Study plan

Name of study plan: 01 093 NSTI TZP 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: 120
Elective courses credits: 0
Sum of credits in the plan: 120
Note on the plan:

Name of the block: Compulsory courses in the program
Minimal number of credits of the block: 102
The role of the block: P

Code of the group: 12NS*1P-TZP
Name of the group: 2012 NSTI 1.sem povinné TZP
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
2163011	**Project 1** ***Pavel Vybíral***	Z	5	0P+5C	*	P
2371519	**Means of Automatic Control I.**	Z,ZK	6	3P+0C+2L	*	P
2161004	**Environmental engineering** ***Jiří Bašta***	Z,ZK	6	3P+2C	*	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-TZP Name=2012 NSTI 1.sem povinné TZP

2163011	Project 1	Z	5
Project, dimensioning and designing solution of basic elements for heating, ventilation and air conditioning plants, devices for air pollution control, air feed and systems with recoverable source of heat.			
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.			
2161004	Environmental engineering	Z,ZK	6
Application of a theory 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, 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-TZP
Name of the group: 2012 NSTI 2.sem povinné TZP
Requirement credits in the group: In this group you have to gain 28 credits
Requirement courses in the group: In this group you have to complete 7 courses
Credits in the group: 28

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
2161083	**Aerodynamics of Ventilation** *Martin Barták* ***Martin Barták*** *Martin Barták (Gar.)*	Z,ZK	4	2P+1C	*	P
2162076	**Alternative Energy Sources**	KZ	3	2P+1C	*	P
2151164	**Refrigeration Technique and Heat Pumps**	Z,ZK	4	2P+1C	*	P
2161112	**Air Pollution Control** *Jiří Hemerka, Pavel Vybíral* ***Jiří Hemerka*** *Jiří Hemerka (Gar.)*	Z,ZK	4	2P+1C	*	P
2163012	**Project II.** ***Vladimír Zmrhal***	Z	5	0P+5C	*	P
2161086	**Ventilation** ***Vladimír Zmrhal***	Z,ZK	4	2P+1C	*	P
2161085	**Heating** ***Jiří Bašta***	Z,ZK	4	2P+1C	*	P

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

2161083	Aerodynamics of Ventilation	Z,ZK	4
Application of fluid mechanics principles in heating, ventilation and air-conditioning. Solution tools for problems concerning air flow indoors or in ducts.			
2162076	Alternative Energy Sources	KZ	3
Principles and basics of alternative energy sources applications. Solar energy. Heat pumps. Biomass utilization.			
2151164	Refrigeration Technique and Heat Pumps	Z,ZK	4
2161112	Air Pollution Control	Z,ZK	4
Fundamentals of the air pollution control with the accent to methods of particulate matter and gaseous pollutants removal and propagation of pollutants in the atmosphere.			
2163012	Project II.	Z	5
Design of heating systems, heat distributors and systems for using recoverable source of energy. Design of ventilation and air conditioning systems, including gas cleaning and reduction of noise.			
2161086	Ventilation	Z,ZK	4
Main knowledge for design, control and evaluation of ventilation and air conditioning systems. Design according to demands for treatment of thermal and humidity state and quality of air in residential and technological rooms.			
2161085	Heating	Z,ZK	4
Knowledge improvement from the field of heating of residential and industrial buildings. Designing of convective and radiant heating systems.			

Code of the group: 12NS*3P-TZP
Name of the group: 2012 NSTI 3.sem povinné TZP
Requirement credits in the group: In this group you have to gain 22 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 22
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
2162070	**Experimental Methods**	KZ	5	1P+4L	*	P
2161079	**Air-Conditioning** *Vladimír Zmrhal* ***Vladimír Zmrhal*** *Vladimír Zmrhal (Gar.)*	Z,ZK	4	2P+1C	*	P
2163013	**Project IV.** *Roman Vavřička, Miloš Lain* ***Vladimír Zmrhal*** *Vladimír Zmrhal (Gar.)*	Z	5	0P+5C	*	P
2161051	**Heat and Moisture Transfer in Environmental Engineering** *Martin Barták* ***Martin Barták*** *Martin Barták (Gar.)*	Z,ZK	4	2P+1C	*	P
2161102	**Radiant and Industrial Heating** *Jiří Bašta, Jindřich Boháč* ***Jiří Bašta*** *Jiří Bašta (Gar.)*	Z,ZK	4	2P+1C	*	P

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

2162070	Experimental Methods	KZ	5
Develop knowledge and facility of measuring method in environmental engineering			
2161079	Air-Conditioning	Z,ZK	4
Extend knowledge for design, control and evaluation of single-zone and multi-zone air conditioning systems.			
2163013	Project IV.	Z	5
Design of heating systems, heat distributors and systems for using recoverable source of energy. Design of ventilation and air conditioning systems, including gas cleaning and reduction of noise.			
2161051	Heat and Moisture Transfer in Environmental Engineering	Z,ZK	4
Application of heat and mass transfer in environmental engineering. Solution tools for tasks concerned with heat and moisture transfer.			
2161102	Radiant and Industrial Heating	Z,ZK	4
Student will be informed about the basics of radiant and other industrial heating systems			

Code of the group: 12NS*4P-TZP
Name of the group: 2012 NSTI 4.sem povinné TZP
Requirement credits in the group: In this group you have to gain 23 credits
Requirement courses in the group: In this group you have to complete 5 courses
Credits in the group: 23
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
2163073	**Hygiene and Physsiology of Work** ***Jiří Bašta***	Z	2	1P+1C	*	P
2161087	**Control of HVAC Systems** *Jiří Bašta, Jindřich Boháč* ***Jiří Bašta*** *Jiří Bašta (Gar.)*	Z,ZK	4	2P+1C	*	P
2161039	**Noise and Vibration Control**	Z,ZK	4	2P+1C	*	P
2162056	**Sanitary Installations** *Roman Vavřička* ***Roman Vavřička*** *Roman Vavřička (Gar.)*	KZ	3	2P+1C	*	P

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

2163073	Hygiene and Physsiology of Work	Z	2
The subject allow student to get knowledge about relations between human being and living (working) environment. It offers basic orientation in problematic of ergonomic load of living respectively working environment.			
2161087	Control of HVAC Systems	Z,ZK	4
Application of basic approaches to automatic control of HVAC systems and equipment. Automatic control sequences of air conditioning and sources of heat.			
2161039	Noise and Vibration Control	Z,ZK	4
Student will be informed about the basic methods of noise control and acoustic dimensions, which are important for evaluation of noise.			
2162056	Sanitary Installations	KZ	3
Fundamentals for solving water-supply, gas and for waste draining by indoor building and by civil amenities building.			

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 18
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** *Eliška Vítková, Ilona Šimice, Michaela Schusová, Veronika Kratochvílová, Hana Volejníková, Nina Procházková Ayyub* ***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** *Eliška Vítková, Michaela Schusová, Petr Laurich, Jaroslava Kommová* ***Jaroslava Kommová***	Z	2	0P+2C	*	PV
2043085	**Russian - Preparatory Course / FME** *Eliška Vítková, Michaela Schusová, Hana Volejníková, Dušana Jirovská* ***Eliška Vítková***	Z	2	0P+2C	*	PV
2043084	**Spanish - Preparatory Course / FME** *Eliška Vítková, 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** *Eliška Vítková, Ilona Šimice, Michaela Schusová, Veronika Kratochvílová, 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** *Eliška Vítková, Michaela Schusová, Dušana Jirovská* ***Dušana Jirovská*** *Michaela Schusová (Gar.)*	ZK	1	0P+0C	*	PV
2041082	**German - Master Exam / FME** *Eliška Vítková, Michaela Schusová, Petr Laurich, Jaroslava Kommová* ***Jaroslava Kommová***	ZK	1	0P+0C	*	PV
2041085	**Russian - Master Exam / FME** *Eliška Vítková, Michaela Schusová, Hana Volejníková, Dušana Jirovská, Petr Zitko* ***Eliška Vítková***	ZK	1	0P+0C	*	PV
2041084	**Spanish - Master Exam / FME** *Eliška Vítková, Michaela Schusová, Jaime Andrés Villagómez* ***Eliška Vítková***	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-TZP
Name of the group: 2012 NSTI 2.sem 1povvol TZP
Requirement credits in the group: In this group you have to gain 3 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 3
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
2162073	**Filtration** ***Jiří Hemerka***	KZ	3	1P+1C	*	PV
E162017	**Introduction to Building Performance Simulation** ***Martin Barták***	KZ	3	1P+1C	*	PV
2162067	**District heating**	KZ	3	1P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12NS*2Q-TZP Name=2012 NSTI 2.sem 1povvol TZP

2162073	Filtration	KZ	3
Theory of particle separation in the fibrous filter layer, classification and use of room air filters and HEPA filters. Industrial fabric filters - performance, filter media, use.			
E162017	Introduction to Building Performance Simulation	KZ	3
Overview and application of software tools in HVAC engineering.			
2162067	District heating	KZ	3
District heating with heat generators in heat-only and combined heat&power mode. Heat generators. Heating nets. Delivery stations.			

Code of the group: 12NS*3Q-TZP
Name of the group: 2012 NSTI 3.sem 2povvol TZP
Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 2 courses
Credits in the group: 6
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
E162016	**Building and HVAC Systems Simulation** ***Martin Barták***	KZ	3	1P+1C	*	PV
2162055	**Particle Separation** ***Jiří Hemerka***	KZ	3	1P+1C	*	PV
2162024	**Industrial Ventilation**	KZ	3	1P+1C	*	PV

Characteristics of the courses of this group of Study Plan: Code=12NS*3Q-TZP Name=2012 NSTI 3.sem 2povvol TZP

E162016	Building and HVAC Systems Simulation	KZ	3
Capita selecta of modeling and simulation in HVAC engineering with focus on air flow in buildings, solar heating technology and control of HVAC systems. This course follows up on E162009.			
2162055	Particle Separation	KZ	3
Fundamentals of the particle separation from flue gases and working knowledge for choice and dimensioning type of the separator.			
2162024	Industrial Ventilation	KZ	3
Design and functional properties of ventilation systems for technological premises. Heat and mass transfer, aerodynamics calculation. Energy demands of systems.			

Code of the group: 12NS*4Q-TZP
Name of the group: 2012 NSTI 4.sem 2povvol TZP
Requirement credits in the group: In this group you have to gain 6 credits
Requirement courses in the group: In this group you have to complete 2 courses
Credits in the group: 6
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
2162102	**Heating Surfaces** ***Jiří Bašta***	KZ	3	1P+1C	*	PV
2162101	**Pneumatic Transport** ***Jiří Hemerka***	KZ	3	1P+1C	*	PV
2162104	**Solar Thermal Engineering**	KZ	3	1P+1C	*	PV
2162103	**Fans**	KZ	3	1P+1C	*	PV

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

2162102	Heating Surfaces	KZ	3
Thermal-technical, geometric and operating characteristic of heating surfaces. Options and dimensioning of heating surfaces with respect to heating system and heated building (space).			
2162101	Pneumatic Transport	KZ	3
Theoretical fundamentals and calculation of the pipe pneumatic transport of granular materials. Working knowledge for choice and dimensioning type of the pneumatic transport.			
2162104	Solar Thermal Engineering	KZ	3
Subject Solar Thermal Engineering is focused on practical designing and evaluation of solar thermal systems, extending the knowledge gained in subjects on alternative energy sources			

2162103	Fans	KZ	3

Types of fans, Eulers equations for fans, criteria numbers of fans. Optimal parametrs of fans, pressure loss, effciency of fans. Centrifugal flow fans, aerodynamics of fans, fan performance curve. Cross flow fan. Axial flow fans.Diffuser of axial fans.Control of fans. Fans in practices.

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.		
2151026	Energy Sources and Conversions	Z,ZK	6
2151164	Refrigeration Technique and Heat Pumps	Z,ZK	4
2161004	Environmental engineering	Z,ZK	6
	Application of a theory in environmental engineering		
2161039	Noise and Vibration Control	Z,ZK	4
	Student will be informed about the basic methods of noise control and acoustic dimensions, which are important for evaluation of noise.		
2161051	Heat and Moisture Transfer in Environmental Engineering	Z,ZK	4
	Application of heat and mass transfer in environmental engineering. Solution tools for tasks concerned with heat and moisture transfer.		
2161079	Air-Conditioning	Z,ZK	4
	Extend knowledge for design, control and evaluation of single-zone and multi-zone air conditioning systems.		
2161083	Aerodynamics of Ventilation	Z,ZK	4
	Application of fluid mechanics principles in heating, ventilation and air-conditioning. Solution tools for problems concerning air flow indoors or in ducts.		
2161085	Heating	Z,ZK	4
	Knowledge improvement from the field of heating of residential and industrial buildings. Designing of convective and radiant heating systems.		
2161086	Ventilation	Z,ZK	4
	Main knowledge for design, control and evaluation of ventilation and air conditioning systems. Design according to demands for treatment of thermal and humidity state and quality of air in residential and technological rooms.		
2161087	Control of HVAC Systems	Z,ZK	4
	Application of basic approaches to automatic control of HVAC systems and equipment. Automatic control sequences of air conditioning and sources of heat.		
2161102	Radiant and Industrial Heating	Z,ZK	4
	Student will be informed about the basics of radiant and other industrial heating systems		
2161112	Air Pollution Control	Z,ZK	4
	Fundamentals of the air pollution control with the accent to methods of particulate matter and gaseous pollutants removal and propagation of pollutants in the atmosphere.		

2162024	Industrial Ventilation	KZ	3
Design and functional properties of ventilation systems for technological premises. Heat and mass transfer, aerodynamics calculation. Energy demands of systems.			
2162055	Particle Separation	KZ	3
Fundamentals of the particle separation from flue gases and working knowledge for choice and dimensioning type of the separator.			
2162056	Sanitary Installations	KZ	3
Fundamentals for solving water-supply, gas and for waste draining by indoor building and by civil amenities building.			
2162067	District heating	KZ	3
District heating with heat generators in heat-only and combined heat&power mode. Heat generators. Heating nets. Delivery stations.			
2162070	Experimental Methods	KZ	5
Develop knowledge and facility of measuring method in environmental engineering			
2162073	Filtration	KZ	3
Theory of particle separation in the fibrous filter layer, classification and use of room air filters and HEPA filters. Industrial fabric filters - performance, filter media, use.			
2162076	Alternative Energy Sources	KZ	3
Principles and basics of alternative energy sources applications. Solar energy. Heat pumps. Biomass utilization.			
2162101	Pneumatic Transport	KZ	3
Theoretical fundamentals and calculation of the pipe pneumatic transport of granular materials. Working knowledge for choice and dimensioning type of the pneumatic transport.			
2162102	Heating Surfaces	KZ	3
Thermal-technical, geometric and operating characteristic of heating surfaces. Options and dimensioning of heating surfaces with respect to heating system and heated building (space).			
2162103	Fans	KZ	3
Types of fans, Eulers equations for fans, criteria numbers of fans. Optimal parametrs of fans, pressure loss, effciency of fans. Centrifugal flow fans, aerodynamics of fans, fan performance curve. Cross flow fan. Axial flow fans.Diffuser of axial fans.Control of fans. Fans in practices.			
2162104	Solar Thermal Engineering	KZ	3
Subject Solar Thermal Engineering is focused on practical designing and evaluation of solar thermal systems, extending the knowledge gained in subjects on alternative energy sources			
2163011	Project 1	Z	5
Project, dimensioning and designing solution of basic elements for heating, ventilation and air conditioning plants, devices for air pollution control, air feed and systems with recoverable source of heat.			
2163012	Project II.	Z	5
Design of heating systems, heat distributors and systems for using recoverable source of energy. Design of ventilation and air conditioning systems, including gas cleaning and reduction of noise.			
2163013	Project IV.	Z	5
Design of heating systems, heat distributors and systems for using recoverable source of energy. Design of ventilation and air conditioning systems, including gas cleaning and reduction of noise.			
2163073	Hygiene and Physsiology of Work	Z	2
The subject allow student to get knowledge about relations between human being and living (working) environment. It offers basic orientation in problematic of ergonomic load of living respectively working environment.			
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.			
E162016	Building and HVAC Systems Simulation	KZ	3
Capita selecta of modeling and simulation in HVAC engineering with focus on air flow in buildings, solar heating technology and control of HVAC systems. This course follows up on E162009.			
E162017	Introduction to Building Performance Simulation	KZ	3
Overview and application of software tools in HVAC engineering.			

For updated information see http://bilakniha.cvut.cz/en/FF.html
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