Study plan

Name of study plan: 02 098 NSTI ENE 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: 114
Elective courses credits: 5
Sum of credits in the plan: 119
Note on the plan:

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 54
The role of the block: P

Code of the group: 12NS*1P-ENE
Name of the group: 2012 NSTI 1.sem povinné ENE
Requirement credits in the group: In this group you have to gain 29 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 29
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
2153051	**Project I.** ***Pavel Skopec***	Z	5	0P+5C	*	P
2371519	**Means of Automatic Control I.**	Z,ZK	6	3P+0C+2L	*	P
2181136	**Processing Equipments Design**	Z,ZK	6	3P+2C	*	P
2151026	**Energy Sources and Conversions**	Z,ZK	6	3P+2C	*	P

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

2153051	Project I.	Z	5
2371519	Means of Automatic Control I.	Z,ZK	6
Various categories of means for automatic control according to the different criterions. Main features in each category.Air and hydraulic fluid as a medium for information transfer. Symbols and descriptions in pneumatic and hydraulic diagrams. Pneumatic control systems design. Pneumatic actuators, valves, special pneumatic, electropneumatic devices. Control valves, categories, dimensioning, design, applications. Inteligent pneumatics as an integration of pneumatic, electronic and control components and systems. Valve islands and terminals, standard, with industrial buses communication, programmable. Pneumatic positioning systems.			
2181136	Processing Equipments Design	Z,ZK	6
PEs classification, their parameters and criteria of their rating. Ways of PEs design according their purpose and utilization. Materials used for PEs, welding, corrosion mechanisms and anticorrosion prevention. Dimension of shafts, beams, supports, pipes, heat exchangers and pressure vessels. Sealing and packing of fix parts (flanges) and moving parts (rotating shafts etc.). Practical examples of proper and improper designs of apparatuses. Example of heat exchanger design (heat transfer area calculation, its arrangement, head loss calculation, thermal dilatation, strength calculation, low cycle fatigue (thermal dilatation)).			
2151026	Energy Sources and Conversions	Z,ZK	6

Code of the group: 12NS*2P-ENE
Name of the group: 2012 NSTI 2.sem povinné ENE
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 2 courses
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
2153052	**Project II.** ***Pavel Skopec***	Z	5	0P+5C	*	P
2151079	**Thermal Cycles in Power Generation**	Z,ZK	5	3P+1C	*	P

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

2153052	Project II.	Z	5
2151079	Thermal Cycles in Power Generation	Z,ZK	5

The lectures are focused on developing the knowledge required to analyse energy cycles performance (e.g. efficiency, power output, work and heat input) from cycle data. Steam Power (Rankine) Cycle: beginning with a simple cycle and adding more refinements (feedheating, economiser etc.). Application to electrical power generation where the heat source is supplied by: i) fossil fuel and ii) nuclear fuel. Gas Turbine (Brayton) Cycle: simple, then add intercooler, heat exchanger and reheater. The use of gas turbines for gas turbines to electrical power generation. Latest developments with concentrated solar energy as a heat source. Cooling towers. Hybrid systems: CHP, steam turbine with gas turbine. Exergy analysis of the energy cycles.

Code of the group: 12NS*3P-ENE
Name of the group: 2012 NSTI 3.sem povinné ENE
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
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
2153053	**Project III.** *Zdeněk Funda, Ondřej Bartoš, Jakub Maščuch, Michal Kolovratník, Jan Hrdlička, Václav Novotný, Jan Havlík, Václav Dostál, Pavel Skopec, ...* ***Jan Havlík*** *Tomáš Dlouhý (Gar.)*	Z	10	0P+10C	*	P

Characteristics of the courses of this group of Study Plan: Code=12NS*3P-ENE Name=2012 NSTI 3.sem povinné ENE

2153053	Project III.	Z	10

Code of the group: 12NS*4P-ENE
Name of the group: 2012 NSTI 4.sem povinné ENE
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
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
2153998	**Diploma Thesis** ***Michal Kolovratník***	Z	10	0P+10C	*	P

Characteristics of the courses of this group of Study Plan: Code=12NS*4P-ENE Name=2012 NSTI 4.sem povinné ENE

2153998	Diploma Thesis	Z	10

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 60
The role of the block: PV

Code of the group: 12N**3Q--JV
Name of the group: 2012 N 3.sem povinná jazyková výuka
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
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=12N3Q--JV Name=2012 N 3.sem povinná jazyková výuka**

2043081	English - 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. European level A1 - A2.			
2043086	Czech - Preparatory Course	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.			
2043083	French - 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.			
2043082	German - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2043085	Russian - 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.			
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*** *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

Characteristics of the courses of this group of Study Plan: Code=12N3Q--JZ Name=2012 N 3.sem povinná jazyková zkouška**

2041081	English - Master Exam	ZK	1
Mapped to the level of Common European Framework of Reference: A2. 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.			
2041086	Czech- Master Exam	ZK	1

2041083	French - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2041082	German - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2041085	Russian - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2041084	Spanish - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			

Code of the group: 12NS*2Q-ENE
Name of the group: 2012 NSTI 2.sem 4povvol ENE
Requirement credits in the group: In this group you have to gain at least 19 credits (at most 20)
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 19
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
2151094	**Biomass and Renewable Energy Sources** ***Jan Hrdlička***	Z,ZK	5	2P+2C	*	PV
2151095	**Nuclear Energy** *Pavel Zácha* ***Pavel Zácha***	Z,ZK	4	2P+2C	*	PV
2151089	**Industrial power engineering**	Z,ZK	5	2P+1C	*	PV
2151010	**Combustion and Boilers** ***Jan Hrdlička***	Z,ZK	5	3P+1C	*	PV
2151170	**Gaseous Fuids Compression and Delivery**	Z,ZK	5	3P+1C	*	PV
2151157	**Principles of Refrigerating Technology and Heat Pumps**	Z,ZK	5	2P+2C	*	PV
2151144	**Introductory Cryogenics and Vacuum Technology**	Z,ZK	5	3P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12NS*2Q-ENE Name=2012 NSTI 2.sem 4povvol ENE

2151094	Biomass and Renewable Energy Sources	Z,ZK	5
The course comprises from 1/3 of general survey of various renewable energy sources (wind , hydro, solar and geothermal power) and the other 2/3 are dedicated to origin, types properties and energy coversion technologies of biomass.			
2151095	Nuclear Energy	Z,ZK	4
2151089	Industrial power engineering	Z,ZK	5
2151010	Combustion and Boilers	Z,ZK	5
2151170	Gaseous Fuids Compression and Delivery	Z,ZK	5
Theory of compression processes. Constructions, calculation, capacity control of compressors, operation with various gases. Refrigerating compressors. Accessories of a compressor stations and plants. Compressed air technology.Economical and ecological problems of a compressed air production and distribution.			
2151157	Principles of Refrigerating Technology and Heat Pumps	Z,ZK	5
2151144	Introductory Cryogenics and Vacuum Technology	Z,ZK	5

Code of the group: 12NS*3Q-ENE
Name of the group: 2012 NSTI 3.sem 4povvol ENE
Requirement credits in the group: In this group you have to gain at least 16 credits (at most 20)
Requirement courses in the group: In this group you have to complete 4 courses
Credits in the group: 16
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
2151164	**Refrigeration Technique and Heat Pumps**	Z,ZK	4	2P+1C	*	PV
2151006	**Nuclear Reactors and Steam Generators**	Z,ZK	5	3P+1C	*	PV
2151171	**Compressors - selected Parts** ***Michal Kolovratník***	Z,ZK	4	2P+1C	*	PV
2151037	**Steam and Gas Turbines** ***Ondřej Bartoš***	Z,ZK	5	3P+1C	*	PV
2151115	**Design and Economy of Power Facilities** ***Michal Kolovratník***	Z,ZK	5	3P+1C	*	PV

2151153	**Design and Operation of Cooling Equipments**	Z,ZK	5	2P+2C	*	PV
2152022	**Social acpects of power engineering** ***Jakub Maščuch***	KZ	4	2P+1C	*	PV
2151084	**Boiler Design** ***Zdeněk Funda***	Z,ZK	5	3P+1C	*	PV
2151021	**District Heating** ***Zdeněk Funda***	Z,ZK	5	2P+2C	*	PV
2151108	**Thermal Hydraulics of Nuclear Reactors**	Z,ZK	5	2P+2C	*	PV

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

2151164	Refrigeration Technique and Heat Pumps	Z,ZK	4
2151006	Nuclear Reactors and Steam Generators	Z,ZK	5
Problems with achievement of reactor criticality, principles of reactivity control. Fuels, moderators and structural materials for nuclear power reactors. Principal design characteristics of nuclear reactors, reactor kinetics and reactor radiation. Advanced reactors and steam generators.			
2151171	Compressors - selected Parts	Z,ZK	4
Selected parts of the theory, design and operation of positive displacement compressors (include refrigerating compressors). Non-ideal gas compression.			
2151037	Steam and Gas Turbines	Z,ZK	5
Condensing, backpressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage with a short (one-dimensional approach) and long (three-dimensional effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and design of a multi-stage steam and gas turbines. Power control of a steam and gas turbines. Off-design operation conditions of a steam and gas turbines.			
2151115	Design and Economy of Power Facilities	Z,ZK	5
2151153	Design and Operation of Cooling Equipments	Z,ZK	5
2152022	Social acpects of power engineering	KZ	4
2151084	Boiler Design	Z,ZK	5
Basic types of boilers, design variants. Fuel preparation before combustion - grinding and drying of solid fuels, energy balance. Influence of steam parameters and fuel properties on boiler design - influence of calorific value, influence of water, ash, volatile chlorine and nitrogen content. Methodology of new boiler design. Power plant boilers - sub and supercritical, fluidized bed boilers. Recent trends in boiler design - options for boiler efficiency improvement. Materials for boiler construction. Boiler slave equipment - transport lines, fans, precipitators.			
2151021	District Heating	Z,ZK	5
2151108	Thermal Hydraulics of Nuclear Reactors	Z,ZK	5

Code of the group: 12NS*4Q-ENE-238
Name of the group: 2012 NSTI 4.sem 1povvol ENE
Requirement credits in the group: In this group you have to gain at least 2 credits (at most 3)
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**
2383062	**Budget and Project Economic Assessment** *František Freiberg, Miroslav Žilka* ***František Freiberg*** *František Freiberg (Gar.)*	Z	2	1P+2C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12NS*4Q-ENE-238 Name=2012 NSTI 4.sem 1povvol ENE

2383062	Budget and Project Economic Assessment	Z	2
The goal of the course is to improve the knowledge gained within the basic bachelor's degree course Management and Economics of the Enterprise. The course focuses primarily on deepening of basic knowledge and skills in the creation and evaluation of the operational budget, proper preparation and evaluation of costing model for manufactured products and the economic evaluation of an investment project, as it corresponds to contemporary knowledge and the development of management methods and techniques. Students specify a simple fictional industrial or engineering company or its sub-section (preferably inspired by their practical experience, internships or training program in real company). The first student's task is to prepare a detailed plan and budget of a project (e.g. new product development, product or process innovation, etc.) focused on improvement of profitability, competitiveness or effectiveness of the company. The second task is cost calculation for chosen calculation unit. Last task within this course is the evaluation of economical effectiveness of the project described within the first task. The dynamic methods like Net Present Value (NPV), Internal Rate of Return (IRR) or Discounted Payback Period (DPP) are used for this evaluation. The quality of realization and presentation of the task's outputs together with the results of the test decides on granting / denial of credit.			

Code of the group: 12NS*4Q-ENE
Name of the group: 2012 NSTI 4.sem 5povvol ENE
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 4 courses
Credits in the group: 20
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
2152045	**Ecological Waste Treatment** ***Jan Opatřil***	KZ	4	2P+1C	*	PV
2151137	**Environmenatal Aspects of Energy Systems** ***Pavel Skopec***	Z,ZK	4	2P+1C	*	PV
2152029	**Energy Audit** ***Michal Kolovratník***	KZ	4	2P+0C	*	PV
2152064	**Measurement in the Branch**	KZ	4	0P+2L	*	PV
2151059	**Advanced Power Generation Systems** ***Michal Kolovratník***	Z,ZK	4	2P+1C	*	PV
2151082	**Operation of Power Devices** ***Zdeněk Funda***	Z,ZK	4	2P+1C	*	PV
2151080	**Control and Automation Engineering in Power Industry** ***Ondřej Bartoš***	Z,ZK	4	2P+1C	*	PV
2151177	**Thermal Insulation** ***Martin Neužil***	Z,ZK	4	1P+1C	*	PV
2152062	**Turbocompressors and Fans**	KZ	4	2P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12NS*4Q-ENE Name=2012 NSTI 4.sem 5povvol ENE

2152045	Ecological Waste Treatment	KZ	4
2151137	Environmenatal Aspects of Energy Systems	Z,ZK	4
2152029	Energy Audit	KZ	4
2152064	Measurement in the Branch	KZ	4
2151059	Advanced Power Generation Systems	Z,ZK	4
Current state and development of modern power generation technologies. Modern coal power plants. Prediction of the inlet steam parameters (sub-or super-critical). Gas turbines in power generation. Combined steam and gas cycles in electricity and heat production. Modern steam boilers with supercritical steam parameters. Atmospheric fluidized bed combustion of coal. Pressurized combustion and gasification of coal. Modern technologies of coal utilisation. Advanced nuclear power reactors.			
2151082	Operation of Power Devices	Z,ZK	4
2151080	Control and Automation Engineering in Power Industry	Z,ZK	4
Fundamental terms of automatic control system in the power engineering. Means of automation control in the power engineering. Fundamental properties of control loops. Fundaments of the dynamic system theory. Structure of the power unit control system - safety appliance of the unit, automatic control of the power unit production. Dynamics of the steam-boilers, steam turbines and the power system. Stability control systems. The controlling of the performance and supplying of steam-boiler. Control of steam turbines. Control of power units and power systems.			
2151177	Thermal Insulation	Z,ZK	4
2152062	Turbocompressors and Fans	KZ	4

List of courses of this pass:

Code	Name of the course	Completion	Credits
2041081	English - Master Exam	ZK	1
Mapped to the level of Common European Framework of Reference: A2. 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.			
2041082	German - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2041083	French - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2041084	Spanish - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2041085	Russian - Master Exam / FME	ZK	1
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			
2041086	Czech- Master Exam	ZK	1
2043081	English - 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. European level A1 - A2.			
2043082	German - Lower Intermediate Course	Z	2
Mapped to the level of Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which 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 of professional language.			

2043083	French - 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.			
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.			
2043085	Russian - 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.			
2043086	Czech - Preparatory Course	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.			
2151006	Nuclear Reactors and Steam Generators	Z,ZK	5
Problems with achievement of reactor criticality, principles of reactivity control. Fuels, moderators and structural materials for nuclear power reactors. Principal design characteristics of nuclear reactors, reactor kinetics and reactor radiation. Advanced reactors and steam generators.			
2151010	Combustion and Boilers	Z,ZK	5
2151021	District Heating	Z,ZK	5
2151026	Energy Sources and Conversions	Z,ZK	6
2151037	Steam and Gas Turbines	Z,ZK	5
Condensing, backpressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage with a short (one-dimensional approach) and long (three-dimensional effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and design of a multi-stage steam and gas turbines. Power control of a steam and gas turbines. Off-design operation conditions of a steam and gas turbines.			
2151059	Advanced Power Generation Systems	Z,ZK	4
Current state and development of modern power generation technologies. Modern coal power plants. Prediction of the inlet steam parameters (sub-or super-critical). Gas turbines in power generation. Combined steam and gas cycles in electricity and heat production. Modern steam boilers with supercritical steam parameters. Atmospheric fluidized bed combustion of coal. Pressurized combustion and gasification of coal. Modern technologies of coal utilisation. Advanced nuclear power reactors.			
2151079	Thermal Cycles in Power Generation	Z,ZK	5
The lectures are focused on developing the knowledge required to analyse energy cycles performance (e.g. efficiency, power output, work and heat input) from cycle data. Steam Power (Rankine) Cycle: beginning with a simple cycle and adding more refinements (feedheating, economiser etc.). Application to electrical power generation where the heat source is supplied by: i) fossil fuel and ii) nuclear fuel. Gas Turbine (Brayton) Cycle: simple, then add intercooler, heat exchanger and reheater. The use of gas turbines for gas turbines to electrical power generation. Latest developments with concentrated solar energy as a heat source. Cooling towers. Hybrid systems: CHP, steam turbine with gas turbine. Exergy analysis of the energy cycles.			
2151080	Control and Automation Engineering in Power Industry	Z,ZK	4
Fundamental terms of automatic control system in the power engineering. Means of automation control in the power engineering. Fundamental properties of control loops. Fundaments of the dynamic system theory. Structure of the power unit control system - safety appliance of the unit, automatic control of the power unit production. Dynamics of the steam-boilers, steam turbines and the power system. Stability control systems. The controlling of the performance and supplying of steam-boiler. Control of steam turbines. Control of power units and power systems.			
2151082	Operation of Power Devices	Z,ZK	4
2151084	Boiler Design	Z,ZK	5
Basic types of boilers, design variants. Fuel preparation before combustion - grinding and drying of solid fuels, energy balance. Influence of steam parameters and fuel properties on boiler design - influence of calorific value, influence of water, ash, volatile chlorine and nitrogen content. Methodology of new boiler design. Power plant boilers - sub and supercritical, fluidized bed boilers. Recent trends in boiler design - options for boiler efficiency improvement. Materials for boiler construction. Boiler slave equipment - transport lines, fans, precipitators.			
2151089	Industrial power engineering	Z,ZK	5
2151094	Biomass and Renewable Energy Sources	Z,ZK	5
The course comprises from 1/3 of general survey of various renewable energy sources (wind , hydro, solar and geothermal power) and the other 2/3 are dedicated to origin, types properties and energy coversion technologies of biomass.			
2151095	Nuclear Energy	Z,ZK	4
2151108	Thermal Hydraulics of Nuclear Reactors	Z,ZK	5
2151115	Design and Economy of Power Facilities	Z,ZK	5
2151137	Environmenatal Aspects of Energy Systems	Z,ZK	4
2151144	Introductory Cryogenics and Vacuum Technology	Z,ZK	5
2151153	Design and Operation of Cooling Equipments	Z,ZK	5
2151157	Principles of Refrigerating Technology and Heat Pumps	Z,ZK	5
2151164	Refrigeration Technique and Heat Pumps	Z,ZK	4
2151170	Gaseous Fuids Compression and Delivery	Z,ZK	5
Theory of compression processes. Constructions, calculation, capacity control of compressors, operation with various gases. Refrigerating compressors. Accessories of a compressor stations and plants. Compressed air technology.Economical and ecological problems of a compressed air production and distribution.			
2151171	Compressors - selected Parts	Z,ZK	4
Selected parts of the theory, design and operation of positive displacement compressors (include refrigerating compressors). Non-ideal gas compression.			
2151177	Thermal Insulation	Z,ZK	4
2152022	Social acpects of power engineering	KZ	4
2152029	Energy Audit	KZ	4
2152045	Ecological Waste Treatment	KZ	4
2152062	Turbocompressors and Fans	KZ	4
2152064	Measurement in the Branch	KZ	4
2153051	Project I.	Z	5
2153052	Project II.	Z	5
2153053	Project III.	Z	10

2153998	Diploma Thesis	Z	10
2181136	Processing Equipments Design	Z,ZK	6
PEs classification, their parameters and criteria of their rating. Ways of PEs design according their purpose and utilization. Materials used for PEs, welding, corrosion mechanisms and anticorrosion prevention. Dimension of shafts, beams, supports, pipes, heat exchangers and pressure vessels. Sealing and packing of fix parts (flanges) and moving parts (rotating shafts etc.). Practical examples of proper and improper designs of apparatuses. Example of heat exchanger design (heat transfer area calculation, its arrangement, head loss calculation, thermal dilatation, strength calculation, low cycle fatigue (thermal dilatation)).			
2371519	Means of Automatic Control I.	Z,ZK	6
Various categories of means for automatic control according to the different criterions. Main features in each category.Air and hydraulic fluid as a medium for information transfer. Symbols and descriptions in pneumatic and hydraulic diagrams. Pneumatic control systems design. Pneumatic actuators, valves, special pneumatic, electropneumatic devices. Control valves, categories, dimensioning, design, applications. Inteligent pneumatics as an integration of pneumatic, electronic and control components and systems. Valve islands and terminals, standard, with industrial buses communication, programmable. Pneumatic positioning systems.			
2383062	Budget and Project Economic Assessment	Z	2
The goal of the course is to improve the knowledge gained within the basic bachelor's degree course Management and Economics of the Enterprise. The course focuses primarily on deepening of basic knowledge and skills in the creation and evaluation of the operational budget, proper preparation and evaluation of costing model for manufactured products and the economic evaluation of an investment project, as it corresponds to contemporary knowledge and the development of management methods and techniques. Students specify a simple fictional industrial or engineering company or its sub-section (preferably inspired by their practical experience, internships or training program in real company). The first student's task is to prepare a detailed plan and budget of a project (e.g. new product development, product or process innovation, etc.) focused on improvement of profitability, competitiveness or effectiveness of the company. The second task is cost calculation for chosen calculation unit. Last task within this course is the evaluation of economical effectiveness of the project described within the first task. The dynamic methods like Net Present Value (NPV), Internal Rate of Return (IRR) or Discounted Payback Period (DPP) are used for this evaluation. The quality of realization and presentation of the task's outputs together with the results of the test decides on granting / denial of credit.			

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