Study plan

Name of study plan: Inteligentní budovy - platný od roku 2020

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 full-time

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: 88

The role of the block: P

Code of the group: 2020_MIBBME

Name of the group: Safety of the master's studies

Requirement credits in the group:

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

Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BEZM	Safety in Electrical Engineering for a master's degree Vladimír K la, Radek Havlí ek, Ivana Nová, Josef ernohous, Pavel Mlejnek Radek Havlí ek Vladimír K la (Gar.)	Z	0	2BP+2BC	Z	Р

Characteristics of the courses of this group of Study Plan: Code=2020_MIBBME Name=Safety of the master's studies

BEZM	Safety in Electrical Engineering for a master's degree	Z	0
The course provides for	students of all programs periodic training guidelines for health and occupational safety and gives knowledge of electrical haz	zard of given bran	ch of study.
Students receive indian	possible qualification according to the current Directive of the Dean		

Code of the group: 2020_MIBDIP Name of the group: Diploma Thesis

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

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

Credits in the group: 26 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
ADIP26	Diploma Thesis	Z	26	36s	L	Р

Characteristics of the courses of this group of Study Plan: Code=2020_MIBDIP Name=Diploma Thesis

ADIP26	Diploma Thesis	Z	26
Independent final comp	rehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his c	or her branch of s	tudy, which will
he specified by branch	department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehen	sive final examin	ation

Code of the group: 2020_MIBP

Name of the group: Compulsory subjects of the programm

Requirement credits in the group: In this group you have to gain 50 credits

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

Credits in the group: 50 Note on the group:

124OSIB

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
124OSIB	Acoustics and Lighting Jaroslav Vychytil, Lenka Maierová Jaroslav Vychytil Jaroslav Vychytil (Gar.)	KZ	4	2P	Z	Р
125ESB	Buildings Ecology Systems Stanislav Frolík Stanislav Frolík (Gar.)	KZ	4	2P	L	Р
125EABU	Energy Audit of Building Karel Kabele, Miroslav Urban, Michal Kabrhel Karel Kabele Karel Kabele (Gar.)	KZ	4	2P+1C	L	Р
124KPKP	Building Structures Ctislav Fiala Ctislav Fiala (Gar.)	ZK	4	3P	Z	Р
2161108	Transport Phenomena Martin Barták Martin Barták Martin Barták (Gar.)	Z,ZK	4	2P+1C	*	Р
2161109	Automatic control in environmental engineering of building Ji í Bašta, Jind ich Bohá Ji í Bašta Ji í Bašta (Gar.)	Z,ZK	4	2P+1C	*	Р
A5M14RPI	Distribution of Electric Energy and Drives Ji í Lettl, Pavel Mindl, Jan Bauer Ji í Lettl Ji í Lettl (Gar.)	Z,ZK	5	2P+1L	Z	Р
2161102	Radiant and Industrial Heating Ji í Bašta, Roman Vav i ka Ji í Bašta Ji í Bašta (Gar.)	Z,ZK	4	2P+1C	*	Р
A5M38SZS	Sensors and Networks Pavel Ripka, Antonín Platil Antonín Platil Pavel Ripka (Gar.)	Z,ZK	4	2P+1L	L	Р
124ST1	Thermal Engineering in Construction Jan Tywoniak Jan Tywoniak Jan Tywoniak (Gar.)	ZK	5	2P	Z	Р
B5M99SCT	Technology for Smart Cities Lukáš Ferkl Lukáš Ferkl Lukáš Ferkl (Gar.)	Z,ZK	4	2P+1C	Z	Р
2161567	Ventilation and Air Conditioning Vladimír Zmrhal, Petr Zelenský Vladimír Zmrhal Vladimír Zmrhal (Gar.)	Z,ZK	4	2P+1C	2	Р

Characteristics of the courses of this group of Study Plan: Code=2020 MIBP Name=Compulsory subjects of the programm

ΚZ

4

4

Z,ZK

The course introduces students to the basics of building lighting technology and building acoustics and deepens further knowledge 125ESB ΚZ **Buildings Ecology Systems** 4 Principles of environmentally friendly water management. Disposal of sewage water and use of rain water. Measurement of water consumption, system design, pumping devices, water saving and special installations 125EABU ΚZ **Energy Audit of Building** Advanced course for introduction into energy auditing. Lectures topics: Energy audit and energy performance of buildings, legislation. EPDB - energy performance directive for buildings. Methodology of calculating energy performance of buildings. Energy audit - procedure and parts. Sankey energy flow diagram. Analysis of initial condition, description of initial condition object survey and survey of project documentation. Determining source efficiency, distribution and emission of heat. Steps towards reduction of energy consumption - building, heating, lighting, ventilating systems, technologies. Application of measures on a specific object. Synergic impact of energy saving measures. Economical evaluation, evaluation from the aspect of environment protection. Evaluation - emission Individual object survey. Energy audit of industrial objects. Methods of buildings evaluation. Seminar is focused on the realistic buildings resulting to presenting case study report about energy audit of existing building. **Building Structures** Basics of building structures. Functional requirements, structural systems, spatial effect of the structural system. Vertical load-bearing structures, floor structures, overhanging structures. Envelopes of buildings, windows, partitions, floors, suspended ceilings, Stairs, roof construction timber roof trusses, roof envelopes, Foundation structures, structural solution of the substructure, waterproofing of the substructure. Structural systems of single and multi-storey buildings, structural systems of long-span structures 2161108 Z,ZK Transport Phenomena 4 Basics of transport phenomena for the study programme Intelligent Buildings. Momentum, heat and mass transport in built environment. 2161109 Automatic control in environmental engineering of building Z,ZK 4 Application of basic approaches to automatic control of HVAC systems and equipments. Automatic control sequences of air conditioning and sources of heat. A5M14RPI Distribution of Electric Energy and Drives Z,ZK 5 2161102 Radiant and Industrial Heating Z,ZK Student will be informed about the basics of radiant and other industrial heating systems A5M38SZS Z,ZK Sensors and Networks 4 Applications of sensors in buildings ZK 124ST1 5 Thermal Engineering in Construction The subject discusses the basic chapters of building physics - part hygrothermal performance of buildings in an overview manner with the aim of providing basic information to students coming from non-construction bachelor's fields and at the same time supplementing knowledge and linking it with contexts for students coming from civil engineering

Code of the group: 2020_MIBPRO1

Technology for Smart Cities

Ventilation and Air Conditioning

Acoustics and Lighting

Name of the group: Project 1

air in residential and technological rooms.

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 1 course

Credits in the group: 6

B5M99SCT

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

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
2163033	Design IB I. Martin Barták, Ji í Bašta, Jind ich Bohá , Roman Vav i ka, Vladimír Zmrhal, Petr Zelenský, Ji í Hemerka, Miroslav Ku era, Miloš Lain, Ji í Bašta Ji í Bašta (Gar.)	Z	6	0P+4C	*	Р
125PIB1	Project 1 Stanislav Frolík, Karel Kabele, Miroslav Urban, Michal Kabrhel, Zuzana Veverková, Ilona Koubková, Bohumír Garlík, Daniel Adamovský, Pavla Hofbauer Pechová, Stanislav Frolík Michal Kabrhel (Gar.)	Z	6	4C	L	Р
A5M99PR1	Project 1 Petr Kašpar Petr Kašpar (Gar.)	Z	6	0P+4C	L	Р

2163033	Design IB I.	Z	6
Design of heating:	ystems, heat distributors and systems for using recoverable source of energy. Design of ventilation and air conditioning systems, inc	cluding gas cleani	ng and reduction
of noise.			
125PIB1	Project 1	Z	6
Project 1 is the sul	ject of the interfaculty course Intelligent Buildings. Its content is focused on the issue of intelligent buildings in order to link the known	, wledge from the B	achelor's degree
to other disciplines	. In the project, the student demonstrates the ability to independently develop a project in the field of intelligent buildings using a t	horough analysis	of the current
	a the literature		
state of the art from	i the literature.		
state of the art from A5M99PR1	Project 1	Z	6
A5M99PR1		Z ssignment of the	1

Code of the group: 2020_MIBPRO2

Name of the group: Project 2

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 1 course

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
2163034	Project IB II. Ji í Bašta Ji í Bašta (Gar.)	Z	6	0P+4C	*	Р
125PIB2	Project 2 Michal Kabrhel Michal Kabrhel (Gar.)	Z	6	4C	Z	Р
A5M99PR2	Project 2 Petr Kašpar Petr Kašpar (Gar.)	Z	6	0P+4C	Z	Р

Characteristics of the courses of this group of Study Plan: Code=2020_MIBPRO2 Name=Project 2

Onal actoristics of	the courses of this group of olday Flam: code=2020_imbi Roz Name=1 roject 2						
2163034	Project IB II.	Z	6				
Project and experiment	al solution of environmental devices. Optimization investment and operating costs, economic appraisal of ecologic investmen	t.					
125PIB2 Project 2 Z 6							
Project 2 is the subject	of the interfaculty discipline Intelligent Buildings. In the project, the student demonstrates the ability to independently develop	a more advance	d project in the				
field of intelligent buildir	ngs.						
A5M99PR2	Project 2	Z	6				
The topic of the thesis i	s chosen by the student and selected from the list of topics. Project 2 mostly follows the topic of "Project 1" with a higher diffic	ulty. The assignm	ent of the project				
is subject to the approv	subject to the approval of the faculty guarantor or tutor. The work will be publicly presented.						

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 32

The role of the block: PV

Code of the group: 2020_MIBPV

Name of the group: Compulsory optionally subjects

Requirement credits in the group: In this group you have to gain at least 32 credits (at most 92)

Requirement courses in the group: In this group you have to complete at least 8 courses (at most 23)

Credits in the group: 32

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
2162035	Alternative Energy Sources Tomáš Matuška Tomáš Matuška (Gar.)	KZ	4	2P+1C	*	PV
2151154	Refrigertion and heat pumps	KZ	4	3P+1C		PV
A5M16EUE	Economics of Energy Use	KZ	4	3P+1C	Z	PV
	Ji í Beranovský, Július Bemš Ji í Beranovský Július Bemš (Gar.) Electrical Light 1		1			51/
A5M15ES1	Petr Žák, Petr Žák Petr Žák Petr Žák (Gar.)	KZ	4	2P+1S	Z	PV
A5M34EZS	Electronic security systems Miroslav Husák, Jan Novák, Tomáš Teplý, Václav Prajzler Václav Prajzler (Gar.)	KZ	4	3P+1L	Z	PV
A5M34ELE	Electronics Alexandr Laposa, Adam Bou a Alexandr Laposa Alexandr Laposa (Gar.)	KZ	4	3P+1L	L	PV
125EIBB	Electroengineering and intelligent buildings Hana Kabrhelová, Bohumír Garlík Bohumír Garlík Bohumír Garlík (Gar.)	KZ	4	2P	Z	PV
2162700	Experimental Methods 1 Miroslav Ku era Miroslav Ku era (Gar.)	KZ	4	0P+4L	*	PV
A5M16FIP	Corporate finance Old ich Starý, Ji í Vaší ek, Blanka Ku erková Ji í Vaší ek Old ich Starý (Gar.)	KZ	4	3P+1C	L	PV
A5M13FVS	Photovoltaic Systems Pavel Hrzina, Ladislava erná, Vít zslav Benda Ladislava erná Pavel Hrzina (Gar.)	KZ	4	2P+2L	L	PV
124INBB	Integrated Design of Buildings Jan R ži ka, Tereza Pavl , Martin Volf, Petr Hájek, Antonín Lupíšek Petr Hájek Petr Hájek (Gar.)	Z,ZK	4	2P+1C	Z	PV
A5M38MEB	Measurements in the Buildings Petr Kašpar Petr Kašpar Petr Kašpar (Gar.)	KZ	4	2P+1L	Z	PV
125MEC	Simulation of Building Energy Performance Karel Kabele, Miroslav Urban Karel Kabele Karel Kabele (Gar.)	KZ	4	1P+1C	Z	PV
A5M13NZZ	Independent sources Pavel Hrzina, Václav Papež Pavel Hrzina Pavel Hrzina (Gar.)	KZ	4	3P+1L	Z	PV
125OZEB	Renewable Energy Sources Michal Kabrhel Michal Kabrhel Michal Kabrhel (Gar.)	ZK	4	2P	Z	PV
125PBZB	Fire Services Ilona Koubková, Bohumír Garlík, Daniel Adamovský, Pavla Hofbauer Pechová Ilona Koubková Ilona Koubková (Gar.)	KZ	4	2P	L	PV
2162019	Industrial Heating, Ventilation, Airconditioning Vladimír Zmrhal, Miloš Lain Vladimír Zmrhal Vladimír Zmrhal (Gar.)	KZ	4	2P+1C	2	PV
A5M38SBD	Collection and Data Transfer Pavel Mlejnek Pavel Mlejnek (Gar.)	KZ	4	2P+1L	L	PV
2162064	Noise and Vibration Control Miroslav Ku era, Richard Nový Miroslav Ku era Miroslav Ku era (Gar.)	KZ	4	2P+1C	*	PV
125SYB	Building Systems Karel Kabele, Jan Tywoniak Karel Kabele Karel Kabele (Gar.)	ZK	4	4P	Z	PV
125TECE	Technological Units Hana Kabrhelová, Ilona Koubková Ilona Koubková (Gar.)	KZ	4	2P	Z	PV
2162113	Heating Jií Bašta, Jind ich Bohá , Roman Vav i ka Jií Bašta Jií Bašta (Gar.)	KZ	4	2P+2C	1	PV
2162066	Heat Supply Tomáš Matuška Tomáš Matuška (Gar.)	KZ	4	2P+1C	3	PV
Characteristics of	of the courses of this group of Study Plan: Code=2020_MIBPV Nam	ne=Compulso	rv optior	nallv sub	iects	
2162035	Alternative Energy Sources	-	, , , , , ,	ĺ	KZ	4
Principles and basics 2151154	of alternative energy sources use in buildings. Solar energy. Heat pumps. Biomass utilization Refrigertion and heat pumps	n.			KZ	4
	duction to the refrigeration technology and the heat pumps with the following thematic areas: Fu	undamentals of the	ermodynamie	l cs. Classific		•
	rm, basic processes. Converting of units parameters to other working conditions. Improvemen	•	•			
-	gerants: classification, nomenclature, legislation. Sorption cycles: classification, thermodynami ocesses. Heat pumps: heating and hot tap water. Heat sources for HP	c rundaments of m	uiticompone	nt systems,	absorption cyc	ies LiBr-H
45M16EUE	Economics of Energy Use				KZ	4
Organization and ene	rgy management of company, buildings or energy systems. Energy need and consumption,				of aggregate, s	econdary
	gy audit and feasibility study, optimization of energy management of energy systems. Prices	and tariffs, econo	my and fina	ncial analys		
A5M15ES1	Electrical Light 1				KZ	4
A5M34EZS A5M34ELE	Electronics security systems Electronics			-	KZ KZ	4
125EIBB	Electronics Electronics Electronics			-	KZ KZ	4
	ty, intelligent systems, new technologies significantly influence various HVAC system applications.	ations. The fundam	nental idea is	l s to save en		-
optimal indoor and out	tdoor environmental parameters. The influence of electromagnetic environment, electromagnetic environment, electromagnetic environment, electromagnetic environment, electromagnetic environment electromagnetic electromagnetic environment electromagnetic electromagnetic electromagnetic electromagnetic environment electromagnetic elec					
	solve the whole complex of HVAC and intelligent wiring.					
2162700	Experimental Methods 1				KZ	4

Introduction study of experimental technique in environmental engineering

A5M16FIP Corporate finance Principles of finance, present value and alternative cost of capital, financial calculus, long-term finance, valuation of bonds and stocks, investment decision and net present value, IRR, comparison time period, annual equivalent value, inflation and return, capital asset pricing model, portfolio, sensitivity analysis and risk, short term finance, cash flow management. Dividend policy. A5M13FVS Photovoltaic Systems Solar energy and its exploitation using photovoltaic systems. Photovoltaic phenomena, solar cells and their characteristics, solar modules (construction, technology, parameters). Photovoltaic systems (including energy conservation). Photovoltaic system applications, optimisation of operating conditions. Basic economical and ecological aspects, present trends **124INBB** Integrated Design of Buildings The main objective of the subject Integrated Building Design is to get an complex overview of the principles of integrated buildings design, life cycle assessment of buildings, evaluation of building performance, green/sustainable certification systems and understand environmental, social and economic aspects of the built environment. A5M38MEB Measurements in the Buildings The students will learn about principles of measurement of basic physical quantities in the building. As the majority of the physical quantities are converted to the electrical signals, an overview of measurement of the electrical quantities is also presented. The subject is not intended for students who have already studied the subjects Electrical measurement and Sensors and transducers on CTU FEE. **125MEC** Simulation of Building Energy Performance ΚZ The course is aimed at explaining the issues of modelling and simulation of energy behaviour of buildings. Students will be introduced to an overview of tools and methodologies for solving these problems and learn how to use the simulation software DesignBuilder. In addition, they will be introduced to climate data, materials, construction and other factors affecting building behaviour. The aim of the course is to provide students with basic knowledge and practical experience in modelling and simulating building energy behaviour. A5M13NZZ Independent sources ΚZ Electrochemical sources of the electric power - overview. Electrochemical sources (accumulators), applications. Uninteruptible power sources in IB. Other sources of the electrical energy. Perspective sources of electrical enegy, storage of energy. Renewable Energy Sources The course deals with renewable energy sources and building energy systems. The different types of energy-solar, wind, biomass, geothermal and hydro-are discussed in detail. The characteristics of the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design facilities and systems that use renewable energy sources. 125PBZB ΚZ Fire water, hydrant systems, fire pipe, fire station. Fixed fire-fighting water with water mist, foam, and halon. Special fire-fighting equipment. Protecting buildings against fire spread from technological equipment. Electric fire alarm. Fire control equipment. Backup power source. 2162019 Industrial Heating, Ventilation, Airconditioning ΚZ 4 Design and functional properties of ventilation systems for technological premises. Heat and mass transfer, aerodynamics calculation. Energy demands of systems. A5M38SBD Collection and Data Transfer ΚZ 4 2162064 Noise and Vibration Control ΚZ 4 Student will be informed about the basic acoustic dimensions, which are important for evaluation of noise. 125SYB **Building Systems** ZK Multi-criteria analysis of the requirements for the indoor environment and the function of the systems in different types of buildings and plants and optimization criteria for the design of energy and ecological building systems. Relationships between building technical equipment and the building. Integrated view of conceptual solutions in different building types in terms of indoor systems and building design. E.g. office buildings, residential buildings, halls, shopping centres, cultural centres, industrial buildings, sports buildings, family houses, passive etc. The audience will be introduced to the requirements for the indoor environment, the characteristic elements of energy and environmental building systems in relation to the structural design for the building type. 125TECE Technological Units ΚZ 4 Saunas, fireplaces, kitchen technology, elevators, heat pumps, technology, swimming pools, heat source and technological systems. 2162113 ΚZ 4 Heating Knowledge improvement from the field of heating of residential and industrial buildings. Designing of convective and radiant heating systems. ΚZ 4 2162066 District heating with heat generators in heat-only and combined heat&:power mode. Heat generators. Heating networks. Renewable energy sources in district heating

Name of the block: Elective courses Minimal number of credits of the block: 0

The role of the block: V

Code of the group: 2020_MIBVOLPRE Name of the group: Elective subjects Requirement credits in the group: Requirement courses in the group:

Credits in the group: 0

Note on the group:

~Nabídku volitelných předmětů uspořádaných podle kateder najdete na webových stránkách http://www.fel.cvut.cz/cz/education/volitelne-predmety.html\\

List of courses of this pass:

	Name of the course	Completion	Credits
124INBB	Integrated Design of Buildings	Z,ZK	4
The main objective	of the subject Integrated Building Design is to get an complex overview of the principles of integrated buildings design, life cycle asset	ssment of buildings	s, evaluatio
of	building performance, green/sustainable certification systems and understand environmental, social and economic aspects of the buil	t environment.	
124KPKP	Building Structures	ZK	4
-	structures. Functional requirements, structural systems, spatial effect of the structural system. Vertical load-bearing structures, floor structures.		_
	dings, windows, partitions, floors, suspended ceilings. Stairs, roof construction timber roof trusses, roof envelopes. Foundation structu		ution of the
	substructure, waterproofing of the substructure. Structural systems of single and multi-storey buildings, structural systems of long-spa		
124OSIB	Acoustics and Lighting	KZ	4
	The course introduces students to the basics of building lighting technology and building acoustics and deepens further knowled		
124ST1	Thermal Engineering in Construction	ZK	5
-	ses the basic chapters of building physics - part hygrothermal performance of buildings in an overview manner with the aim of providing	-	
	om non-construction bachelor's fields and at the same time supplementing knowledge and linking it with contexts for students coming		
125EABU	Energy Audit of Building	KZ	4
	or introduction into energy auditing. Lectures topics: Energy audit and energy performance of buildings, legislation. EPDB - energy perfo Iculating energy performance of buildings. Energy audit - procedure and parts. Sankey energy flow diagram. Analysis of initial condition		_
	survey of project documentation. Determining source efficiency, distribution and emission of heat. Steps towards reduction of energy or		
	survey of project documentation. Determining source emolericy, distribution and emission of near. Steps towards reduction of energy colors, technologies. Application of measures on a specific object. Synergic impact of energy saving measures. Economical evaluati	•	•
	stection. Evaluation - emission Individual object survey. Energy audit of industrial objects. Methods of buildings evaluation. Seminar is for		-
	resulting to presenting case study report about energy audit of existing building.		
125EIBB	Electroengineering and intelligent buildings	KZ	4
-	ociety, intelligent systems, new technologies significantly influence various HVAC system applications. The fundamental idea is to save		and ensu
	outdoor environmental parameters. The influence of electromagnetic environment, electromagnetic compatibility, application of intellige		
	a system approach to solve the whole complex of HVAC and intelligent wiring.		
125ESB	Buildings Ecology Systems	KZ	4
Principles of enviro	onmentally friendly water management. Disposal of sewage water and use of rain water. Measurement of water consumption, system d	esign, pumping de	vices, wat
	saving and special installations.		
125MEC	Simulation of Building Energy Performance	KZ	4
The course is aim	ned at explaining the issues of modelling and simulation of energy behaviour of buildings. Students will be introduced to an overview of	f tools and method	dologies fo
olving these probl	lems and learn how to use the simulation software DesignBuilder. In addition, they will be introduced to climate data, materials, construc	ction and other factor	ors affectir
building be	chaviour. The aim of the course is to provide students with basic knowledge and practical experience in modelling and simulating build	ling energy behavi	our.
125OZEB	Renewable Energy Sources	ZK	4
The course deals	with responsible energy courses and building energy systems. The different types of energy color wind, biomess, goothermal and budgets		
	with renewable energy sources and building energy systems. The different types of energy-solar, wind, biomass, geothermal and hydi	ro-are discussed ir	detail. Th
characteristics of	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design fa		
	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design fa renewable energy sources.	cilities and system	
125PBZB	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design fa renewable energy sources. Fire Services	cilities and system	s that use
125PBZB	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design fa renewable energy sources. Fire Services t systems, fire pipe, fire station. Fixed fire-fighting water with water mist, foam, and halon. Special fire-fighting equipment. Protecting build	cilities and system	s that use
125PBZB Fire water,hydrant	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design fa renewable energy sources. Fire Services t systems, fire pipe, fire station. Fixed fire-fighting water with water mist, foam, and halon. Special fire-fighting equipment. Protecting built technological equipment. Electric fire alarm. Fire control equipment. Backup power source.	cilities and system KZ dings against fire s	s that use 4 spread fron
125PBZB Fire water,hydrant 125PIB1	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design fa renewable energy sources. Fire Services t systems, fire pipe, fire station. Fixed fire-fighting water with water mist, foam, and halon. Special fire-fighting equipment. Protecting built technological equipment. Electric fire alarm. Fire control equipment. Backup power source. Project 1	cilities and system KZ dings against fire s	s that use 4 spread from
125PBZB Fire water,hydrant 125PIB1 Project 1 is the sub	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design fa renewable energy sources. Fire Services t systems, fire pipe, fire station. Fixed fire-fighting water with water mist, foam, and halon. Special fire-fighting equipment. Protecting built technological equipment. Electric fire alarm. Fire control equipment. Backup power source. Project 1 piect of the interfaculty course Intelligent Buildings. Its content is focused on the issue of intelligent buildings in order to link the knowled	KZ dings against fire s Z ge from the Bache	s that use 4 spread fror 6 slor's degree
125PBZB Fire water,hydrant 125PIB1 Project 1 is the sub	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design farenewable energy sources. Fire Services It systems, fire pipe, fire station. Fixed fire-fighting water with water mist, foam, and halon. Special fire-fighting equipment. Protecting build technological equipment. Electric fire alarm. Fire control equipment. Backup power source. Project 1 Diject of the interfaculty course Intelligent Buildings. Its content is focused on the issue of intelligent buildings in order to link the knowledges. In the project, the student demonstrates the ability to independently develop a project in the field of intelligent buildings using a tho	KZ dings against fire s Z ge from the Bache	s that use 4 spread fror 6 slor's degree
125PBZB Fire water,hydrant 125PIB1 Project 1 is the sub to other discipline	f the energies and the most appropriate methods of use are described. Attention is paid to understanding the correct way to design farenewable energy sources. Fire Services It systems, fire pipe, fire station. Fixed fire-fighting water with water mist, foam, and halon. Special fire-fighting equipment. Protecting build technological equipment. Electric fire alarm. Fire control equipment. Backup power source. Project 1 Diject of the interfaculty course Intelligent Buildings. Its content is focused on the issue of intelligent buildings in order to link the knowledges. In the project, the student demonstrates the ability to independently develop a project in the field of intelligent buildings using a tho state of the art from the literature.	KZ dings against fire s Z dge from the Bache rough analysis of t	s that use 4 spread from 6 slor's degreethe current
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	Vantilation and Air Conditioning	Z,ZK	4
2161567	Ventilation and Air Conditioning r design, control and evaluation of ventilation and air conditioning systems. Design according to demands for treatment of thermal ar		•
	air in residential and technological rooms.		id quality c
2162019 Design an	Industrial Heating, Ventilation, Airconditioning and functional properties of ventilation systems for technological premises. Heat and mass transfer, aerodynamics calculation. Energy	KZ demands of systen	4 ns.
2162035	Alternative Energy Sources Principles and basics of alternative energy sources use in buildings. Solar energy. Heat pumps. Biomass utilization.	KZ	4
2162064	Noise and Vibration Control	KZ	4
2462066	Student will be informed about the basic acoustic dimensions, which are important for evaluation of noise.	KZ	4
2162066 District heatin	Heat Supply Ig with heat generators in heat-only and combined heat&power mode. Heat generators. Heating networks. Renewable energy so		4 ating.
2162113	Heating Knowledge improvement from the field of heating of residential and industrial buildings. Designing of convective and radiant heating	KZ	4
2162700	Experimental Methods 1 Introduction study of experimental technique in environmental engineering	KZ	4
2163033	Design IB I.	Z	6
Design of heating s	ystems, heat distributors and systems for using recoverable source of energy. Design of ventilation and air conditioning systems, includ of noise.	ling gas cleaning ar	nd reduction
2163034	Project IB II.	Z	6
	oject and experimental solution of environmental devices. Optimization investment and operating costs, economic appraisal of ecolog		
A5M13FVS	Photovoltaic Systems d its exploitation using photovoltaic systems. Photovoltaic phenomena, solar cells and their characteristics, solar modules (construction)	KZ	4
	ns (including energy conservation). Photovoltaic system applications, optimisation of operating conditions. Basic economical and ecol		
A5M13NZZ	Independent sources	KZ	4
	sources of the electric power - overview. Electrochemical sources (accumulators), applications. Uninteruptible power sources in IB. O		-
	energy. Perspective sources of electrical enegy, storage of energy.		
A5M14RPI	Distribution of Electric Energy and Drives	Z,ZK	5
A5M15ES1	Electrical Light 1	KZ	4
A5M16EUE	Economics of Energy Use	KZ	4
	energy management of company, buildings or energy systems. Energy need and consumption, energy balance. Energy characteriza sources. Energy audit and feasibility study, optimization of energy management of energy systems. Prices and tariffs, economy and		secondary
A5M16FIP	Corporate finance	KZ	4
•	e, present value and alternative cost of capital, financial calculus, long-term finance, valuation of bonds and stocks, investment decisi riod, annual equivalent value, inflation and return, capital asset pricing model, portfolio, sensitivity analysis and risk, short term finance, ca policy.	•	
A5M34ELE	Electronics	KZ	4
A5M34EZS	Electronic security systems	KZ	4
A5M38MEB	Measurements in the Buildings	KZ	4
The students will le	arn about principles of measurement of basic physical quantities in the building. As the majority of the physical quantities are conver- surement of the electrical quantities is also presented. The subject is not intended for students who have already studied the subjects Sensors and transducers on CTU FEE.		-
A5M38SBD	Collection and Data Transfer	KZ	4
	Sensors and Networks	Z,ZK	4
A5M38SZS	Applications of sensors in buildings		
A5M38SZS A5M99PR1	Applications of sensors in buildings Project 1	Z	6
A5M99PR1			
A5M99PR1	Project 1 sis is chosen by the student and selected from the list of topics. "Project 1" is followed by "Project 2" with a higher difficulty. The assignment		
A5M99PR1 The topic of the the	Project 1 sis is chosen by the student and selected from the list of topics. "Project 1" is followed by "Project 2" with a higher difficulty. The assign to the approval of the faculty guarantor or tutor. The work will be publicly presented.	gnment of the proje	ct is subject
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