Study plan

Name of study plan: Inteligentní budovy - platný od roku 2024

Faculty/Institute/Others: Faculty of Electrical Engineering
Department:
Branch of study guaranteed by the department: Welcome page
Garantor of the study branch:
Program of study: Intelligent Buildings
Type of study: Follow-up master full-time
Required credits: 116
Elective courses credits: 4
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: 84
The role of the block: P

Code of the group: 2024_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 Kůla, Radek Havlíček, Ivana Nová, Josef Černohous, Pavel Mlejnek* ***Radek Havlíček*** *Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P

Characteristics of the courses of this group of Study Plan: Code=2024_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 hazard of given branch of study. Students receive indispensable qualification according to the current Directive of the Dean.

Code of the group: 2024_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	P

Characteristics of the courses of this group of Study Plan: Code=2024_MIBDIP Name=Diploma Thesis

ADIP26	Diploma Thesis	Z	26

Independent final comprehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehensive final examination.

Code of the group: 2024_MIBP
Name of the group: Compulsory subjects of the programm
Requirement credits in the group: In this group you have to gain 48 credits
Requirement courses in the group: In this group you have to complete 11 courses

Credits in the group: 48
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
125ESB	**Buildings Ecology Systems** *Stanislav Frolík* ***Stanislav Frolík*** *Stanislav Frolík (Gar.)*	KZ	4	2P	L	P
B5M14ESIB	**Electrical Systems of Intelligent Buildings** *Miroslav Chomát, Pavel Mindl, Jiří Lettl Miroslav Chomát (Gar.)*	ZK	5	2P+2L		P
125EABU	**Energy Audit of Building** *Karel Kabele, Miroslav Urban, Michal Kabrhel* ***Karel Kabele*** *Karel Kabele (Gar.)*	KZ	4	2P+1C	L	P
2161079	**Air-Conditioning** *Vladimír Zmrhal, Petr Zelenský* ***Vladimír Zmrhal*** *Vladimír Zmrhal (Gar.)*	Z,ZK	4	2P+1C	*	P
124KPKP	**Building Structures** *Ctislav Fiala* ***Ctislav Fiala*** *Ctislav Fiala (Gar.)*	ZK	4	3P	Z	P
2161108	**Transport Phenomena** *Martin Barták* ***Martin Barták*** *Martin Barták (Gar.)*	Z,ZK	4	2P+1C	*	P
2161109	**Automatic control in environmental engineering of building** *Jiří Bašta, Jindřich Boháč* ***Jiří Bašta*** *Jiří Bašta (Gar.)*	Z,ZK	4	2P+1C	*	P
2161102	**Radiant and Industrial Heating** *Jiří Bašta, Roman Vavřička* ***Jiří Bašta*** *Jiří Bašta (Gar.)*	Z,ZK	4	2P+1C	*	P
B5M38SZS1	**Sensors and Networks** *Pavel Mlejnek, Pavel Ripka, Antonín Platil Antonín Platil (Gar.)*	Z,ZK	5	2P+2C	L	P
124ST1	**Thermal Engineering in Construction** *Jan Tywoniak* ***Jan Tywoniak*** *Jan Tywoniak (Gar.)*	ZK	5	2P	Z	P
B5M38TPUR	**Technology for Sustainable Development**	Z,ZK	5	2P+2C	Z	P

Characteristics of the courses of this group of Study Plan: Code=2024_MIBP Name=Compulsory subjects of the programm

125ESB	Buildings Ecology Systems	KZ	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.			
B5M14ESIB	Electrical Systems of Intelligent Buildings	ZK	5
125EABU	Energy Audit of Building	KZ	4
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.			
2161079	Air-Conditioning	Z,ZK	4
Extend knowledge for design, control and evaluation of single-zone and multi-zone air conditioning systems.			
124KPKP	Building Structures	ZK	4
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	Transport Phenomena	Z,ZK	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.			
2161102	Radiant and Industrial Heating	Z,ZK	4
Student will be informed about the basics of radiant and other industrial heating systems			
B5M38SZS1	Sensors and Networks	Z,ZK	5
124ST1	Thermal Engineering in Construction	ZK	5
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.			
B5M38TPUR	Technology for Sustainable Development	Z,ZK	5

Code of the group: 2024_MIBPRO1
Name of the group: Project 1
Requirement credits in the group: In this group you have to gain 5 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 5
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
125P1IB	**Project IB I** *Michal Kabrhel* ***Michal Kabrhel*** *Michal Kabrhel (Gar.)*	Z	5	4C	L	P
2163004	**Project IB 1** ***Jiří Bašta***	Z	5	0P+4C+0L		P
B5M99PR1	**Project 1** *Pavel Mlejnek, Antonín Platil, Petr Kašpar* ***Antonín Platil*** *Antonín Platil (Gar.)*	Z	5	0P+4C	L	P

Characteristics of the courses of this group of Study Plan: Code=2024_MIBPRO1 Name=Project 1

125P1IB	Project IB I	Z	5
2163004	Project IB 1	Z	5
B5M99PR1	Project 1	Z	5

The topic of the thesis 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 of the project is subject to the approval of the faculty guarantor or tutor. The work will be publicly presented.

Code of the group: 2024_MIBPRO2
Name of the group: Project 2
Requirement credits in the group: In this group you have to gain 5 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 5
Note on the group:

Code	Name of the course / Name of the group of courses *(in case of groups of courses the list of codes of their members)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
125P2IB	**Project IB II** ***Michal Kabrhel***	Z	5	4C	Z	P
2163034	**Project IB II.** ***Jiří Bašta*** *Jiří Bašta (Gar.)*	Z	6	0P+4C	*	P
B5M99PR2	**Project 2** ***Antonín Platil*** *Antonín Platil (Gar.)*	Z	5	0P+4C	Z	P

Characteristics of the courses of this group of Study Plan: Code=2024_MIBPRO2 Name=Project 2

125P2IB	Project IB II	Z	5
2163034	Project IB II.	Z	6

Project and experimental solution of environmental devices. Optimization investment and operating costs, economic appraisal of ecologic investment.

B5M99PR2	Project 2	Z	5

The topic of the thesis is chosen by the student and selected from the list of topics. Project 2 mostly follows the topic of "Project 1" with a higher difficulty. The assignment of the project is 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: 2024_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 99)
Requirement courses in the group: In this group you have to complete at least 8 courses (at most 24)
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
124OSIB	**Acoustics and Lighting** *Jaroslav Vychytil, Lenka Maierová* ***Jaroslav Vychytil*** *Jaroslav Vychytil (Gar.)*	KZ	4	2P	Z	PV
2162078	**Alternative Energy Sources** ***Tomáš Matuška***	KZ	5	2P+2C+0L		PV
2162079	**Cooling in Environmental Engineering of Buldings**	KZ	4	3P+1C+0L		PV
125ESB	**Buildings Ecology Systems** *Stanislav Frolík* ***Stanislav Frolík*** *Stanislav Frolík (Gar.)*	KZ	4	2P	L	PV
A5M16EUE	**Economics of Energy Use** *Jiří Beranovský, Július Bemš* ***Jiří Beranovský*** *Július Bemš (Gar.)*	KZ	4	3P+1C	Z	PV

A5M15ES1	**Electrical Light 1** *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** Václav Prajzler (Gar.)*	KZ	4	3P+1L	Z	PV
A5M34ELE	**Electronics** *Alexandr Laposa, Adam Bouřa **Alexandr Laposa** Alexandr Laposa (Gar.)*	KZ	4	3P+1L	L	PV
2162700	**Experimental Methods 1** *Miroslav Kučera **Miroslav Kučera** Miroslav Kučera (Gar.)*	KZ	4	0P+4L	*	PV
A5M16FIP	**Corporate finance** *Oldřich Starý, Jiří Vašíček, Blanka Kučerková **Jiří Vašíček** Oldřich Starý (Gar.)*	KZ	4	3P+1C	L	PV
A5M13FVS	**Photovoltaic Systems** *Pavel Hrzina, Ladislava Černá, Vítězslav Benda **Ladislava Černá** Pavel Hrzina (Gar.)*	KZ	4	2P+2L	L	PV
124INBB	**Integrated Design of Buildings** *Jan Růžička, Petr Hájek, Antonín Lupíšek **Antonín Lupíšek** Petr Hájek (Gar.)*	Z,ZK	4	2P+1C	Z	PV
B5M38MEB1	**Measurements in the Buildings** *Pavel Mlejnek, Petr Kašpar Pavel Mlejnek (Gar.)*	KZ	5	2P+2L	Z	PV
125MBST	**Building and HVAC Systems Modelling** *Karel Kabele **Karel Kabele** Karel Kabele (Gar.)*	KZ	4	1P+1C	L	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** *Bohumír Garlík, Ilona Koubková, Pavla Hofbauer Pechová, Daniel Adamovský **Ilona Koubková** Ilona Koubková (Gar.)*	KZ	4	2P	L	PV
A5M38SBD	**Collection and Data Transfer** *Pavel Mlejnek **Pavel Mlejnek** Pavel Mlejnek (Gar.)*	KZ	4	2P+1L	L	PV
2162064	**Noise and Vibration Control** *Miroslav Kučera, Richard Nový **Miroslav Kučera** Miroslav Kučera (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** Ilona Koubková (Gar.)*	KZ	4	2P	Z	PV
2162077	**Ventilation** ***Vladimír Zmrhal***	KZ	4	2P+2C+0L		PV
2162113	**Heating** *Jiří Bašta, Jindřich Boháč, Roman Vavřička **Jiří Bašta** Jiří Bašta (Gar.)*	KZ	4	2P+2C	1	PV
2162081	**District Heating** ***Tomáš Matuška***	KZ	5	2P+2C+0L		PV

Characteristics of the courses of this group of Study Plan: Code=2024_MIBPV Name=Compulsory optionally subjects

125ESB	Buildings Ecology Systems	KZ	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.			
124OSIB	Acoustics and Lighting	KZ	4
The course introduces students to the basics of building lighting technology and building acoustics and deepens further knowledge.			
2162078	Alternative Energy Sources	KZ	5
2162079	Cooling in Environmental Engineering of Buldings	KZ	4
A5M16EUE	Economics of Energy Use	KZ	4
Organization and energy management of company, buildings or energy systems. Energy need and consumption, energy balance. Energy characterization of aggregate, secondary energy sources. Energy audit and feasibility study, optimization of energy management of energy systems. Prices and tariffs, economy and financial analysis.			
A5M15ES1	Electrical Light 1	KZ	4
A5M34EZS	Electronic security systems	KZ	4
A5M34ELE	Electronics	KZ	4
2162700	Experimental Methods 1	KZ	4
Introduction study of experimental technique in environmental engineering			
A5M16FIP	Corporate finance	KZ	4
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	KZ	4
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	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 assessment of buildings, evaluation of building performance, green/sustainable certification systems and understand environmental, social and economic aspects of the built environment.			
B5M38MEB1	Measurements in the Buildings	KZ	5
125MBST	Building and HVAC Systems Modelling	KZ	4
A5M13NZZ	Independent sources	KZ	4
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.			

125OZEB	Renewable Energy Sources	ZK	4
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	Fire Services	KZ	4
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.			
A5M38SBD	Collection and Data Transfer	KZ	4
2162064	Noise and Vibration Control	KZ	4
Student will be informed about the basic acoustic dimensions, which are important for evaluation of noise.			
125SYB	Building Systems	ZK	4
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	KZ	4
Saunas, fireplaces, kitchen technology, elevators, heat pumps, technology, swimming pools, heat source and technological systems.			
2162077	Ventilation	KZ	4
2162113	Heating	KZ	4
Knowledge improvement from the field of heating of residential and industrial buildings. Designing of convective and radiant heating systems.			
2162081	District Heating	KZ	5

Name of the block: Elective courses
Minimal number of credits of the block: 0
The role of the block: V

Code of the group: 2024_MIBVOLPR
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:

Code	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 assessment of buildings, evaluation of building performance, green/sustainable certification systems and understand environmental, social and economic aspects of the built environment.			
124KPKP	Building Structures	ZK	4
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.			
124OSIB	Acoustics and Lighting	KZ	4
The course introduces students to the basics of building lighting technology and building acoustics and deepens further knowledge.			
124ST1	Thermal Engineering in Construction	ZK	5
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.			
125EABU	Energy Audit of Building	KZ	4
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.			
125ESB	Buildings Ecology Systems	KZ	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.			
125MBST	Building and HVAC Systems Modelling	KZ	4

125OZEB	Renewable Energy Sources	ZK	4
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.			
125P1IB	Project IB I	Z	5
125P2IB	Project IB II	Z	5
125PBZB	Fire Services	KZ	4
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.			
125SYB	Building Systems	ZK	4
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	KZ	4
Saunas, fireplaces, kitchen technology, elevators, heat pumps, technology, swimming pools, heat source and technological systems.			
2161079	Air-Conditioning	Z,ZK	4
Extend knowledge for design, control and evaluation of single-zone and multi-zone air conditioning systems.			
2161102	Radiant and Industrial Heating	Z,ZK	4
Student will be informed about the basics of radiant and other industrial heating systems			
2161108	Transport Phenomena	Z,ZK	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.			
2162064	Noise and Vibration Control	KZ	4
Student will be informed about the basic acoustic dimensions, which are important for evaluation of noise.			
2162077	Ventilation	KZ	4
2162078	Alternative Energy Sources	KZ	5
2162079	Cooling in Environmental Engineering of Buldings	KZ	4
2162081	District Heating	KZ	5
2162113	Heating	KZ	4
Knowledge improvement from the field of heating of residential and industrial buildings. Designing of convective and radiant heating systems.			
2162700	Experimental Methods 1	KZ	4
Introduction study of experimental technique in environmental engineering			
2163004	Project IB 1	Z	5
2163034	Project IB II.	Z	6
Project and experimental solution of environmental devices. Optimization investment and operating costs, economic appraisal of ecologic investment.			
A5M13FVS	Photovoltaic Systems	KZ	4
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.			
A5M13NZZ	Independent sources	KZ	4
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.			
A5M15ES1	Electrical Light 1	KZ	4
A5M16EUE	Economics of Energy Use	KZ	4
Organization and energy management of company, buildings or energy systems. Energy need and consumption, energy balance. Energy characterization of aggregate, secondary energy sources. Energy audit and feasibility study, optimization of energy management of energy systems. Prices and tariffs, economy and financial analysis.			
A5M16FIP	Corporate finance	KZ	4
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.			
A5M34ELE	Electronics	KZ	4
A5M34EZS	Electronic security systems	KZ	4
A5M38SBD	Collection and Data Transfer	KZ	4
ADIP26	Diploma Thesis	Z	26
Independent final comprehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehensive final examination.			
B5M14ESIB	Electrical Systems of Intelligent Buildings	ZK	5
B5M38MEB1	Measurements in the Buildings	KZ	5
B5M38SZS1	Sensors and Networks	Z,ZK	5
B5M38TPUR	Technology for Sustainable Development	Z,ZK	5
B5M99PR1	Project 1	Z	5
The topic of the thesis 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 of the project is subject to the approval of the faculty guarantor or tutor. The work will be publicly presented.			
B5M99PR2	Project 2	Z	5
The topic of the thesis is chosen by the student and selected from the list of topics. Project 2 mostly follows the topic of "Project 1" with a higher difficulty. The assignment of the project is subject to the approval of the faculty guarantor or tutor. The work will be publicly presented.			

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 hazard of given branch of study. Students receive indispensable qualification according to the current Directive of the Dean.			

For updated information see http://bilakniha.cvut.cz/en/f3.html
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