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: Mechanical Engineering

Type of study: Follow-up master

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	*	Р
2371519	Means of Automatic Control I.	Z,ZK	6	3P+0C+2L	*	Р
2161004	Environmental engineering	Z,ZK	6	3P+2C	*	Р
2181136	Processing Equipments Design	Z,ZK	6	3P+2C	*	Р
2151026	Energy Sources and Conversions	Z,ZK	6	3P+2C	*	Р

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

2103001	Froject i.		5
2371519	Means of Automatic Control I.	Z,ZK	6
Various categories	s of means for automatic control according to the different criterions. Main features in each category.Air and hydraulic fluid as a me	edium for informat	ion transfer.
Symbols and desc	criptions in pneumatic and hydraulic diagrams. Pneumatic control systems design. Pneumatic actuators, valves, special pneumatic,	electropneumatic	devices. Contro
valves, categories	, dimensioning, design, applications. Inteligent pneumatics as an integration of pneumatic, electronic and control components and sy	stems. Valve islan	ds and terminals
standard, with ind	ustrial buses communication, programmable. Pneumatic positioning systems.		
2161004	Environmental engineering	Z,ZK	6
Application of a th	eory in environmental engineering	'	•
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, w	elding, corrosion r	mechanisms and
anticorrosion prev	ention. Dimension of shafts, beams, supports, pipes, heat exchangers and pressure vessels. Sealing and packing of fix parts (flan	iges) and moving	parts (rotating
shafts etc.). Practi	cal examples of proper and improper designs of apparatuses. Example of heat exchanger design (heat transfer area calculation, its a	ırrangement, head	loss calculation
thermal dilatation,	strength calculation, low cycle fatigue (thermal dilatation)).		

Z,ZK

Code of the group: 12NS*2P-ENE

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

Energy Sources and Conversions

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:

2151026

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	*	Р
2151079	Thermal Cycles in Power Generation	Z,ZK	5	3P+1C	*	Р

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. Zden k Funda, Ond ej Bartoš, Jakub Maš uch, Michal Kolovratník, Jan Hrdli ka, Václav Novotný, Jan Havlík, Václav Dostál, Pavel Skopec, Jan Havlík Tomáš Dlouhý (Gar.)	Z	10	0P+10C	*	Р

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
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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

Tioto on the g	ioup.					
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	Z	10	0P+10C	*	Р

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

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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 Ilona Šimice, Michaela Schusová, Veronika Kratochvílová, Eliška Vítková, 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 Michaela Schusová (Gar.)	Z	2	0P+2C	*	PV
2043082	German - Lower Intermediate Course Michaela Schusová, Eliška Vítková, Petr Laurich, Jaroslava Kommová Jaroslava Kommová	Z	2	0P+2C	*	PV
2043085	Russian - Preparatory Course / FME Michaela Schusová, Eliška Vítková, Hana Volejníková, Dušana Jirovská Eliška Vítková	Z	2	0P+2C	*	PV
2043084	Spanish - Preparatory Course / FME Michaela Schusová, Eliška Vítková, Jaime Andrés Villagómez Eliška Vítková	Z	2	0P+2C	*	PV

2043081	English - Preparatory Course / FME	Z	2
•	early 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 sin	nple way about
2043086	Czech - Preparatory Course	Z	2
_	early what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about the gand comprehension of simple texts. Improvement of professional language.	m. Writing in a sin	nple way about
2043083	French - Preparatory Course / FME	Z	2
_	early what is spoken about everyday situations which a student meets at school or in his/her free time and speaking about the gand comprehension of simple texts. Improvement of professional language.	m. Writing in a sin	nple way about
2043082	German - Lower Intermediate Course	Z	2
• • •	Common European Framework of Reference A2 Aim: Understanding clearly spoken language about everyday situations which and speaking about them. Writing in a simple way about familiar topics, reading and comprehesion of simple texts. Improvement		
2043085	Russian - Preparatory Course / FME	Z	2
Aim: Understanding cl	parly 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 sin	nple way about
familiar topics. Reading	g and comprehension of simple texts. Improvement of professional language.		
2043084	Spanish - Preparatory Course / FME	Z	2
Aim: Understanding cl	early 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 sin	nole way about

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:

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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
2041081	English - Master Exam Ilona Šimice, Michaela Schusová, Veronika Kratochvílová, Eliška Vítková, Hana Volejníková, Nina Procházková Ayyub Nina Procházková Ayyub	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, Eliška Vítková, Dušana Jirovská Dušana Jirovská Michaela Schusová (Gar.)	ZK	1	0P+0C	*	PV
2041082	German - Master Exam / FME Michaela Schusová, Eliška Vítková, Petr Laurich, Jaroslava Kommová Jaroslava Kommová	ZK	1	0P+0C	*	PV
2041085	Russian - Master Exam / FME Michaela Schusová, Eliška Vítková, Hana Volejníková, Dušana Jirovská, Petr Zitko Eliška Vítková	ZK	1	0P+0C	*	PV
2041084	Spanish - Master Exam / FME Michaela Schusová, Eliška Vítková, Jaime Andrés Villagómez Eliška Vítková	ZK	1	0P+0C	*	PV

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

2041081	English - Master Exam	ZK	1			
Mapped to the level of 0	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 a	nd speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improveme	nt of professional	language.			
2041082	German - Master Exam / FME	ZK	1			
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	s 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.			
2041085	Russian - Master Exam / FME	ZK	1			
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	s 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.			
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 a	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 Hrdli ka	Z,ZK	5	2P+2C	*	PV
2121041	Pumping Technology	Z,ZK	5	3P+1C	*	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 Hrdli ka	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 compris	ses from 1/3 of general survey of various renewable energy sources (wind , hydro, solar and geothermal power) and th	ne other 2/3 are dedicated to	origin, types				
properties and energy coversion technologies of biomass.							
2121041	Pumping Technology	Z,ZK	5				
The course is cons	idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering.	Students will gain knowledg	e on basic types				
of hydrostatic and h	hydrodynamic pumps, their construction and operational characteristics. Students will also get knowledge on the funda	mentals of operation of pum	ps in hydraulic				
systems and more	complex overview in selecting of type, construction and operation of pumps that are used in hydraulic systems.						
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 compres	sion processes. Constructions, calculation, capacity control of compressors, operation with various gases. Refrigerating	g compressors. Accessories	of a compresso				
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
2121042	Hydrostatic Pumps and Transmission	Z,ZK	4	2P+1C	Z	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 Ond ej 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 Maš uch	KZ	4	2P+1C	*	PV
2151084	Boiler Design Zden k Funda	Z,ZK	5	3P+1C	*	PV
2151021	District Heating Zden k 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 4poyvol ENE

2151164	Refrigeration Technique and Heat Pumps	Z,ZK	4
2121042	Hydrostatic Pumps and Transmission	Z,ZK	4
The course is consi	sidered for the students in the master study programme of Mechanical Engineering-Pumps and machinery facility	ities. Students will gain knowledge o	n basic types of
	, construction and operation characteristics. The course will provide students with comprehensive overwiev in se	9 3.	ation of hydraulic
pumps. Students wi	vill also pass inroduction to the fundamentals of hydrostatic and hydrodynamic transmissions, their characteristic	cs, construction and applications.	
2151006	Nuclear Reactors and Steam Generators	Z,ZK	5
Problems with achie	levement of reactor criticality, principles of reactivity control. Fuels, moderators and structural materials for nucle	ear power reactors. Principal design	characteristics
of nuclear reactors,	s, reactor kinetics and reactor radiation. Advanced reactors and steam generators.		
2151171	Compressors - selected Parts	Z,ZK	4
Selected parts of th	he theory, design and operation of positive displacement compressors (include refrigerating compressors). Non-	i-ideal gas compression.	
0454007			
2151037	Steam and Gas Turbines	Z,ZK	5
	Steam and Gas Turbines pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine sta	1 ,	_
Condensing, backp		age with a short (one-dimensional a	pproach) and
Condensing, backp long (three-dimensi	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine sta	age with a short (one-dimensional a	pproach) and
Condensing, backp long (three-dimensi	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine sta sional effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and de	age with a short (one-dimensional a	pproach) and
Condensing, backp long (three-dimensi control of a steam a 2151115	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine sta sional effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and de and gas turbines. Off-design operation conditions of a steam and gas turbines.	age with a short (one-dimensional a	pproach) and turbines. Power
Condensing, backp long (three-dimensi control of a steam a 2151115 2151153	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage statistical effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and de and gas turbines. Off-design operation conditions of a steam and gas turbines. Design and Economy of Power Facilities	age with a short (one-dimensional a esign of a multi-stage steam and gas	pproach) and turbines. Power
Condensing, backp long (three-dimensi control of a steam a 2151115 2151153 2152022	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage standard effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and defeats and gas turbines. Off-design operation conditions of a steam and gas turbines. Design and Economy of Power Facilities Design and Operation of Cooling Equipments	age with a short (one-dimensional a sesign of a multi-stage steam and gas Z,ZKZ,ZK	pproach) and turbines. Power 5
Condensing, backp long (three-dimensi control of a steam a 2151115 2151153 2152022 2151084	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage is sional effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and defend gas turbines. Off-design operation conditions of a steam and gas turbines. Design and Economy of Power Facilities Design and Operation of Cooling Equipments Social acpects of power engineering	age with a short (one-dimensional a sign of a multi-stage steam and gas Z,ZK Z,ZK KZ	pproach) and turbines. Power 5 5 4 5
Condensing, backp long (three-dimensicontrol of a steam a 2151115 2151153 2152022 2151084 Basic types of boile	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage is sional effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and defend gas turbines. Off-design operation conditions of a steam and gas turbines. Design and Economy of Power Facilities Design and Operation of Cooling Equipments Social acpects of power engineering Boiler Design	age with a short (one-dimensional a sesign of a multi-stage steam and gas Z,ZK Z,ZK KZ Z,ZK KZ LZ,ZK KZ LZ,ZK IJ LZ	pproach) and turbines. Power 5 5 4 5 9 properties on
Condensing, backplong (three-dimensicontrol of a steam at 2151115 2151153 2152022 2151084 Basic types of boile boiler design - influe	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage and effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and defeat and gas turbines. Off-design operation conditions of a steam and gas turbines. Design and Economy of Power Facilities Design and Operation of Cooling Equipments Social acpects of power engineering Boiler Design ers, design variants. Fuel preparation before combustion - grinding and drying of solid fuels, energy balance. Inf	age with a short (one-dimensional a sesign of a multi-stage steam and gas Z,ZK Z,ZK KZ Z,ZK KZ LZ,ZK KZ LZ,ZK Sluence of steam parameters and fue or design. Power plant boilers - sub a	pproach) and turbines. Power 5 5 4 5 el properties on nd supercritical,
Condensing, backplong (three-dimensicontrol of a steam at 2151115 2151153 2152022 2151084 Basic types of boile boiler design - influe	pressure and extraction steam turbines. Basic principals of energy transformations in a turbine stage. Turbine stage and effects) blade. Energy losses, polytropic and isentropic turbine efficiency. Thermodynamic analysis and defeat and gas turbines. Off-design operation conditions of a steam and gas turbines. Design and Economy of Power Facilities Design and Operation of Cooling Equipments Social acpects of power engineering Boiler Design ers, design variants. Fuel preparation before combustion - grinding and drying of solid fuels, energy balance. Infuence of calorific value, influence of water, ash, volatile chlorine and nitrogen content. Methodology of new boile	age with a short (one-dimensional a sesign of a multi-stage steam and gas Z,ZK Z,ZK KZ Z,ZK KZ LZ,ZK KZ LZ,ZK Sluence of steam parameters and fue or design. Power plant boilers - sub a	pproach) and turbines. Power 5 5 4 5 el properties on nd supercritical,

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:

11010 011 1110	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	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

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

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 Opat il	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
2122041	Micro-hydro water turbines	KZ	2	2P+1C	*	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 Zden k Funda	Z,ZK	4	2P+1C	*	PV
2151080	Control and Automation Engineering in Power Industry Ond ej 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
2122022	Special Parts of Pumping Technology	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
2122041	Micro-hydro water turbines	KZ	2

The course is considered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will get knowledge on basic types of water turbines, their operational characteristics, construction and applications. The course will provide students with comprehensive overview in selecting type, construction and operation of micro-hydro water turbines.

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
2122022	Special Parts of Pumping Technology	KZ	4

The course is considered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. The content of the course assumes the knowledge of the previous course dealing with pumping technology. Students will get more detailed knowledge on pumps and pumping technology, in particular in the field of design and operation of the contemporary pumping facilities.

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		71.6	
	Spanish - Master Exam / FME	ZK	1
	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. Improvemer		
2041085	Russian - Master Exam / FME	ZK	1
	Nussian - Master Example Fine I 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. Improvemen		
2041086	Czech- Master Exam	ZK	1
2043081	English - Preparatory Course / FME	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.	-	1
um. Ondorotanam	familiar topics. Reading and comprehension of simple texts. Improvement of professional language. European level A1 - A2		o way abov
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		_
	time and speaking about them. Writing in a simple way about familiar topics. reading and comprehesion of simple texts. Improvemer		
2043083	French - Preparatory Course / FME	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	e way abo
	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.		
2043084	Spanish - Preparatory Course / FME	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	e way abo
	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.		_
2043085	Russian - Preparatory Course / FME	Z	2
im: 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	e way abo
	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.		
2043086	Czech - Preparatory Course	Z	2
im: 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	e way abo
	familiar topics. Reading and comprehension of simple texts. Improvement of professional language.		
2121041	Pumping Technology	Z,ZK	5
	idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will g	-	
or nydrostatic and	hydrodynamic pumps, their construction and operational characteristics. Students will also get knowledge on the fundamentals of operation and more complex everytime and more complex everytime of the construction and operation of pumps that are used in hydrolling everytimes and operation of pumps that are used in hydrolling everytimes and operation of pumps that are used in hydrolling everytimes and operation of pumps that are used in hydrolling everytimes and operation of pumps that are used in hydrolling everytimes and operation of pumps.		ın nyarauı
0404040	systems and more complex overview in selecting of type, construction and operation of pumps that are used in hydraulic systems		1
2121042	Hydrostatic Pumps and Transmission sidered for the students in the master study programme of Mechanical Engineering-Pumps and machinery facilities. Students will gair	Z,ZK	4
	construction and operation characteristics. The course will provide students with comprehensive overwiev in selecting type, construct	ŭ	
	tudents will also pass inroduction to the fundamentals of hydrostatic and hydrodynamic transmissions, their characteristics, construct	•	•
2122022	Special Parts of Pumping Technology	KZ	4
	nsidered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. The conten		
The course is con	isideled for the students in the master study programme or Mechanical Engineering, Dranch of study i ower Engineering. The conten		
knowledge of the r	previous course dealing with numning technology. Students will get more detailed knowledge on numps and numning technology in n		
knowledge of the p	previous course dealing with pumping technology. Students will get more detailed knowledge on pumps and pumping technology, in p and operation of the contemporary pumping facilities.		
	and operation of the contemporary pumping facilities.	articular in the fie	eld of desig
2122041	and operation of the contemporary pumping facilities. Micro-hydro water turbines	earticular in the fie	eld of desig
2122041 The course is cons	and operation of the contemporary pumping facilities.	earticular in the fie	eld of designation 2 n basic typ
2122041 he course is cons	and operation of the contemporary pumping facilities. Micro-hydro water turbines idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will	earticular in the fie	eld of designation 2 n basic typ
2122041 he course is cons	and operation of the contemporary pumping facilities. Micro-hydro water turbines idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will their operational characteristics, construction and applications. The course will provide students with comprehensive overview in selec	earticular in the fie	eld of designation 2 n basic typ
2122041 The course is cons of water turbines,	and operation of the contemporary pumping facilities. Micro-hydro water turbines idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will their operational characteristics, construction and applications. The course will provide students with comprehensive overview in selection of micro-hydro water turbines.	KZ get knowledge or ecting type, constr	2 n basic typ ruction and
2122041 he course is cons of water turbines,	and operation of the contemporary pumping facilities. Micro-hydro water turbines idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will their operational characteristics, construction and applications. The course will provide students with comprehensive overview in selection of micro-hydro water turbines. Nuclear Reactors and Steam Generators	KZ get knowledge or ecting type, constr	2 n basic typ ruction and
2122041 he course is cons of water turbines,	and operation of the contemporary pumping facilities. Micro-hydro water turbines idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will their operational characteristics, construction and applications. The course will provide students with comprehensive overview in selection of micro-hydro water turbines. Nuclear Reactors and Steam Generators ievement of reactor criticality, principles of reactivity control. Fuels, moderators and structural materials for nuclear power reactors. Programme of turbines in the master study programme of turbines in the master study programme of the students with comprehensive overview in selections.	KZ get knowledge or ecting type, constr	2 n basic typ ruction and
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2122041 he course is cons of water turbines, 2151006 Problems with ach 2151010 2151021	and operation of the contemporary pumping facilities. Micro-hydro water turbines idered for the students in the master study programme of Mechanical Engineering, branch of study Power Engineering. Students will their operational characteristics, construction and applications. The course will provide students with comprehensive overview in sele operation of micro-hydro water turbines. Nuclear Reactors and Steam Generators ievement of reactor criticality, principles of reactivity control. Fuels, moderators and structural materials for nuclear power reactors. Profounded reactors, reactor kinetics and reactor radiation. Advanced reactors and steam generators. Combustion and Boilers District Heating	KZ get knowledge or ecting type, constr Z,ZK rincipal design cha	2 n basic typ ruction and 5 aracteristic
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2151089	Industrial power engineering	Z,ZK	5
2151094	Biomass and Renewable Energy Sources	Z,ZK	5
	rises from 1/3 of general survey of various renewable energy sources (wind , hydro, solar and geothermal power) and the other 2/3 a		igin, 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
2151104	Gaseous Fuids Compression and Delivery	Z,ZK	5
	Gaseous Fulus Compression and Delivery sion processes. Constructions, calculation, capacity control of compressors, operation with various gases. Refrigerating compressors		1
Theory of comples	stations and plants. Compressed air technology. Economical and ecological problems of a compressed air production and distril		Compressor
2151171	Compressors - selected Parts	Z,ZK	4
	cted parts of the theory, design and operation of positive displacement compressors (include refrigerating compressors). Non-ideal g		
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
2161004	Environmental engineering	Z,ZK	6
2101004	Application of a theory in environmental engineering		0
2181136	Processing Equipments Design	Z.ZK	6
	their parameters and criteria of their rating. Ways of PEs design according their purpose and utilization. Materials used for PEs, weldi	,	_
	rention. Dimension of shafts, beams, supports, pipes, heat exchangers and pressure vessels. Sealing and packing of fix parts (flange	-	
shafts etc.). Practic	al examples of proper and improper designs of apparatuses. Example of heat exchanger design (heat transfer area calculation, its arrar	igement, head loss	calculation,
	thermal dilatation, strength calculation, low cycle fatigue (thermal dilatation)).		
2371519	Means of Automatic Control I.	Z,ZK	6
-	es of means for automatic control according to the different criterions. Main features in each category. Air and hydraulic fluid as a med		
•	iptions in pneumatic and hydraulic diagrams. Pneumatic control systems design. Pneumatic actuators, valves, special pneumatic, ele	•	
valves, categories,	dimensioning, design, applications. Inteligent pneumatics as an integration of pneumatic, electronic and control components and system	ns. Valve islands an	id terminals,
0000000	standard, with industrial buses communication, programmable. Pneumatic positioning systems.		
2383062		Z	2
•	urse is to improve the knowledge gained within the basic bachelor's degree course Management and Economics of the Enterprise.TI c knowledge and skills in the creation and evaluation of the operational budget, proper preparation and evaluation of costing model fo		
	luation of an investment project, as it corresponds to contemporary knowledge and the development of management methods and te		
	ustrial or engineering company or its sub-section (preferably inspired by their practical experience, internships or training program in re-	· ·	
	a detailed plan and budget of a project (e.g. new product development, product or process innovation, etc.) focused on improvement	,	
	the company. The second task is cost calculation for chosen calculation unit. Last task within this course is the evaluation of economic		•
	the first task. The dynamic methods like Net Present Value (NPV), Internal Rate of Return (IRR) or Discounted Payback Period (DPP		
	The quality of vacination and procentation of the tools a cutoute together with the require of the tool decides an greating / decides	£	

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The quality of realization and presentation of the task's outputs together with the results of the test decides on granting / denial of credit.