Nina Procházková Ayyub, Hana Volejníková, Veronika Kratochvílová Nina Procházková Ayyub	Z,ZK	2	0P+2C	*	PV
2041066	Czech - Bachelor Exam Eliška Vítková, Michaela Schusová, Jaroslava Kommová, Petr Laurich Jaroslava Kommová	ZK	2	0P+2C	*	PV
2041063	French - Bachelor Exam /FME Michaela Schusová, Dušana Jirovská Eliška Vítková Eliška Vítková (Gar.)	Z,ZK	2	0P+2C	*	PV
2041062	German - Bachelor Exam / FME  Eliška Vítková, Michaela Schusová, Jaroslava Kommová, Petr Laurich  Jaroslava Kommová	Z,ZK	2	0P+2C	*	PV

2041065	Russian - Bachelor Exam / FME Eliška Vítková, Michaela Schusová, Hana Volejníková, Dušana Jirovská Eliška Vítková	Z,ZK	2	0P+2C	*	PV
2041064	Spanish - Bachelor Exam / FME Eliška Vítková, Michaela Schusová, Jaime Andrés Villagómez Eliška Vítková	Z,ZK	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12B\*A4Q-BZJ Name=06 2012 bakalá ské zkoušky z jazyk anglicky

2041061	English-Bachelor Exam Z,ZK 2								
Aapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions,									
to write a summary, a r	o write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.								
2041066	Czech - Bachelor Exam ZK 2								
Mapped to the Commo	n European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater diff	iculties, to take pa	rt in discussions,						
to write a summary, a r	eport and an essay, to read technical texts, to master grammar at advanced level.								
2041063	French - Bachelor Exam /FME	Z,ZK	2						
Mapped to the Commo	Aapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions,								
to write a summary, a r	eport and an essay, to read technical texts, to master grammar at advanced level.								

German - Bachelor Exam / FME Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions,

to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level 2041065 Russian - Bachelor Exam / FME

Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions,

to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level. 2041064 Z.ZK 2 Spanish - Bachelor Exam / FME

Mapped to the Common European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part in discussions, to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.

Code of the group: 12BSA6Q-OP

Name of the group: 09 2012 BSTR 6. sem oborové projekty anglicky

Requirement credits in the group: In this group you have to gain 10 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 10 Note on the group:

2041062

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
E162091	Project	KZ	2	0P+2C	*	PV
E152091	Project Michal Kolovratník	KZ	2	0P+2C	*	PV
E362091	Project	KZ	2	0P+2C		PV
E372091	Project Vladimír Hlavá	KZ	2	0P+2C	*	PV
E132503	Project František Lopot	KZ	2	0P+2C	*	PV
E182091	Project	KZ	2	0P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BSA6Q-OP Name=09 2012 BSTR 6. sem oborové projekty anglicky

E162091	Project	KZ	2				
Student will be inform	ed about basics of environmental engineering and creation of thermal comfort.	'					
E152091	Project	KZ	2				
E362091	Project	KZ	2				
E372091	Project	KZ	2				
An individual project f	rom the branch of specialization (instrumentation, control engineering, informatics), or individual work, related to another subjections.	ct.	•				
E132503	Project	KZ	2				
Elaboration of semes	er global project of mechanical drive of conveyor composed of electric motor, elastic shaft coupling (respectively V-belt drive),	gearbox provided	with two pairs				
of mating gears and c	ompensating double-row toothed shaft coupling (respectively roller chain drive). Second, alternative arrangement of projected m	echanical drive is	provided instead				
of previous gearbox a	of previous gearbox and additional mechanical drives by means of only one single-stage warm gearbox Elaboration of 4 additional reports analysing production and economic problems						
of assigned machine	element (gearbox shaft or gear). Besides project of mechanical drive must be elaborated design project of crank mechanism a	nd its flywheel for	assigned				
single-cylinder piston	ongino						

2

ΚZ

Code of the group: 12BSA6Q-PP

Project Absolvent se seznámí se základy oboru Procesní technika.

Name of the group: 10 2012 BSTR 6. sem prezentace projekt anglicky Requirement credits in the group: In this group you have to gain 20 credits

Requirement courses in the group: In this group you have to complete 5 courses

Credits in the group: 20

E182091

Note on the group:

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
E163091	Project Presentation	Z	4	4B	*	PV
E153091	Project Presentation	Z	4	4B	*	PV
E363091	Project Presentation	Z	4	4B		PV
E373091	Project Presentation	Z	4	4B	*	PV
E133091	Project Presentation František Lopot	Z	4	4B	*	PV
E183091	Project Presentation	Z	4	0P+4C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12BSA6Q-PP Name=10 2012 BSTR 6. sem prezentace projekt anglicky E163091 Project Presentation Processing and presentation of engaged theme Ζ E153091 **Project Presentation** 4 E363091 **Project Presentation** Ζ 4 E373091 Ζ **Project Presentation** 4 Presentation of the project prepared for the subject E372091. Report in pdf format and prepared presentation (MS Powerpoint, Impress) required. Presentation, discussion (questions of another students and their supervisors). E133091 **Project Presentation** Ζ 4 E183091 **Project Presentation** Ζ Preparation and presentation of a given project theme.

Name of the block: Elective courses
Minimal number of credits of the block: 32

The role of the block: V

Code of the group: 12BSA\*V-ALFA

Name of the group: 02 2012 ALFA volitelné pro STR anglicky

Requirement credits in the group: In this group you have to gain 32 credits

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

Credits in the group: 32 Note on the group:

Code of the group: 12B\*A\*V-DOP SEMI

Name of the group: 05 2012 doporu ené seminá e anglicky

Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0 Note on the group:

140to on the	group.					
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
E026002	Physics I Seminary Petr Duchá ek, Jan Novák, Miroslav Jílek, Daniel Tischler	Z	2	0P+2C	*	V
E026003	Physics II Seminary Petr Duchá ek, Jan Novák Petr Duchá ek	Z	2	0P+2C	*	V

Characteristics of the courses of this group of Study Plan: Code=12B\*A\*V-DOP SEMI Name=05 2012 doporu ené seminá e anglicky

E026002	Physics I Seminary	Z	2
Solving of problems cor	responding to the lectures of Physics I.	•	
E026003	Physics II Seminary	Z	2
The array of the section for the second and			\ <b></b>

The subject is intended for students who need more detailed practising and improvement (including knowledge from former physics courses, or high-school knowledge) necessary for successful finishing Physics II course. The instructions are analogical to seminars with a short corresponding theoretical background. The link between physical concepts and methods of solution of typical problems is underlying.

Code of the group: 12B\*A1V-DOP ZJK

Name of the group: 12 2012 doporu ené základní jazykové kurzy anglicky

Requirement credits in the group:

## Requirement courses in the group:

Credits in the group: 0

Note on the group:

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
E046117	Czech - Advanced Jaroslava Kommová	Z	2	0+2	Z	V
E046125	Czech - Lower Intermediate  Jaroslava Kommová	Z	2	0+2	Z	V
E046128	Czech - Upper Intermediate  Jaroslava Kommová	Z	2	0+2	L	V
E046118	Czech Advanced Jaroslava Kommová	Z	2	0+2	L	V
E046120	Czech for Beginners II.  Jaroslava Kommová	Z	2	0+2	*	V
E046119	Czech Language for Beginners I.  Jaroslava Kommová	Z	2	0+2	*	V
E046126	Czech Lower Intermediate Petr Laurich	Z	2	0+2	L	V
E046127	Czech Upper Intermediate  Jaroslava Kommová	Z	2	0+2	Z	V
E046078	German - Lower Intermediate Course  Jaroslava Kommová	Z	2	0+2	Z	V
E046079	German Lower Intermediate  Eliška Vítková, Michaela Schusová, Jaroslava Kommová, Petr Laurich  Jaroslava Kommová Eliška Vítková (Gar.)	Z	2	0+2	L	V
E046080	German Upper Intermediate Eliška Vítková	Z	2	0+2	Z	V
E046081	German Upper Intermediate  Eliška Vítková, Michaela Schusová, Jaroslava Kommová, Petr Laurich  Jaroslava Kommová Jaroslava Kommová (Gar.)	Z	2	0+2	L	V
E046082	German Advanced	Z	2	0+2	Z	V
E046083	German Advanced Jaroslava Kommová	Z	2	0+2	L	V
E046076	Jaroslava Kommová	Z	2	0+2	Z	V
E046077	German Beginners Jaroslava Kommová	Z	2	0+2	L	V

# Characteristics of the courses of this group of Study Plan: Code=12B\*A1V-DOP ZJK Name=12 2012 doporu ené základní jazykové kurzy anglicky

kurzy anglicky			
E046117	Czech - Advanced	Z	2
Comprehension of sp	oken language as well as lectures in Czech on topics familiar to the student. Communication with native speakers, participation in	discussions. Expr	essing opinions.
Written skills. Ability t	o write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and technical a	articles.	
E046125	Czech - Lower Intermediate	Z	2
Aim: Understanding of	le arly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about th	em. Writing in a sir	nple way about
familiar topics. Reading	ng and comprehension of simple texts. Improvement of professional language.		
E046128	Czech - Upper Intermediate	Z	2
Mapped to the Comm	on European Framework of Reference Level A2-B1. The aim is to extend language skills taking into consideration professiona	Czech and comm	non professional
terminology. Compret	ension of standard Czech speech and conversation about topics of everyday life - at school, at work, during free time, on inte	rmediate level. Bro	adening the
knowledge technical	anguage.		
E046118	Czech Advanced	Z	2
	f Common European Framework of Reference: B1- B2 The aim: comprehension of spoken Czech as well as lectures given in	•	
	a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and compreher	nsion of popular-so	ientific and
scientific articles or to	xts from student's field of studies without difficulties. Grammar structures on advanced level.		
E046120	Czech for Beginners II.	Z	2
Mapped to the Comm	on European Framework of Reference Level A1 Aim: Basic vocabulary of everyday life in a written and spoken form. Understal	nding and use of ba	asic expressions
of general scientific to	rminology (professional language).		
E046119	Czech Language for Beginners I.	Z	2
Basic vocabulary of e	veryday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (profes	ssional language)	
E046126	Czech Lower Intermediate	Z	2
Mapped to the level of	f Common European Framework of Reference A2 Aim: Understanding clearly what is spoken about everyday situations which	a student meets a	t school or in
his/her free time and	speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement	of professional lan	guage.
E046127	Czech Upper Intermediate	Z	2
Understanding standa	ard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Abi	ity to describe exp	eriences and
events, briefly explain	one's opinions and plans. Reading and understanding general and technical texts.		
E046078	German - Lower Intermediate Course	Z	2
Aim: Understanding of	learly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about the	em. Writing in a sir	nple way about
familiar topics. Readir	ng and comprehension of simple texts. Improvement of professional language.		
E046079	German Lower Intermediate	Z	2
Mapped to the level of	f Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which	ch a student meets	either at school
or in his/her free time	and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement	ent of professional	language.

E046080	German Upper Intermediate	Z	2
Understanding standard	d speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Abili	ty to describe exp	eroences and
events, briefly explain o	ne's opinions and plans.		
E046081	German Upper Intermediate	Z	2
Mapped to the level of	Common European Framework of Reference:A2 - B1 Understanding standard speech about familiar topics, that a students or	omes across at w	ork, at school,
during free time, and ta	lking about these topics. Ability to describe experiences and events, explain one´s opinions and plans. Reading and understa	nding general and	d technical texts.
E046082	German Advanced	Z	2
Comprehension of spol	, ven language as well as lectures in German on topics familiar to the student. Communication with native speakers, participati	on in discussions	Expressing
opinions. Written skills.	Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and te	chnical articles.	
E046083	German Advanced	Z	2
Mapped to the level of	Common European Framework of Reference: B1- B2 The aim: comprehension of spoken German as well as lectures given in	German without	great difficulties
and active participation	in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and compre	hension of popul	ar-scientific and
scientific articles or text	s from student's field of studies without difficulties. Grammar structures on advanced level.		
E046076		Z	2
E046077	German Beginners	Z	2
Mapped to the Commo	n European Framework of Reference level A1. Basic vocabulary of everyday lifein a written and spoken form. understanding a nology.	and use of basic e	expressions of

## List of courses of this pass:

Name of the course	Completion	Credits
English-Bachelor Exam	Z,ZK	2
	ties, to take part in	discussions
to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.		
German - Bachelor Exam / FME	Z,ZK	2
on European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul	ties, to take part in	discussions
to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.		
French - Bachelor Exam /FME	Z,ZK	2
		ı discussions
to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.	•	
Spanish - Bachelor Exam / FME	Z.ZK	2
·	1 ' 1	l
·		
Russian - Bachelor Exam / FMF	7.7K	2
	1 '	
·	, p	
	7K	2
	1	l
·	tioo, to taito partiir	
	7 7K	5
	2,21	, ,
	7 7V	6
•	1 '	O
		4
		8
	1 ' 1	_
·		
	7 7K	8
boundary in E^k. Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Different	ial operators div (d	ivergence)
;, boundary in E^k. Real function of k-variables. Partial derivatives and differentiability. Gradient and directional derivative. Different		
ction given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral,	Fubini theorem. Tra	insformation
	Fubini theorem. Tra	insformation
ction given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, ylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green	Fubini theorem. Tra	insformation
action given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, ylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.	Fubini theorem. Tra	insformation
action given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, sylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Greet of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.  Algorithmization and Programming	Fubini theorem. Tra n's theorem. A pote or field through a su	ential vector urface. The
action given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, ylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Green of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.	Fubini theorem. Tra n's theorem. A pote or field through a su  KZ ices, vectors and o	ential vector urface. The 4 perations.
action given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, sylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Greet of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.  Algorithmization and Programming  TLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matr	Fubini theorem. Tra n's theorem. A pote or field through a su  KZ ices, vectors and o ems of linear equati	ential vector ential vector urface. The 4 perations.
action given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, sylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Greet of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.  Algorithmization and Programming  TLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrix and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systems	Fubini theorem. Tra n's theorem. A pote or field through a su  KZ rices, vectors and o ems of linear equati tructures. Algorithm	ential vector urface. The  4 perations. ions. Script:
ction given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, sylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Greet of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.  Algorithmization and Programming  TLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrix and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systeture of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Standinimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of standing in the problems in	Fubini theorem. Tra n's theorem. A pote or field through a su  KZ rices, vectors and o ems of linear equati tructures. Algorithm	ential vector urface. The  4 perations. ions. Script:
action given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, sylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Greet of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.  Algorithmization and Programming  TLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrix and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systeture of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. St	Fubini theorem. Tra n's theorem. A pote or field through a su  KZ rices, vectors and o ems of linear equati tructures. Algorithm systems of linear e  KZ	ansformation ential vector urface. The 4 perations. Scripts nization of quations.
Interception given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, sylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Greet of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.  Algorithmization and Programming  TLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrix and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. System of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Statininimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of computer Graphics	Fubini theorem. Tra n's theorem. A pote or field through a su  KZ rices, vectors and o ems of linear equati tructures. Algorithm systems of linear e  KZ	ansformation ential vector urface. The 4 perations. Scripts nization of quations.
Intion given implicitly. Local and global (= absolute) extremes of a function of more variables. Double integral, volume (=triple) integral, sylindrical and spherical coordinates. A simple smooth curve and line integral of a scalar and vector function. Circulation and Greet of a line integral on the path. Simple smooth surface and surface integral of a scalar function and a vector function. Flow of a vector Gauss-Ostrogradskij theorem.  Algorithmization and Programming  TLAB and its programming language. MATLAB command line. Elementary commands, variable, assignment and expression. Matrix and output. Condition and cycle. Algorithmization of simple problems in MATLAB. Graphical commands. Matrix operations. Systeture of program. Variables, expressions, assignment, and input / output commands. switch. For cycle. Arrays and files. Pointers. Stainimum, mean, norm, numerical integration, bisection method, Newton method, matrix operations. Direct methods for solution of simple Graphics  Computer Graphics  do not the mathematical theory of the curves and surfaces in computer graphics and their visualisation. The Rhinoceros - NURBS responses to the curves and surfaces in computer graphics and their visualisation.	Fubini theorem. Tra n's theorem. A pote or field through a su  KZ rices, vectors and o ems of linear equati tructures. Algorithm systems of linear e  KZ	ansformation ential vector urface. The 4 perations. Scripts nization of quations.
niconiconiconiconiconiconiconiconiconico	English-Bachelor Exam  In European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  German - Bachelor Exam / FME  In European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  French - Bachelor Exam / FME  In European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Spanish - Bachelor Exam / FME  In European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Russian - Bachelor Exam / FME  In European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Czech - Bachelor Exam  In European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Czech - Bachelor Exam  In European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficul to write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Mathematics III.  An introductory course in ordinary differential equation and infinite series.  Constructive Geometry  The subject is focused on geometric objects in the space - curves, surfaces	English-Bachelor Exam  Z,ZK on European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part into write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  German - Bachelor Exam / FME  On European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part into write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  French - Bachelor Exam / FME  Z,ZK on European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part into write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Spanish - Bachelor Exam / FME  Z,ZK on European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part into write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Russian - Bachelor Exam / FME  Z,ZK on European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part into write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Russian - Bachelor Exam / FME  Z,ZK on European Framework Level B2. The aim is to understand spoken language and lectures on technical topics without greater difficulties, to take part into write a summary, a report and an essay, to read technical texts, to master grammar at advanced level.  Czech - Bachelor Exam  Mathematics III.  An introductory course in ordinary differential equation and infinite series.  Constructive Geometry  An introductory course in ordinary differential equation and infinite series.  Constructive Geometry  The subject is focused on geometric objects in the space -

Spectra, x-rays, ;laser. Band theory of solids, semiconductors. Nucleus, radioactivity, sources of nuclear energy. Laboratories - measurements of 6 experiments related to the lectures.

E021041	Physics I.	Z,ZK	7
-	namics of a particle motion. Principle of conservation of energy. System of particles, centre of mass. Rigid body. Continuum, elastic pro	•	
	echanics. Temperature and heat transfer. Kinetic theory of gases. Thermodynamics. Electric field, current, conductivity, resistance. Co netic field. Magnetic materials. Electromagnetic field. Laboratories - accuracy of measurements, systematic and random errors, unce		
irisulators. Magi	measurements, regression, measurements of 11 various experiments related to the lectures.	riality of difect and	munect
E026002	Physics I Seminary	Z	2
	Solving of problems corresponding to the lectures of Physics I.	ı	
E026003	Physics II Seminary	Z	2
-	ided for students who need more detailed practising and improvement (including knowledge from former physics courses, or high-scl		
successful finishing	Physics II course. The instructions are analogical to seminars with a short corresponding theoretical background. The link between p	hysical concepts ar	nd methods
F046076	of solution of typical problems is underlying.	7	2
E046076	Cormon Paginnara	Z Z	2
E046077	German Beginners mmon European Framework of Reference level A1. Basic vocabulary of everyday lifein a written and spoken form. understanding an	. – .	
mapped to allo de	general scientific terminology.	a doo or bacie oxpr	000.01.00
E046078	German - Lower Intermediate Course	Z	2
Aim: Understandin	g clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them.	Writing in a simple	way about
	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.		
E046079	German Lower Intermediate	Z	2
• •	I of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvemen		
E046080	German Upper Intermediate	7	2
	andard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability	to describe expero	_
J	events, briefly explain one s opinions and plans.	, , , , , , , , , , , , , , , , , , , ,	
E046081	German Upper Intermediate	Z	2
Mapped to the lev	el of Common European Framework of Reference: A2 - B1 Understanding standard speech about familiar topics, that a students com	nes across at work,	at school,
	nd talking about these topics. Ability to describe experiences and events, explain one's opinions and plans. Reading and understanding	ng general and tech	
E046082	German Advanced	Z	2
	of spoken language as well as lectures in German on topics familiar to the student. Communication with native speakers, participatio Written skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific a		1
E046083	German Advanced	7	2
	l of Common European Framework of Reference: B1- B2 The aim: comprehension of spoken German as well as lectures given in G		
	ation in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehe	-	
	scientific articles or texts from student's field of studies without difficulties. Grammar structures on advanced level.		
E046117	Czech - Advanced	Z	2
	spoken language as well as lectures in Czech on topics familiar to the student. Communication with native speakers, participation in dis		ng opinions.
E046118	en skills. Ability to write an essay or a report. Reading and understanding texts concerning currant issues and popular scientific and to Czech Advanced	7	2
	Ozecit Advanced   of Common European Framework of Reference: B1- B2 The aim: comprehension of spoken Czech as well as lectures given in Czec	∠ ch without great diff	
• •	on in a discussion. Written and oral skills on advanced level. Ability to write a summary, a report, an essay. Reading and comprehens	•	
	scientific articles or texts from student's field of studies without difficulties. Grammar structures on advanced level.		
E046119	Czech Language for Beginners I.	Z	2
	abulary of everyday life in a spoken and written form. Understanding and use of basic expressions of general scientific terminology (p	rofessional langua	
E046120	Czech for Beginners II.	Z	2
wapped to the Con	nmon European Framework of Reference Level A1 Aim: Basic vocabulary of everyday life in a written and spoken form. Understanding of general scientific terminology (professional language).	g and use of basic e	expressions
E046125	Czech - Lower Intermediate	Z	2
	g clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them.		
	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.		
E046126	Czech Lower Intermediate	Z	2
	rel of Common European Framework of Reference A2 Aim: Understanding clearly what is spoken about everyday situations which a		
	ne and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement	of professional lan	
E046127	Czech Upper Intermediate andard speech about familiar matters that a student meets at work, at school, during free time, and talking about these topics. Ability	to describe experie	2
Understanding sta	andard speech about familiar matters that a student meets at work, at scribbly, during free time, and talking about these topics. Ability events, briefly explain one's opinions and plans. Reading and understanding general and technical texts.	to describe experie	ences and
E046128	Czech - Upper Intermediate	Z	2
	nmon European Framework of Reference Level A2-B1. The aim is to extend language skills taking into consideration professional Cz	1	
terminology. Com	prehension of standard Czech speech and conversation about topics of everyday life - at school, at work, during free time, on interm	ediate level. Broad	ening the
	knowledge technical language.		
E121023	Thermomechanics	Z,ZK	5
E101E00	Subject covers fundamental knowledge in thermodynamics, heat tranfer and gas dynamics	7 71/	E
E121500	Fluid Dynamics  The first course in Fluid Mechanics designed to provide the fundamental tools necessary to analyse a fluid systems and predict its	Z,ZK	5
E131002	Engineering Design II	Z,ZK	4
	entals of GPS (Geometrical Product Specification). Students will get critical knowledge about ISO system of limits and fits, tolerancin		
	sional loops, tolerancing of angles and cones, tolerancing of threads. Integral part of course is a project where students apply and pr	-	
	lectures.		
E131005	History of Technology	ZK	3
	human knowledge in the domain of science and technology in the retrospective of the development of our civilization. Emphasis is		
recimology with	special attention to the contribution of mining, iron metallurgy, power engineering, transportation and of the machine industry in the r	iai i owei selise of ti	ie wolu.

E131026	Machine Elements and Mechanisms II.	ZK	3
Preliminary design	, design calculations and aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism,	pipelines and their	accessories
	and fittings.		1
E131512	Machine Elements and Mechanisms I.	Z,ZK	6
, ,	elements (screwed, clamped, splined, welded, riveted, soldered and adhesive joints; joints with use of feathers, pins, tenons, cotters, ke ion, gear drives). Seminars are devoted to practical individual solution of simple design projects - tasks with motion screws, preloader	• •	
' ' '	non, gear drives). Seminars are devoted to practical individual solution of simple design projects - tasks with motion screws, preloaded nd key joints between shafts and hubs and tasks with welded and riveted joints. Sketching of machine elements and their simple asser	,	
proceed, opiniod di	seminar work.	nory unito to aloo in	aioporioabio
E131517	Machine Elements and Mechanisms II.	Z,ZK	7
!	t, design calculations and aplication of axles and shafts, sliding and rolling bearings, shaft connections, elements of crank mechanism,	1	accessories
	and fittings.		
E132001	Engineering Design I.	KZ	2
The course is focu	used on building up the ability of future designers to express their ideas through common communication language - technical drawin	g. During the cours	se students
	train and improve their skills in spatial imagination and engineering way of thinking.		_
E132503	Project	KZ	2
	mester global project of mechanical drive of conveyor composed of electric motor, elastic shaft coupling (respectively V-belt drive), ge d compensating double-row toothed shaft coupling (respectively roller chain drive). Second, alternative arrangement of projected mech	•	-
1	x and additional mechanical drives by means of only one single-stage warm gearbox Elaboration of 4 additional reports analysing proc		
	achine element (gearbox shaft or gear). Besides project of mechanical drive must be elaborated design project of crank mechanism a		
J	single-cylinder piston engine.	,,	<b>J</b>
E133013	Engineering Design III.	Z	2
E133014	Engineering Design IV.	Z	2
Information about of	general principles of a new technical product design, stages of development of a new product, the designer fundamental assignment is	to propose a rivalr	rous product
	including. Designing of a dribling jig. A drilling jig is a device by means of which holes on many duplicate parts may be drilled exact	tly alike.	,
E133025	Design	Z	4
	n, design calculations and their aplications in case of geared transmissions, axles and shafts, sliding and rolling bearings, shaft coupl		T
E133091	Project Presentation	Z	4
E141504	Electrical Circuits and Electronics	Z,ZK	4
	eory of electrical circuits, analysis special types of electrical circuits as DC and AC. Transient states in circuits with accumulators of en		
	er transformation for analysis AC circuits supplied with harmonic signal. El. Power and Energy. Introduction into electronics. Principle a omponents. Application in electronic circuits (rectifier, stabilizer, power control, operational amplifier). Analogue and digital circuits. Pri		
Semiconductor co	signal processing. Logical circuits, converters, microprocessor.	ncipie or arialogue	and digital
E141505	Electrical Machines and Drives	Z,ZK	4
	ectrical power and energy. Calculation, measurement, power factor. Magnetic circuit, materials, hysteresis loop. Electromagnet. Transi		1
	obtribut power and energy. Calculation, modernment, power lactor, magnetic energi, materials, mystercolo loop. Electromagnet. mane	orrier, principie, co	onstruction,
3-phase transfor	rmer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed-		
l '	rmer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed- bus machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque character	torque characteris	tic, speed
control. Synchrono	rmer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed out machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characte Low-voltage distribution system.	torque characteris ristic. Low-voltage i	tic, speed instruments.
control. Synchrono E152091	rmer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed- bus machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque character Low-voltage distribution system.  Project	torque characteris ristic. Low-voltage i	tic, speed
E152091 E153005	rmer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed ous machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characte Low-voltage distribution system.  Project  Fundamentals of Energy Conversions	torque characteris ristic. Low-voltage i	tic, speed instruments.
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control. Synchrono  E152091 E153005 The subject FEC of Structure of primar fuels, their types at Thermal cycles. Cacycle, application. fluid, efficiency x of the control o	rmer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed us machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characte Low-voltage distribution system.  Project  Fundamentals of Energy Conversions  larify the reasons, procedures and consequences of energy conversions from sources to applications. 1. Introduction. Energy, forms y sources to cover world energy consumption. World reserves, advances and depletion of primary energy sources. Situation on the W and properties. Secondary fuels. Combustion of fossil fuels. Combustion equipment and their efficiency. Ecological consequences of carnot's comparison cycle. Thermal efficiency. 4. Rankine steam cycle, thermal and real efficiency. Steam circulation carnotization. Surve Internal heat transfer, carnotization, thermal and real efficiency. Combine cycle power plant. 6. Cooling cycles, heat pumps, organic Foor. 7. Engines with internal combustion (Otto, Diesel, Atkinson, Miller, etc), Stirring cycle, Family of Kalina cycles. 8. Renewable so problems). Direct transformation (heat-8gt;Electr.). Special applications.  Project Presentation  Project Presentation  Project Presentation  Project Presentation  Project Presentation  Project Presentation of engaged theme  Momentum, Heat and Mass Transfer  transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanica on continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and the systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.  Chemistry  for from the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure and properties measurement.  Project Presentation  Project Presentation  Project Presentation  Preparation and presentation of a	torque characteris ristic. Low-voltage in KZ Z and transformation (orld, EU and Czec ombustion. 3. I. and by of steam turbinest ankine cycles. Typurces, application, KZ Z Z,ZK I energy equation. rmal radiation. Multication in Multication in KZ S of matter, thermomistry. Laboratory KZ Z,ZK	tic, speed instruments.  2 1 1 s of energy. thia 2. Fossil d II. TD law. s. 5 Brighton les, working importance,  4 2 4 5 Residence ticomponent  3 dynamics, practice is  2 4 4
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control. Synchrono  E152091  E153005 The subject FEC of Structure of primar fuels, their types at Thermal cycles. Cacycle, application. fluid, efficiency x of the control	mer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed us machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characte Low-voltage distribution system.  Project  Fundamentals of Energy Conversions  larify the reasons, procedures and consequences of energy conversions from sources to applications. 1. Introduction. Energy, forms yo sources to cover world energy consumption. World reserves, advances and depletion of primary energy sources. Situation on the Wand properties. Secondary fuels. Combustion of fossil fuels. Combustion equipment and their efficiency. Ecological consequences of carnot's comparison cycle. Thermal efficiency. 4. Rankine steam cycle, thermal and real efficiency. Steam circulation carnotization. Surve Internal heat transfer, carnotization. thermal and real efficiency. Combine cycle power plant. 6. Cooling cycles, heat pumps, organic Profe. 7. Engines with internal combustion (Otto, Diesel, Atkinson, Miller, etc), Striling cycle, Family of Kalina cycles. 8. Renewable so problems). Direct transformation (heat->,Electr.). Special applications.  Project Presentation  Project Presentation  Project Presentation  Processing and presentation of engaged theme  Momentum, Heat and Mass Transfer  transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanica or continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and the systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.  Chemistry  ry from the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure and properties not the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure and properties not properties measur	torque characteris ristic. Low-voltage in KZ  Z and transformation forld, EU and Czec ombustion. 3. I. and by of steam turbinest ankine cycles. Typurces, application,  Z  Z,ZK I energy equation. rmal radiation. Multiput Capacitation in Multiput Capacitation. Multiput Capacitation in Multiput Capacitation. Multiput Capacitation in Ca	tic, speed instruments.  2 1 1 so of energy. thia 2. Fossil d II. TD law. s. 5 Brighton les, working importance,  4 2 4 5 Residence ticomponent  3 dynamics, practice is  2 4 of general ne balance
control. Synchrono  E152091  E153005 The subject FEC of Structure of primar fuels, their types at Thermal cycles. Cacycle, application. fluid, efficiency x of the fuels of th	rmer, operating conditions, rated (scheduled) values. Induction machine, principle, construction, operating conditions. Starting, speed us machines. DC-machines, principle, parameters, operating conditions, construction, starting, speed control, speed-torque characte Low-voltage distribution system.  Project  Fundamentals of Energy Conversions  larify the reasons, procedures and consequences of energy conversions from sources to applications. 1. Introduction. Energy, forms yo sources to cover world energy consumption. World reserves, advances and depletion of primary energy sources. Situation on the Wand properties. Secondary fuels. Combustion of fossil fuels. Combustion equipment and their efficiency. Ecological consequences of a arnot's comparison cycle. Thermal efficiency. 4. Rankine steam cycle, thermal and real efficiency. Steam circulation carnotization. Surve Internal heat transfer, carnotization. thermal and real efficiency. Combine cycle power plant. 6. Cooling cycles, heat pumps, organic Foor. 7. Engines with internal combustion (Otto, Diesel, Atkinson, Miller, etc), Stirling cycle, Family of Kalina cycles. 8. Renewable so problems). Direct transformation (heat-&gt.Electr.). Special applications.  Project Presentation  Project Presentation  Project Presentation  Project Presentation  Processing and presentation of engaged theme  Momentum, Heat and Mass Transfer  transport phenomena balances in homogeneous fluids. Navier-Stokes equations. Momentum transport in turbulent flows. Mechanica no continuous systems. Conduction heat transfer. Forced and natural convection heat transfer. Heat transfer with phase changes and the systems. Mass transfer by molecular diffusion, convection, with chemical reactions and interphase mass transfer.  Chemistry  ry from the point of view of mechanical and process engineering. Physical chemistry forms 2/3 of the course (structure and properties no reinted upon the material properties measurement.  Project  Absolvent se seznámi se základy oboru Procesní technika.  Project	torque characteris ristic. Low-voltage in KZ  Z and transformation forld, EU and Czec ombustion. 3. I. and by of steam turbinest ankine cycles. Typurces, application,  Z  KZ  Z,ZK  I energy equation. rmal radiation. Multiput soft matter, thermo mistry. Laboratory  KZ  Z,ZK  ment and balance system of forces. This systems. Center is systems. Center in the control of the cycles. The systems. Center in the control of the cycles. The systems. Center in the cycles. The cycles is systems. Center in the cycles in the cycl	tic, speed instruments.  2 1 1 so of energy. thia 2. Fossil d II. TD law. s. 5 Brighton les, working importance,  4 2 4 5 Residence ticomponent  3 dynamics, practice is  2 4 of general ne balance

E311102	Mechanics II.	Z,ZK	4
•	and of rigid bodies. Transformation matrix. Kinematics of concurrent movements. Motion: translation, rotation, general planar motion, sp		
general spatial motion	on. Composition of mechanisms. Basic planar mechanisms. Analytical methods in kinematics of mechanisms - Trigonometric and vector		ical methods
	in kinematics. Basic theory of gearing. Transmition mechanisms with geers. Strutting and seezing in mechanisms. Cable mechan	sms.	
E311108	Mechanics III.	Z,ZK	6
• .	of systems of particles. Dynamics of body. Mass distribution in a body. Inertia tensor. D'Alembert principle. Inertial effects of motion.	•	•
Free body diagrar	n method. Newton-Euler equations. Dynamics of multibody systems. Vibrations of systems with 1 DOF. Free oscillations. Forced oscill		harmonic
	force and rotating unbalanced mass. Kinematic excitation. Oscillation of systems with two DOFs, torsional oscillation. Hertz theory o		
E321039	Materials Science II.	Z,ZK	4
Fundamentals of me	stallurgy, iron-carbon alloys and influence of other elements, phase transformations, thermal, combined chemical and thermal and the		l processing,
	technical iron-carbon alloys, non-ferrous metals and their alloys, plastics, structural ceramics, composites, selection of materia		
E322029	Materials Science I.	KZ	3
	nt state of materials engineering, overview of technical materials, internal structure of metals, crystal lattices and their defects, deform		
	ials, structure and properties of materials and their testing, fundamentals of thermodynamics, phases and phase transformations, irc		
E331068	Technology I.	Z,ZK	5
Foundry properties	f metals. Treatment. Pouring. Casting solidification. Moulding and core making. Thermal treatment. Plastic deformation. Division of formi	• .	mi-products,
	heating-up. Cutting. Cold and hot forming. Welds. Weldability. Weldment testing. Thermal cutting. Brazing. Surface treatments		
E333038	Fundamentals of Technology I.	Z	3
The study of manufa	cturing processes forms a core subject area for a majority of mechanical enginnering stdents. It contains basic concept of three mar	ufacturing techno	ologies such
	as casting, forming and welding, including basic terms, methods and materials.		
E341014	Technology II.	Z,ZK	5
Mechanics of chip fo	rmation, cutting processes, finishing operations, non-traditional machining processes. Production rates calculation, machining econom programming of manufacture. Engineering metrology. Assembly techniques. Introduction to process planing.	ics. Automation o	of processes,
E362091	Project	KZ	2
E363091	Project Presentation	Z	4
E371047	Automatic Control	Z,ZK	5
	rs are important part of many industrial processes. The goal of this course is to introduce students into basic knowledge of automatic	,	_
	s, open versus closed loop control, design of controllers and frequency based analysis of control systems. The course also concentrate	-	ilu practice
			and control
	logic controllers. Some seminaries are arranged in Japoratories where practical skills and control engineering methods are trained. S	-	
via programmabil	logic controllers. Some seminaries are arranged in laboratories where practical skills and control engineering methods are trained. S  MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes	Students begin to	
	MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes	Students begin to	work with
E372041	MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes  Computer Support for Study	Students begin to s).	work with
E372041 The course introduc	MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes  Computer Support for Study es students into creating technical and professional documents on computers or Web and into realizing technical computations with the	Students begin to s). KZ e use of compute	work with  3 ers. Students
E372041 The course introduc	MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes   Computer Support for Study  es students into creating technical and professional documents on computers or Web and into realizing technical computations with the laboratory classes.  I skills by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creating and professional documents on computations with a spreadsheet calculator, and by creating and professional documents on computations with a spreadsheet calculator, and by creating and professional documents on computations with a spreadsheet calculator, and by creating and professional documents on computations with a spreadsheet calculator, and by creating and professional documents on computers or which is considered to the computation of the computation of the computations with a spreadsheet calculator, and by creating and professional documents or computers or which is considered to the computation of the com	Students begin to s).  KZ e use of compute esenting a web p	work with  3 ers. Students page.
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E372041 The course introduct gain practica E372083	MATLAB software as a common platform of control engineers (MATLAB is used on all including most of the laboratory classes  Computer Support for Study  es students into creating technical and professional documents on computers or Web and into realizing technical computations with the  I skills by creating an essay in a text editor, by realizing technical computations with a spreadsheet calculator, and by creating and professional materials of the state of	Students begin to s).  KZ e use of compute esenting a web p	work with  3 ers. Students page.  3
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