# Study plan

# Name of study plan: 09 116 NSTI VMI 2012 základ

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Welcome page

Garantor of the study branch: Program of study: Welcome page

Type of study: unknown Required credits: 121 Elective courses credits: 0 Sum of credits in the plan: 121

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 84

The role of the block: P

Code of the group: 12NS\*1P-VMI

Name of the group: 2012 NSTI 1.sem povinné VMI

Requirement credits in the group: In this group you have to gain 26 credits

Requirement courses in the group: In this group you have to complete 6 courses

Credits in the group: 26 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
2321071	Physical metallurgy Lucie Pilsová, Ji í Janovec, Jan Kr il, Jana Sobotová <b>Jan Kr il</b> Jana Sobotová (Gar.)	Z,ZK	5	3P+1C	*	Р
2321075	Integrity of materials Lucie Pilsová, Ji í Janovec, Pavlína Hájková, Jakub Horváth, Tomáš Vampola Jakub Horváth Jakub Horváth (Gar.)	Z,ZK	4	2P+1C	*	Р
2331090	Theory of Casting Bohumír Bedná , Barbora Bryksí Stunová, Aleš Herman, Irena Kubelková, Milan N mec, Jind ich Zeman, Zden k Kopanica Aleš Herman Aleš Herman (Gar.)	Z,ZK	5	3P+1C	*	Р

## Characteristics of the courses of this group of Study Plan: Code=12NS\*1P-VMI Name=2012 NSTI 1.sem povinné VMI

2321071	Physical metallurgy	Z,ZK	5					
The course deals with the explanation of processes and procedures which form the the theoretical fundamentals of engineering and mechanical engineering technologies. Emphasis								
is laid on thermodynam	ics, diffusion, crystal lattice structures and their imperfections, phase transformations and hardening and dehardening proces	sses. Attention is	also paid to					
degradation processes,	i.e. failure of materials, fatigue, creep, corrosion, wear and radiation failures.							
2321075	Integrity of materials	Z,ZK	4					
Dealing with tasks of co	ntinuum mechanics; finite element method. Matrix and tensor calculus of stress and strain. Linear and nonlinear fracture med	hanics. Assessm	ent of conditions					
of integrity of structures	, operation, safety and reliability of structures with defects.							
2331090	Theory of Casting	Z,ZK	5					
Properties of liquid allo	s. Crystallization of foundry alloys. Volume changes during cooling and solidification, and their consequences. Principles of F	eeding. Controlle	d solidification.					
Interaction the metal with the mold. Defects resulting from shrinkage. Cast iron with lamellar graphite. Cast iron with spheroidal graphite. Malleable cast iron. Cast iron with vermicular								
graphite. Iron for specia	graphite. Iron for special use. Metallurgy of steel. Metallurgy of aluminum alloys, magnesium and titanium. Alloys of copper.							

Code of the group: 12NS\*2P-VMI

Name of the group: 2012 NSTI 2.sem povinné VMI

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 7 courses

Credits in the group: 32 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
2321072	Metallic Materials Jakub Horník, Elena ižmárová Jakub Horník Jakub Horník (Gar.)	Z,ZK	5	2P+2C	*	Р
2341082	Non-convetional material removal processes Pavel Novák	Z,ZK	4	2P+1C	*	Р
2322042	Advanced materials in engineering  Ji í Janovec	KZ	4	1P+2C	*	Р
2341066	Programming of metal cutting on CNC machines  Jan Tomí ek, Pavel Novák Pavel Novák Jan Tomí ek (Gar.)	Z,ZK	5	2P+3C	*	Р
2332114	Project II František Tatí ek	KZ	5	0P+5C	*	Р
2332025	Special Technologies of Surface Treatments  Jaroslav ervený, Zden k Hazdra, Viktor Kreibich, Ji í Kucha Ji í Kucha  Viktor Kreibich (Gar.)	KZ	4	1P+2C	*	Р
2331097	Theory of Joining and Cutting Tomáš Gur ík, Ladislav Kola ík, Marie Kola íková, Antonín K íž, Pavel Rohan Ladislav Kola ík Ladislav Kola ík (Gar.)	Z,ZK	5	2P+2C	*	Р

#### Characteristics of the courses of this group of Study Plan: Code=12NS\*2P-VMI Name=2012 NSTI 2.sem povinné VMI

2321072 Metallic Materials 5 Metallic materials. Classification of metallic materials. Low-carbon weldable steels with higher strength. Stainless steels. Austenitic stainless steels, ferritic stainless steels. Heat-resisting and creep-resisting steels. Tool steels. Non-ferrous metal alloys - basic classification. Copper and copper alloys. Aluminium and aluminium alloys. Titanium and titanium alloys. Heat treatment of metallic materials

Non-convetional material removal processes Basic working principles, current machining apllications, future development. Electrodischarge machining - principle, mechanism of material removal, hole and 3 - D schapes production, wire electrodischarge maschining. The utilization of the energy beams for machining - laser, electron and ion beams, plasma arc. Electrochemical machining - basic principle, applications, full - form shaping. Chemical machining. Water - jet and ultrasonic machining. Technological, economical and surface quality consideration when using nonconventional processes. Environmental and Safety Aspacts of Electrophysical and Electrochemical Processes.

Z,ZK

ΚZ

#### Advanced materials in engineering

Subject promising materials provide an overview of selected recent construction materials. It is presented the development and the physico-mechanical properties of these materials and listed the most common types of these materials. Demonstrated their fundamental characteristics, including economic considerations and international manufacturers. They presented their technological capabilities, usability and design methods for marking.

Processing mock-up for casting, let us say mock-up of die tool models to the form of NC programme for CNC controlled milling machine. Usage of CAM system. Optimalization of tool paths with reference to cycle time and achieved quality of finished machined surface.

2332114 Project II 5 The subject deals with the usage of computer aided techniques in production processes of forming, casting and welding. Basic characteristics of the software FORGE, PAMSTAMP, QForm, Novacast, ProCAST, MagmaSoft and SYSWELD with demonstration of selected examples.

#### 2332025 Special Technologies of Surface Treatments

Programming of metal cutting on CNC machines

Special surface treatment technology, advanced technology trends. Measurement of process parameters in surface technology, computer technology in the management and control of surface treatment . Special surface preparation, combined pretreatment, pretreatment quality control. Conversion layer, in-process protection, anodic oxidation. Testing and quality control of surface treatments. Ways of creating functional coatings, verification of performance. Finishes to heat and abrasion, special skid coatings. Abrasion resistance, tribological properties. Galvanic alloy and composite coatings. Thermally sprayed coatings and their composition. Hot-dip coated in molten metals. Electroforming, the excretion of heavy coatings. Molds for engineering technology methods of surface treatment. Finishes in electrical engineering and electronics. Surface finishing machine tools. Coatings with nanoparticles. Disposal of waste water and environmental issues . Techno-economic indicators finishes.

Theory of Joining and Cutting

Course covers technologies of welding, brazing and thermal cutting. Description of joining methods, their principals, equipment and typical application in the industry is done. In focus are welding technologies (SMAW, GMAW, GTAW, SAW), oxyacetylene cutting, plasma cutting. Covered is also topic of material weldability and assessment of joint quality by destructive and non-destructive methods.

Code of the group: 12NS\*3P-VMI

Name of the group: 2012 NSTI 3.sem povinné VMI

Requirement credits in the group: In this group you have to gain 21 credits

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

Credits in the group: 21

Note on the group:

2341082

2341066

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
2321073	Non-metallic metals Zde ka Jeníková, Ta ana Vacková Ta ana Vacková (Gar.)	Z,ZK	4	2P+2C	*	Р
2382052	Business and Management Petr Žemli ka, Miroslav Žilka Miroslav Žilka (Gar.)	KZ	3	2P+1C	*	Р
2342114	Project III. Pavel Novák	KZ	5	0P+5C	*	Р
2341004	Manufacturing systems design Ji í Kyncl Pavel Novák Libor Beránek (Gar.)	Z,ZK	4	2P+2C	*	Р

2331012	Theory and Practise of Metal Forming Vit Novák, František Tatí ek František Tatí ek (Gar.)	Z,ZK	5	3P+2C	8	Р
Characteristics of the	courses of this group of Study Plan: Code=12NS*3P-VMI Nam	e=2012 NSTI	3.sem p	ovinné \	/MI	
The lectures cover the entire and the volume of their consumaterials. The lectures also constitutes are constituted in the constitute of t	n-metallic metals range of non-metallic engineering materials, a majority of them are devoted to polymer umption highly exceeds that of the rest of non-metallic materials. Emphasis is laid on e leal with standardization, environmental and economical aspects which follow from the	explanation and re	alization of	uently used basic terms	s in the field of metallic mater	non-metallic ials.
1	siness and Management preneurship as a way relevant to student's future professional career. Technically oriented	d students who ha	ven't anv so	ecialized ec	KZ   onomical and n	3 nanagement
courses in their curriculum ar	e introduced to the fundamental issues needed to start of their own businesses using	simple and unde	rstandable f	orm. To stud	dy the basic inf	ormation of
· -	aterials accessible on the web portal are prepared. Acquired knowledge is then practiced sts and student?s case study, related to small business issues (mostly the business p	· ·	_	nal lectors. E	Evaluation and o	lassification
2342114 Pro	ject III.	· ·	1 7/		KZ	5
1	a complex tasts from the field of machining, process planning and metrology.  nufacturing systems design				Z,ZK	4
Theory and methodology of t	echnological designing, time and spatial structures of production systems. The aim of ystems designing with respect to their flexibility, productivity and production quality. Int ill be acquainted with modern methods of industrial engineering and lean manufacturing.	roduct students to		its with mod	dern approache	s and
	eory and Practise of Metal Forming				Z,ZK	5
	ng theory. Stress-strain relationships in elasticity and plasticity. Methods for analyzing r Juence on the forming process. Fundamentals of theory and practice of basic bulk met	٠.		•		
loads in forming, selection of	- · · · · · · · · · · · · · · · · · · ·					
Requirement cred Requirement coulons on the group Note on the group Name of the block	c: Compulsory elective courses of credits of the block: 37 ock: PV		se			
Name of the grou Requirement cred Requirement cou Credits in the gro	p: 2012 N 3.sem povinná jazyková výuka dits in the group: In this group you have to gain 2 c rses in the group: In this group you have to comple up: 2		se			
Note on the group	): Name of the course / Name of the group of courses					
Code	(in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
2043081	English - Preparatory Course / FME Veronika Kratochvílová, Eliška Vítková, Ilona Šimice, Michaela Schusová, Hana Volejníková Nina Procházková Ayyub	Z	2	0P+2C	*	PV
2043086	Czech - Preparatory Course Michaela Schusová, Hana Volejníková, Petr Laurich	Z	2	0P+2C	*	PV
2043083	French - Preparatory Course / FME Michaela Schusová, Dušana Jirovská Michaela Schusová Dušana Jirovská (Gar.)	Z	2	0P+2C	*	PV
2043082	German - Lower Intermediate Course Eliška Vítková, Michaela Schusová, Petr Laurich, Jaroslava Kommová Jaroslava Kommová Jaroslava Kommová (Gar.)	Z	2	0P+2C	*	PV
2043085	Russian - Preparatory Course / FME Michaela Schusová, Hana Volejníková, Dušana Jirovská Eliška Vítková	Z	2	0P+2C	*	PV
2043084	Spanish - Preparatory Course / FME Michaela Schusová, Jaime Andrés Villagómez Eliška Vítková	Z	2	0P+2C	*	PV
Characteristics of the	courses of this group of Study Plan: Code=12N**3QJV Name	e=2012 N 3.s4	em povin	ná iazvk	ová výnka	_
2043081 Eng Aim: Understanding clearly w familiar topics. Reading and of	glish - Preparatory Course / FME  what is spoken about everyday situations which a student meets at school or in his/her  comprehension of simple texts. Improvement of professional language. European level  ech - Preparatory Course	free time and spe			Z	2 way about
Aim: Understanding clearly w	what is spoken about everyday situations which a student meets at school or in his/her comprehension of simple texts. Improvement of professional language.	free time and spe	eaking abou	t them. Writ		

2043083	French - Preparatory Course / FME	Z	2				
Aim: Understanding cle	Aim: Understanding 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 abo						
familiar topics. Reading	and comprehension of simple texts. Improvement of professional language.						
2043082	German - Lower Intermediate Course	Z	2				
Mapped to the level of 0	Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations whic	h a student meets	either at school				
or in his/her free time a	nd speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improveme	nt of professional	language.				
2043085	Russian - Preparatory Course / FME	Z	2				
Aim: Understanding cle	arly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about the	m. Writing in a sir	nple way about				
familiar topics. Reading	and comprehension of simple texts. Improvement of professional language.						
2043084	Spanish - Preparatory Course / FME	Z	2				
Aim: Understanding 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.							

Code of the group: 12N\*\*3Q--JZ

Name of the group: 2012 N 3.sem povinná jazyková zkouška

Requirement credits in the group: In this group you have to gain 1 credit

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

Credits in the group: 1 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
2041081	English - Master Exam Veronika Kratochvílová, Eliška Vítková, Ilona Šimice, Michaela Schusová, Hana Volejníková, Michele Le Blanc, Nina Procházková Ayyub Nina Procházková Ayyub Ilona Šimice (Gar.)	ZK	1	0P+0C	*	PV
2041086	Czech- Master Exam Michaela Schusová, Hana Volejníková, Petr Laurich	ZK	1	0P+0C	*	PV
2041083	French - Master Exam / FME Michaela Schusová, Dušana Jirovská Dušana Jirovská (Gar.)	ZK	1	0P+0C	*	PV
2041082	German - Master Exam / FME  Eliška Vítková, Michaela Schusová, Petr Laurich, Jaroslava Kommová  Jaroslava Kommová Jaroslava Kommová (Gar.)	ZK	1	0P+0C	*	PV
2041085	Russian - Master Exam / FME Michaela Schusová, Hana Volejníková, Dušana Jirovská Eliška Vítková	ZK	1	0P+0C	*	PV
2041084	Spanish - Master Exam / FME Michaela Schusová, Jaime Andrés Villagómez Eliška Vítková Jaime Andrés Villagómez (Gar.)	ZK	1	0P+0C	*	PV

Characteristic	s of the courses of this group of Study Plan: Code=12N**3QJZ Name=2012 N 3.sem povinná	jazyková zko	uška
2041081	English - Master Exam	ZK	1
Mapped to the leve	el of Common European Framework of Reference: A2. Aim: Understanding clearly what is spoken about everyday situations whic	h a student meets	at school or in
his/her free time a	nd speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement	of professional lar	nguage.
2041086	Czech- Master Exam	ZK	1
2041083	French - Master Exam / FME	ZK	1
Mapped to the leve	el of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations whic	ch a student meets	either at schoo
or in his/her free ti	me and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improveme	ent of professional	language.
2041082	German - Master Exam / FME	ZK	1
Mapped to the leve	el of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations whic	ch a student meets	either at schoo
or in his/her free ti	me and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improveme	ent of professional	language.
2041085	Russian - Master Exam / FME	ZK	1
Mapped to the leve	el of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations whic	ch a student meets	s either at schoo
or in his/her free ti	me and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improveme	ent of professional	language.
2041084	Spanish - Master Exam / FME	ZK	1
Mapped to the leve	el of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which	ch a student meets	s either at schoo
or in his/her free ti	me and speaking about them. Writing in a simple way about familiar topics, reading and comprehesion of simple texts. Improvement	ent of professional	language.

Code of the group: 12NS\*1Q-VMI

Name of the group: 2012 NSTI 1.sem 1povvol VMI

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

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

Credits in the group: 4 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
2182001	Physical chemistry Jaromír Štancl Radek Šulc Radek Šulc (Gar.)	KZ	4	2P+1C	*	PV
2022010	Physical Foundations of Advanced Technologies Tomáš Horaž ovský, Petr VI ák, Zden k Tolde Petr VI ák (Gar.)	KZ	4	2P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12NS\*1Q-VMI Name=2012 NSTI 1.sem 1povvol VMI

2182001 Physical chemistry Basic principles of physical chemistry in the field assuming real behavior especially that are demonstrated on technical applications. Volumetric properties of fluids. Thermodynamic properties of fluids. Phase equilibria. Solution Thermodynamics. Thermochemistry. Chemical reaction equilibrium. 2022010 Physical Foundations of Advanced Technologies Vacuum technology: theoretical foundations, vacuum pumps, gauges for low pressure measurements, applications in engineering. Gas discharges, physical and plasmochemical methods of surface modification and coatings deposition. Lasers: laser fundamentals, laser categories, laser technology application in mechanical engineering. Piezoelectricity: fundamentals, application in technology, ultrasound generation, piezoelectric pumps, nanofeeds.

Code of the group: 12NS\*3Q-VMI

Name of the group: 2012 NSTI 3.sem 1povvol VMI

Requirement credits in the group: In this group you have to gain 5 credits

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

Credits in the group: 5 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
2332010	Design of the production of castings, forgings, stampings and welded parts	KZ	5	1P+4C	Z	PV
2322043	Project-heat treatment Elena ižmárová	KZ	5	1P+4C	*	PV
2342119	Technical Standardization, Quality, Metrology Pavel Novák	KZ	5	1P+4C	*	PV

### Characteristics of the courses of this group of Study Plan: Code=12NS\*3Q-VMI Name=2012 NSTI 3.sem 1povvol VMI

The course aims to zoom coherence to students of technical standardization, metrology and quality and to acquaint them with the basic themes of these fields.

	у поставительно достром ставительно ставительного поставительного про-					
2332010	KZ	5				
Principles for the prep	Principles for the preparation of production of machine parts with respect to the required quality and production efficiencies. Design of manufacturing processes, tools, equipment are					
machinery in foundries	s, smitheries, mills and welding shops. Adjustments to design machine parts with regard to manufacturing technology, materials a	and prescribed vo	lume production.			
Determination of tech	nological additions, production conditions, parameters and production times. Basic capacity calculations. Data for cost calculat	ion. Design and c	omparison of			
alternatives.						
2322043	Project-heat treatment	KZ	5			
23/2110	Technical Standardization, Quality Metrology	K7	5			

Code of the group: 12NS\*4Q-VMI-DP

Name of the group: 2012 NSTI 4.sem 1povvol VMI - DP

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 1 course

Credits in the group: 10

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Note	on	the	gı	rol	ıp:

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
2323998	Thesis	Z	10	0P+10C	*	PV
2333998	Diploma Thesis Aleš Herman	Z	10	0P+10C	*	PV
2343998	Diploma thesis Pavel Novák	Z	10	0P+10C	*	PV

#### Characteristics of the courses of this group of Study Plan: Code=12NS\*4Q-VMI-DP Name=2012 NSTI 4.sem 1povvol VMI - DP

		· P · · · · · · · · · · · · · · · · · ·	
2323998	Thesis	Z	10
Preparation of a thesis	under the instructions and guidance of a supervisor.		
2333998	Diploma Thesis	Z	10
2343998	Diploma thesis	Z	10
Sources of information	in the field. Databases and corporate literature. Normalization. Search activity. News from the field of engineering technology.	Principles of rese	earch and work
in laboratories. The prin	nciples of work safety in technological devices. Work on specialized tasks related to the focus of a thesis.		

Code of the group: 12NS\*4Q-VMI

Name of the group: 2012 NSTI 4.sem 3povvol VMI

Requirement credits in the group: In this group you have to gain at least 15 credits (at most 18)

Requirement courses in the group: In this group you have to complete 3 courses

Credits in the group: 15 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
2321504	Experimental Methods in Materials Science  Jana Sobotová	Z,ZK	6	2P+2C	*	PV
2321080	Material Engineering  Jana Sobotová	Z,ZK	5	2P+2C	*	PV
2331027	Metallurgy of Casting Alloys Irena Kubelková	Z,ZK	5	2P+2C	*	PV
2321074	Nano and Biomaterials	Z,ZK	5	2P+2C	*	PV
2331076	Design of Surface Treatment	Z,ZK	5	2P+2C	*	PV
2341702	Industrial Metrology Libor Beránek, Petr Mikeš, Jan Urban Pavel Novák Libor Beránek (Gar.)	Z,ZK	5	2P+2C	*	PV
2341063	Technology of cutting with CAM Pavel Novák	Z,ZK	6	2P+2C	*	PV
2331507	Processing Technology of Plastics and Composites  Barbora Bryksí Stunová	Z,ZK	6	2P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12NS\*4Q-VMI Name=2012 NSTI 4.sem 3povvol VMI

2321504	Experimental Methods in Materials Science	Z,ZK	6
Methods of diffracti	on of X-ray and electron diffraction (for the phase analysis to determine the residual stress, texture and analysis of lattice defe	ects). Imaging method	s: light and
electron microscopy	r (preparation of sample and display characteristics, contrast theory). Advanced methods of physical and chemical microanals	ysis: scan-ning electro	n microscopy
(emission, transmis	sion and conductivity method). Electron probe microanalysis: wave-length and energy-dispersive X-ray spectroscopy, quantita	tive microanalysis, sig	ınal processing
2321080	Material Engineering	Z,ZK	5
The course is an ar	nalysis of the fundamental approaches materials engineering as an interdisciplinary field of study which is based on physics, o	chemistry and other to	echnical fields,
but is also intereste	d in knowledge of medicine, economics and ecology. It follows the courses Physical metallurgy, metal and non-metallic mater	ials.	
2331027	Metallurgy of Casting Alloys	Z,ZK	5
The course is aime	d at increasing knowledge of basic studies of foundry technology. It focuses mainly on the following topics: melting of gray iror	ı, metallurgical treatm	ent and its
influence on the str	ucture and properties of gray iron; production of the ductile cast iron; inoculation and modification of cast irons; production of t	the vermicular, mallea	ble iron and of
other special cast in	on types; production and metallurgical treatment of cast steel; production and metallurgical treatment of aluminum and magn	esium alloys; melt qua	ality assurance
methods; casting de	efects.		
2321074	Nano and Biomaterials	Z,ZK	5
Introduction to nand	omaterials and nanotechnology, links between nanomaterials and biomaterials, nanopowders, nanotubes, fluereny, surface an	d nanomaterials, prac	tical application
- industry, energy, n	nedicine. Properties and structure of materials and their relationship to the live system. Immune system, biocompatibility tests	, sterilization. Morpho	logy, roughnes
and tribological pro	perties of the surface of biomaterials. Application of thin films and coatings.		
2331076	Design of Surface Treatment	Z,ZK	5
Subject is specialize	ed to design of convenient technology and operations surface treatments. Takes respect up to material, quality, construction a	nd enviroment engine	ering parts. An
also tekes respect	up to best accessible techniques agreable integrated prevention dle EU laws.		
2341702	Industrial Metrology	Z,ZK	5
Theoretical introduc	ction to measurement on coordinate measuring machines (CMMs). Students will acquainted familiar with the construction and	sensors of CMM. The	ey will gain
important knowledg	e of computer tomography and reverse engineering. We introduce them to the CMM application in industry. This is related to	method of MSA, inclu	ding the
determination of me	easurement uncertainty.		
2341063	Technology of cutting with CAM	Z,ZK	6
CAM systems for N	C program generation for milling and turning operation. CAM system structure and new CNC technologies.	, , ,	
2331507	Processing Technology of Plastics and Composites	Z,ZK	6

## List of courses of this pass:

Code	Name of the course	Completion	Credits
2022010	Physical Foundations of Advanced Technologies	KZ	4
	gy: theoretical foundations, vacuum pumps, gauges for low pressure measurements, applications in engineering. Gas discharges, p ace modification and coatings deposition. Lasers: laser fundamentals, laser categories, laser technology application in mechanical er fundamentals, application in technology, ultrasound generation, piezoelectric pumps, nanofeeds.		
2041081	English - Master Exam	ZK	1
Mapped to the lev	el of Common European Framework of Reference: A2. Aim: Understanding clearly what is spoken about everyday situations which a lie and speaking about them. Writing in a simple way about familiar topics. Reading and comprehension of simple texts. Improvement	student meets at s	

	T		
	German - Master Exam / FME	ZK	1
or in his/her free	l of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a	student meets eith	er at school
0	e time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvemer	nt of professional la	anguage.
2041083	French - Master Exam / FME	ZK	1
Mapped to the leve	el of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a	student meets eith	er at school
	e time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvemer		
2041084	Spanish - Master Exam / FME	ZK	1
	el of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a	l	er at school
1 1	e time and speaking about them. Writing in a simple way about familiar topics, reading and comprehesion of simple texts. Improvemen		
			anguage.
2041085	Russian - Master Exam / FME	ZK	l I
1 ''	el of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a		
	e time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvement		
2041086	Czech- Master Exam	ZK	1
2043081	English - Preparatory Course / FME	Z	2
Aim: Understandir	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. European level A1 - A2	2.	
2043082	German - Lower Intermediate Course	Z	2
	l of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which a	student meets eith	
	e time and speaking about them. Writing in a simple way about familiar topics, reading and comprehesion of simple texts. Improvemen		
2043083	French - Preparatory Course / FME	7	2
	ng clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them.	<del>-</del> Writing in a simple	!
Airi. Oriderstaridir	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.	writing in a simple	way about
2042004		7	
2043084	Spanish - Preparatory Course / FME	Z	2
Aim: Understandir	ng clearly what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about them.	vvriting in a simple	way about
	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.	ı	
2043085	Russian - Preparatory Course / FME	Z	2
Aim: Understandir	ng 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.		
2043086	Czech - Preparatory Course	Z	2
Aim: Understandir	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.		
2182001	Physical chemistry	KZ	4
	f physical chemistry in the field assuming real behavior especially that are demonstrated on technical applications. Volumetric proper	ties of fluids. Therr	nodvnamic
	properties of fluids. Phase equilibria. Solution Thermodynamics. Thermochemistry. Chemical reaction equilibrium.		
2321071	Physical metallurgy	Z,ZK	5
	with the explanation of processes and procedures which form the the theoretical fundamentals of engineering and mechanical engine		-
is laid on thermo	odynamics, diffusion, crystal lattice structures and their imperfections, phase transformations and hardening and dehardening process degradation processes, i.e. failure of materials, fatigue, creep, corrosion, wear and radiation failures.	ses. Alternion is alt	so paid to
0004070		7.71/	
2321072	Metallic Materials	Z,ZK	5
	Classification of metallic materials. Low-carbon weldable steels with higher strength. Stainless steels. Austenitic stainless steels, ferritic		
and creep-resisting			eat-resisting
	ng steels. Tool steels. Non-ferrous metal alloys - basic classification. Copper and copper alloys. Aluminium and aluminium alloys. Titan		eat-resisting
	treatment of metallic materials	ium and titanium a	eat-resisting
2321073			eat-resisting
	treatment of metallic materials	ium and titanium a	eat-resisting illoys. Heat
The lectures cover	treatment of metallic materials  Non-metallic metals	ium and titanium a	eat-resisting alloys. Heat  4 engineering
The lectures cover and the volume of	treatment of metallic materials  Non-metallic metals the entire range of non-metallic engineering materials, a majority of them are devoted to polymer materials which are most frequently under the entire range of non-metallic engineering materials, a majority of them are devoted to polymer materials which are most frequently under the entire range of non-metallic engineering materials.	ium and titanium a  Z,ZK sed in mechanical irms in the field of i	eat-resisting alloys. Heat  4 engineering non-metallic
The lectures cover and the volume of	treatment of metallic materials  Non-metallic metals  the entire range of non-metallic engineering materials, a majority of them are devoted to polymer materials which are most frequently under their consumption highly exceeds that of the rest of non-metallic materials. Emphasis is laid on explanation and realization of basic te	ium and titanium a  Z,ZK sed in mechanical irms in the field of i	eat-resisting alloys. Heat  4 engineering non-metallic
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fluence on the struct ther special cast iron 2331076 ubject is specialized t	Metallurgy of Casting Alloys  at increasing knowledge of basic studies of foundry technology. It focuses mainly on the following topics: melting of gray iron, metallurure and properties of gray iron; production of the ductile cast iron; inoculation and modification of cast irons; production of the vermicul types; production and metallurgical treatment of cast steel; production and metallurgical treatment of aluminum and magnesium alloys		
fluence on the struct ther special cast iron 2331076 ubject is specialized t	ure and properties of gray iron; production of the ductile cast iron; inoculation and modification of cast irons; production of the vermicul	Z,ZK	5
2331076   ubject is specialized t		_	
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ubject is specialized t	methods; casting defects.	, men quanty	/ assuranc
ubject is specialized t	, ,	7.71/	
2331090	Design of Surface Treatment	Z,ZK	5
	o design of convenient technology and operations surface treatments. Takes respect up to material, quality, construction and enviromen	nt engineerin	ig parts. Ai
	also tekes respect up to best accessible techniques agreable integrated prevention dle EU laws.		_
roperties of liquid alle	Theory of Casting	Z,ZK	5
	bys. Crystallization of foundry alloys. Volume changes during cooling and solidification, and their consequences. Principles of Feeding.		
teraction the metal w	ith the mold. Defects resulting from shrinkage. Cast iron with lamellar graphite. Cast iron with spheroidal graphite. Malleable cast iron (	Cast iron with	h vermicul
	graphite. Iron for special use. Metallurgy of steel. Metallurgy of aluminum alloys, magnesium and titanium. Alloys of copper.		
2331097	Theory of Joining and Cutting	Z,ZK	5
ourse covers technol	ogies of welding, brazing and thermal cutting. Description of joining methods, their principals, equipment and typical application in the i	industry is do	one. In foc
e welding technologie	es (SMAW, GMAW, GTAW, SAW), oxyacetylene cutting, plasma cutting. Covered is also topic of material weldability and assessment of journal of the control of	oint quality by	y destructi
	and non-destructive methods.		_
2331507	Processing Technology of Plastics and Composites	Z,ZK	6
2332010	Design of the production of castings, forgings, stampings and welded parts	KZ	5
	rration of production of machine parts with respect to the required quality and production efficiencies. Design of manufacturing process		•
achinery in foundries	smitheries, mills and welding shops. Adjustments to design machine parts with regard to manufacturing technology, materials and presc	ribed volume	e production
Determination of tech	inological additions, production conditions, parameters and production times. Basic capacity calculations. Data for cost calculation. Des	sign and com	nparison c
	alternatives.		
2332025	Special Technologies of Surface Treatments	KZ	4
ecial surface treatm	ent technology, advanced technology trends. Measurement of process parameters in surface technology, computer technology in the	management	t and cont
surface treatment . S	pecial surface preparation, combined pretreatment, pretreatment quality control. Conversion layer, in-process protection, anodic oxid	lation. Testing	and qua
	nents. Ways of creating functional coatings, verification of performance. Finishes to heat and abrasion, special skid coatings. Abrasio	_	
	oy and composite coatings. Thermally sprayed coatings and their composition. Hot-dip coated in molten metals. Electroforming, the exc		_
-	echnology methods of surface treatment. Finishes in electrical engineering and electronics. Surface finishing machine tools. Coatings with		
2140 101 011g001g t	of waste water and environmental issues . Techno-economic indicators finishes.	· · · a· · opa· · · o·	00 . D.opo
2222444			
2332114	Project II	KZ	5
he subject deals with	the usage of computer aided techniques in production processes of forming, casting and welding. Basic characteristics of the softwar	e FORGE, P	AMSTAM
	QForm, Novacast, ProCAST, MagmaSoft and SYSWELD with demonstration of selected examples.		T
2333998	Diploma Thesis	Z	10
2341004	Manufacturing systems design	Z,ZK	4
Theory and method	ology of technological designing, time and spatial structures of production systems. The aim of the course is to teach students with mo	dern approa	ches and
ethodology of produc	tion systems designing with respect to their flexibility, productivity and production quality. Introduct students to the complex design of p	roduction sys	stems with
	the supply chain. Students will be acquainted with modern methods of industrial engineering and lean manufacturing.		
2341063	Technology of cutting with CAM	Z,ZK	6
	CAM systems for NC program generation for milling and turning operation. CAM system structure and new CNC technologies.	_,	1
		Z,ZK	
23/1066		<u>ک,ک۱۲</u>	
2341066	Programming of metal cutting on CNC machines	m Ontimaliz	5
	r casting, let us say mock-up of die tool models to the form of NC programme for CNC controlled milling machine. Usage of CAM systems	em. Optimaliz	_
ocessing mock-up fo	r casting, let us say mock-up of die tool models to the form of NC programme for CNC controlled milling machine. Usage of CAM system paths with reference to cycle time and achieved quality of finished machined surface.	·	zation of to
ocessing mock-up fo	r casting, let us say mock-up of die tool models to the form of NC programme for CNC controlled milling machine. Usage of CAM system paths with reference to cycle time and achieved quality of finished machined surface.  Non-convetional material removal processes	Z,ZK	zation of to
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ocessing mock-up for 2341082 asic working principle re electrodischarge m	r casting, let us say mock-up of die tool models to the form of NC programme for CNC controlled milling machine. Usage of CAM system paths with reference to cycle time and achieved quality of finished machined surface.  Non-convetional material removal processes s, current machining apllications, future development. Electrodischarge machining - principle, mechanism of material removal, hole and caschining. The utilization of the energy beams for machining - laser, electron and ion beams, plasma arc. Electrochemical machining - bases.	Z,ZK 3 - D schapes sic principle, a	4 s production application
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2341082 sisic working principle re electrodischarge n full - form shapi	r casting, let us say mock-up of die tool models to the form of NC programme for CNC controlled milling machine. Usage of CAM system paths with reference to cycle time and achieved quality of finished machined surface.  Non-convetional material removal processes s, current machining apllications, future development. Electrodischarge machining - principle, mechanism of material removal, hole and chaschining. The utilization of the energy beams for machining - laser, electron and ion beams, plasma arc. Electrochemical machining - baseng. Chemical machining. Water - jet and ultrasonic machining. Technological, economical and surface quality consideration when using processes. Environmental and Safety Aspacts of Electrophysical and Electrochemical Processes.	Z,ZK 3 - D schapes sic principle, a g nonconvent  Z,ZK of CMM. They	4 s production application al 5 y will gain
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