## Study plan

## Name of study plan: Electrical Engineering, Power Engineering and Management -Electrical Power Engineering

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: Electrical Engineering, Power Engineering and Management Type of study: Follow-up master combined 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: 61 The role of the block: P

Code of the group: 2018\_MEEMDIP-K Name of the group: Diploma Thesis Requirement credits in the group: In this group you have to gain 25 credits Requirement courses in the group: In this group you have to complete 1 course Credits in the group: 25 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
BDIP25	Diploma Thesis	Z	25	22s	L	Р

#### Characteristics of the courses of this group of Study Plan: Code=2018\_MEEMDIP-K Name=Diploma Thesis

BDIP25	Diploma Thesis	Z	25
Independent final comp	prehensive work for the Master's degree study programme. A student will choose a topic from a range of topics related to his o	or her branch of s	tudy, 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 comprehen	sive final examination	ation.

Code of the group: 2018\_MEEMH-K Name of the group: Humanities subjects 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
BD0M16FIL	Philosophy 2	Z,ZK	5	14KP+6KS	L	Р
BD0M16HVT	History of science and technology 2	Z,ZK	5	14KP+6KS	L	Р
BD0M16PSM	<b>Psychology</b> Milana ížek Hrubá, Jaroslav Knápek <b>Ji í Vaší ek</b> Ji í Vaší ek (Gar.)	Z,ZK	5	14KP+6KS	Z,L	Р
BD0M16TEO	Theology	Z,ZK	5	14KP+6KS	L	Р

#### Characteristics of the courses of this group of Study Plan: Code=2018\_MEEMH-K Name=Humanities subjects

BD0M16FIL	Philosophy 2	Z,ZK	5
BD0M16HVT	History of science and technology 2	Z,ZK	5
This subject traces hist	orical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate s	udents' interest in	the history and
traditions of the subject	, while highlighting the developments in technical education and professional organizations, the process of shaping scientific	life and the influe	nce of technical
engineers			

BD0M16PSM	Psychology	Z,ZK	5		
BD0M16TEO	Theology	Z,ZK	5		
This subject provides to	students the basic orientation in christian theology and requires no special previous education. After short philosophic lectur	e the basic theolo	ogic disciplines		
are gone through. The s	are gone through. The subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones who want to get know Christianity				
- religion from which gra	aws our civilization up.				

### Code of the group: 2018\_MEEMP-K Name of the group: Compulsory subjects of the programme Requirement credits in the group: In this group you have to gain 31 credits Requirement courses in the group: In this group you have to complete 6 courses Credits in the group: 31

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
BD1M16EKE1	Economy of Power Industry Ji í Vaší ek, Old ich Starý, Tomáš Králík Tomáš Králík Old ich Starý (Gar.)	Z,ZK	5	14KP+6KC	L	Ρ
BD1M15IAP	Engineering Applications Jan Kyncl	Z,ZK	5	14KP+6KC	Z	Ρ
BD1M13JAS1	Quality and Reliability Pavel Mach, Martin Molhanec Pavel Mach Pavel Mach (Gar.)	Z,ZK	6	14KP+6KC	Z	Ρ
BD1MPROJ	Individual project Ji í Vaší ek, Miroslav Vítek, Josef ernohous, Zden k Müller, Stanislav Bou ek Old ich Starý Old ich Starý (Gar.)	Z	5	0p+4s	Z	Ρ
BD1M15PPE1	Elements and Operation of Electrical Power Systems Stanislav Bou ek, Jan Hlavá ek	Z,ZK	5	14KP+6KS	Z	Ρ
BD1M14SSE	Machinery and Structures of Power Plants Petr Ko árník Petr Ko árník Petr Ko árník (Gar.)	Z,ZK	5	14KP+6KC	Z	Р

#### Characteristics of the courses of this group of Study Plan: Code=2018\_MEEMP-K Name=Compulsory subjects of the programme

BD1M16EKE1	Economy of Power Industry	Z,ZK	5
Fundamentals of finance	ng of power companies. Cost structure of power generation and distribution. Prices and tariff systems for power, heat and ga	as production and	distribution.
Examples of economic	evaluation and investment appraisal of the typical project in power sector. Renewable energy sources, externalities. Energy p	olicy and energy	law in CR.
Liberalization and powe	r market development.		
BD1M15IAP	Engineering Applications	Z,ZK	5
BD1M13JAS1	Quality and Reliability	Z,ZK	6
Terminology and definit	ons from the area of quality and reliability and their control, philosophy of quality, systems of quality control in the world. Reli	ability as a part o	f quality. Basic
definitions from the area	a of reliability, basic distributions used in reliability and their basic characteristics. Back-up using a warm and cold standby, typ	pes of warm and	cold standbys.
Reliability of component	s and systems, calculation of reliability using composition and decomposition. and using a method of a list. Basic statistical me	ethods and tools jo	pined with quality
control, managerial tool	s for quality control. Techniques FMEA and QFFD, house of quality. Capability of a process. Taguchi loss function. Audits. Sta	tistical inspection	l.
BD1MPROJ	Individual project	Z	5
Independent work in the	form of a project. A student will choose a topic from a list of topics specified by branch department. The project will be defer	nded within the fra	amework of a
subject.			
BD1M15PPE1	Elements and Operation of Electrical Power Systems	Z,ZK	5
BD1M14SSE	Machinery and Structures of Power Plants	Z,ZK	5
The aim of the course is	to acquaint students with forms of energy transformation in power plants, describing the function of power facilities, their structu	ure, properties an	d characteristics.

Name of the block: Povinné p edm ty zam ení Minimal number of credits of the block: 45 The role of the block: PZ

Code of the group: 2018\_MEEMPPS2-K

Name of the group: Compulsory subjects of the specialization Requirement credits in the group: In this group you have to gain 15 credits Requirement courses in the group: In this group you have to complete 3 courses Credits in the group: 15 Note on the group: Specializace Elektroenergetika

Note on the group: Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Scope Semester Code Completion Credits Role members) Tutors, authors and guarantors (gar.) **Distribution of Electrical Energy** BD1M15DEE Z,ZK 5 14KP+6KS Ζ ΡZ Stanislav Bou ek **Power Plants** L BD1M15ENY Z,ZK 5 14KP+6KS ΡZ Stanislav Bou ek

BD1M15ETT Electrical Heat Jan Kyncl	Z,ZK	5	14KP+6KS	Z	PZ
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Characteristics of the courses of this group of Study Plan: Code=2018\_MEEMPPS2-K Name=Compulsory subjects of the specializationBD1M15DEEDistribution of Electrical EnergyZ,ZK5BD1M15ENYPower PlantsZ,ZK5BD1M15ETTElectrical HeatZ,ZK5

#### Code of the group: 2018\_MEEMPS-K

Name of the group: Compulsory subjects of the specialization

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 6 courses

Credits in the group: 30

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
BD1M13ASS	Solar Systems Applications Vít zslav Benda, Ladislava erná, Jakub Holovský, Pavel Hrzina Vít zslav Benda Vít zslav Benda (Gar.)	Z,ZK	5	14KP+6KL	z	ΡZ
BD1M13EKP	Ecology and materials Ivan Kudlá ek Ivan Kudlá ek (Gar.)	Z,ZK	5	14KP+6KC	Z	PZ
BD1M14ESP	Electric Machinery and Apparatus Pavel Mindl, Vít Hlinovský Pavel Mindl	Z,ZK	5	14KP+6KL	Z	ΡZ
BD1M15PRE1	Transmission and Distribution of Electricity Stanislav Bou ek	Z,ZK	5	14KP+6KS	Z	ΡZ
BD1M15TVN	High Voltage Engineering Jan Hlavá ek	Z,ZK	5	14KP+6KL	. L	ΡZ
BD1M14TVM	<b>Theory and Application of Power Converters</b> Jan Bauer <b>Jan Bauer</b> Jan Bauer (Gar.)	Z,ZK	5	14KP+6KL	. L	PZ

#### Characteristics of the courses of this group of Study Plan: Code=2018\_MEEMPS-K Name=Compulsory subjects of the specialization

BD1M13ASS	Solar Systems Applications	Z,ZK	5
The aim of the course is	to deepen the knowledge of the properties of semiconductor materials and structures that are important for a deeper under	standing of the se	miconductor
components technology	<i>.</i>		
BD1M13EKP	Ecology and materials	Z,ZK	5
Electrical Technology fro	om the perspective of ecology. Environmental assessment of the various types of surface protection. Environmental aspects of	of protective syste	ms used in
electronics. Environmen	tal impacts of electrical production. Ekodesign proposal of the electrical product. Principles of the proposal product for a difficul	t operating enviro	nment. Disposal
of electrical waste.			
BD1M14ESP	Electric Machinery and Apparatus	Z,ZK	5
The course is focused of	n contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, sys	tems with moder	n semiconductor
devices and their protect	tion circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fu	undamentals of co	ommutation. The
transformer efficiency, v	oltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous maching	nes. A rotating ma	agnetic field.
Induction machine, star	ting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a r	network. Torque, s	tability, overload
capacity.			
BD1M15PRE1	Transmission and Distribution of Electricity	Z,ZK	5
BD1M15TVN	High Voltage Engineering	Z,ZK	5
BD1M14TVM	Theory and Application of Power Converters	Z,ZK	5
The course focuses on	typical applications of power semiconductor converters on their sizing, switching and protection of power semiconductor converters	erters. It also sur	nmarizes the
basics of modulation an	d control strategies of power semiconductor converters and modern trends in their application in electric drives and other application in electric drives and other application application in the semiconductor converters and modern trends in their application in electric drives and other application application in the semiconductor converters and modern trends in their application in electric drives and other application in the semiconductor converters and modern trends in their application in electric drives and other application in the semiconductor converters and modern trends in the semiconductor converters and modern trends in the semiconductor in the semiconductor converters and modern trends in the semiconductor in the semiconductor converters and modern trends in the semiconductor in the semiconductor converters and modern trends in the semiconductor in the semiconductor converters and modern trends in the semiconductor in the semiconductor converters and modern trends in the semiconductor converters and the semiconductor converters and modern trends in the semiconductor converters and semi	olications.	

Name of the block: Compulsory elective courses Minimal number of credits of the block: 10 The role of the block: PV

Code of the group: 2018\_MEEMPV1-K

Name of the group: Compulsory elective subjects of the specialization Requirement credits in the group: In this group you have to gain at least 10 credits (at most 20) Requirement courses in the group: In this group you have to complete at least 2 courses (at most 4) Credits in the group: 10 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
BD1M16EUE1	Economy of Energy Use Ji í Beranovský <b>Ji í Beranovský</b> Ji í Beranovský (Gar.)	Z,ZK	5	14KP+6KS	L	PV
BD1M15ELS	Electrical Light Marek Bálský, Petr Žák	Z,ZK	5	14KP+6KL	L	PV
BD1M14MDS1	Modeling of Dynamical Systems	Z,ZK	5	14KP+6KC	L	PV
BD1M13VSE	Power components in electrical engineering Václav Papež Václav Papež Václav Papež (Gar.)	Z,ZK	5	14KP+6KL	L	PV

# Characteristics of the courses of this group of Study Plan: Code=2018\_MEEMPV1-K Name=Compulsory elective subjects of the specialization

BD1M16EUE1	Economy of Energy Use	Z,ZK	5
•	ergy management of company, buildings or energy systems. Energy need and consumption, energy balance. Energy characteri	00 0	, secondary
energy sources. Ene	rgy audit and feasibility study, optimization of energy management of energy systems. Prices and tariffs, economy and financial	analysis.	
BD1M15ELS	Electrical Light	Z,ZK	5
BD1M14MDS1	Modeling of Dynamical Systems	Z,ZK	5
The course deals wit	h combining knowledge of the dynamics of rigid bodies, fluid mechanics, aerodynamics, gas dynamics and thermodynamics in th	e compilation of no	nlinear mod
of dynamic systems.	Seminars are focused on assembling of numeric models in Matlab / Simulink.		
BD1M13VSE	Power components in electrical engineering	Z,ZK	5
Power semiconducto	r device (diodes, BJTs, thyristors, MOSFETs and IGBTs) and integraed structures (modules). Structures, function, characteristi	cs and parameters,	Passive
	t electronic. Connection of devices in parallel and in series.		

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

Code of the group: MTV

Name of the group: Physical education

Requirement credits in the group:

Requirement courses in the group:

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
TVV	Physical education	Z	0	0+2	Z,L	V
A003TV	Physical Education	Z	2	0+2	L,Z	V
TV-V1	Physical education	Z	1	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V

#### Characteristics of the courses of this group of Study Plan: Code=MTV Name=Physical education

TVV	Physical education	Z	0
A003TV	Physical Education	Z	2
TV-V1	Physical education	Z	1
TVV0	Physical education	Z	0
TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0

Code of the group: 2018\_MEEMVOL-K 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 v

~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
A003TV	Physical Education	Z	2
BD0M16FIL	Philosophy 2	Z,ZK	5
BD0M16HVT	History of science and technology 2	Z,ZK	5
	historical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate student		
<u>.</u>	ject, while highlighting the developments in technical education and professional organizations, the process of shaping scientific life an engineers		of technica
BD0M16PSM	Psychology	Z,ZK	5
BD0M16TEO	Theology	Z,ZK	5
	es to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture the he subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones who - religion from which graws our civilization up.	-	-
BD1M13ASS	Solar Systems Applications	Z,ZK	5
1	urse is to deepen the knowledge of the properties of semiconductor materials and structures that are important for a deeper understar components technology.		iconductor
BD1M13EKP	Ecology and materials	Z,ZK	5
Electrical Technol	logy from the perspective of ecology. Environmental assessment of the various types of surface protection. Environmental aspects of p	protective system	ns used in
electronics. Environr	mental impacts of electrical production. Ekodesign proposal of the electrical product. Principles of the proposal product for a difficult oper of electrical waste.	rating environme	ent. Disposa
BD1M13JAS1	Quality and Reliability	Z,ZK	6
	efinitions from the area of quality and reliability and their control, philosophy of quality, systems of quality control in the world. Reliabilit		-
	e area of reliability, basic distributions used in reliability and their basic characteristics. Back-up using a warm and cold standby, types of		-
	nents and systems, calculation of reliability using composition and decomposition, and using a method of a list. Basic statistical methods	-	-
	nagerial tools for quality control. Techniques FMEA and QFFD, house of quality. Capability of a process. Taguchi loss function. Audits. S		
BD1M13VSE	Power components in electrical engineering	Z,ZK	5
Power semiconal	uctor device (diodes, BJTs, thyristors, MOSFETs and IGBTs) and integraed structures (modules). Structures, function, characteristics components of powet electronic. Connection of devices in parallel and in series.	and parameters	, Passive
BD1M14ESP		Z,ZK	5
	Electric Machinery and Apparatus		-
	בי טון נטוומנו מוט שטוט-שמנב שאונטוווט עבאנבש וו בע חבושטוגש. במשונ וטףטוטעובש אל שאונטובש מוט שובש טו וובוו נטוווףטובווש, ששונשו		
devices and their pro			
	otection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundar	mentals of comm	utation. Th
transformer efficie		mentals of comm . A rotating mage	utation. The netic field.
transformer efficie nduction machine, s	otection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundar ency, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines starting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a netwo	mentals of comm . A rotating mage	utation. Th netic field.
transformer efficie nduction machine, s 3D1M14MDS1	otection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundar ency, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines starting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a netwo capacity. Modeling of Dynamical Systems th combining knowledge of the dynamics of rigid bodies, fluid mechanics, aerodynamics, gas dynamics and thermodynamics in the com-	nentals of comm . A rotating magi irk. Torque, stabil Z,ZK	nutation. Th netic field. ity, overloa
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transformer efficie nduction machine, s BD1M14MDS1 The course deals wit BD1M14SSE BD1M14SE BD1M14TVM The course focuse basics o BD1M15DEE	otection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundar ency, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines starting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a netwo capacity. Modeling of Dynamical Systems th combining knowledge of the dynamics of rigid bodies, fluid mechanics, aerodynamics, gas dynamics and thermodynamics in the com of dynamic systems. Seminars are focused on assembling of numeric models in Matlab / Simulink. Machinery and Structures of Power Plants eris to acquaint students with forms of energy transformation in power plants, describing the function of power facilities, their structure, pr Theory and Application of Power Converters ers on typical applications of power semiconductor converters and modern trends in their application in electric drives and ot Distribution of Electrical Energy	A rotating mag rk. Torque, stabil Z,ZK npilation of nonlii Z,ZK roperties and cha Z,ZK ers. It also summ her applications. Z,ZK	utation. Th netic field. ity, overloa 5 near model 5 aracteristics 5
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