Study plan

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

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	Psychology Milana ížek Hrubá, Jaroslav Knápek Josef ernohous Ji í Vaší ek (Gar.)	Z,ZK	5	14KP+6KS	Z,L	Ρ
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 histo	rical 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 Josef ernohous, Ji í Vaší ek, Miroslav Vítek, 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	Р
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	ing 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 of	quality. Basic
definitions from the are	a of reliability, basic distributions used in reliability and their basic characteristics. Back-up using a warm and cold standby, ty	pes of warm and o	cold standbys.
Reliability of componen	ts and systems, calculation of reliability using composition and decomposition. and using a method of a list. Basic statistical me	thods and tools jo	ined with quality
control, managerial too	s for quality control. Techniques FMEA and QFFD, house of quality. Capability of a process. Taguchi loss function. Audits. Sta	tistical inspection	
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	mework 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 and	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_MEEMPPS1-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 Elektrické pohony

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
BD1M14DEP	Digital Control of Electric Drives	Z,ZK	5	14+6l	L	ΡZ
BD1M14EPT1	Electric Drives and Traction	Z,ZK	5	14KP+6KL	Z	ΡZ
BD1M14REP	Control and Regulation of Electric Drives	Z,ZK	5	14+6l	Z	ΡZ

Characteristics of the courses of this group of Study Plan: Code=2018_MEEMPPS1-K Name=Compulsory subjects of the specialization

BD1M14DEP Digital Control of Electric Drives

The course deals with basics blocks of control computer for electric drive. It is also discussed the issue of discretization drive control and software and hardware resources needed for developing and debugging control program for electric drive.

BD1M14EPT1 Electric Drives and Traction

7.7K 5 The course focuses on the principles of designing electric drives with AC motors in different ways and different types of load, reliability, design for explosive environments and for special purposes and the necessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric locomotives, as well as the systems of hybrid cars and electric vehicles. 5

BD1M14REP Control and Regulation of Electric Drives Z,ZK

7.7K

5

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The course is focused to introduction to the problems of the theory of continuous control of electrical drives and power converters.	During the semester are	discussed the basics of
feedback control, transmission system, determining the stability of the system, including controller types and methods of tuning.		

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	PZ
BD1M13EKP	Ecology and materials Ivan Kudlá ek Ivan Kudlá ek (Gar.)	Z,ZK	5	14KP+6KC	Z	ΡZ
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	s z	ΡZ
BD1M15TVN	High Voltage Engineering	Z,ZK	5	14KP+6KL	L	PZ
BD1M14TVM	Theory and Application of Power Converters Jan Bauer Jan Bauer 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 understanding of the semiconductor components technology BD1M13EKP Z,ZK 5 Ecology and materials Electrical Technology from the perspective of ecology. Environmental assessment of the various types of surface protection. Environmental aspects of protective systems used in electronics. Environmental impacts of electrical production. Ekodesign proposal of the electrical product. Principles of the proposal product for a difficult operating environment. Disposal of electrical waste. BD1M14ESP **Electric Machinery and Apparatus** Z,ZK 5 The course is focused on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems with modern semiconductor devices and their protection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundamentals of commutation. The transformer efficiency, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines. A rotating magnetic field. Induction machine, starting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a network. Torque, stability, overload capacity BD1M15PRE1 Transmission and Distribution of Electricity Z.ZK 5 BD1M15TVN Z,ZK 5 High Voltage Engineering 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. It also summarizes the basics of modulation and control strategies of power semiconductor converters and modern trends in their application in electric drives and other applications.

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 Ji í Beranovský Ji í Beranovský (Gar.)	Z,ZK	5	14KP+6KS	L	PV
BD1M15ELS	Electrical Light	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	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
Organization and ene	rgy management of company, buildings or energy systems. Energy need and consumption, energy balance. Energy characte	rization of aggregate	, secondary
energy sources. Ene	gy audit and feasibility study, optimization of energy management of energy systems. Prices and tariffs, economy and financia	al analysis.	
BD1M15ELS	Electrical Light	Z,ZK	5
BD1M14MDS1	Modeling of Dynamical Systems	Z,ZK	5
The course deals with	combining knowledge of the dynamics of rigid bodies, fluid mechanics, aerodynamics, gas dynamics and thermodynamics in	the compilation of no	nlinear mod
of dynamic systems.	Seminars are focused on assembling of numeric models in Matlab / Simulink.		
	Dower components in electrical engineering	Z.ZK	F
BD1M13VSE	Power components in electrical engineering	2,21	5
	device (diodes, BJTs, thyristors, MOSFETs and IGBTs) and integraed structures (modules). Structures, function, characteris	1 / 1	о Passive

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

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

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

~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 C	Completion	Credits
BD0M16FIL	Philosophy 2	Z,ZK	5
BD0M16HVT	History of science and technology 2	Z,ZK	5
This subject traces hi	istorical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate student	s' interest in the	history and
traditions of the subje	ect, while highlighting the developments in technical education and professional organizations, the process of shaping scientific life ar	nd the influence	of technica
	engineers		_
BD0M16PSM	Psychology	Z,ZK	5
BD0M16TEO	Theology	Z,ZK	5
	s to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture the e subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones who v - religion from which graws our civilization up.	-	-
BD1M13ASS	Solar Systems Applications	Z,ZK	5
	rse is to deepen the knowledge of the properties of semiconductor materials and structures that are important for a deeper understan	,	conductor
	components technology .		
BD1M13EKP	Ecology and materials	Z,ZK	5
Electrical Technolo	gy from the perspective of ecology. Environmental assessment of the various types of surface protection. Environmental aspects of p	rotective system	is used in
	ental impacts of electrical production. Ekodesign proposal of the electrical product. Principles of the proposal product for a difficult oper of electrical waste.		ent. Disposa
BD1M13JAS1	Quality and Reliability	Z,ZK	6
	finitions from the area of quality and reliability and their control, philosophy of quality, systems of quality control in the world. Reliability		
	area of reliability, basic distributions used in reliability and their basic characteristics. Back-up using a warm and cold standby, types o ents and systems, calculation of reliability using composition and decomposition. and using a method of a list. Basic statistical methods		
	agerial 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
	ctor 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.		
BD1M14DEP	Digital Control of Electric Drives	Z,ZK	5
The course deals with	h basics blocks of control computer for electric drive. It is also discussed the issue of discretization drive control and software and hard	dware resources	s needed fo
	developing and debugging control program for electric drive.		
BD1M14EPT1	Electric Drives and Traction	Z,ZK	5
The course focuses o	on the principles of designing electric drives with AC motors in different ways and different types of load, reliability, design for explosive e	mulizan manta an	-1 f
purposes and the ne	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric la		-
purposes and the n	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric le systems of hybrid cars and electric vehicles.		-
BD1M14ESP	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric le systems of hybrid cars and electric vehicles. Electric Machinery and Apparatus	ocomotives, as v	well as the 5
BD1M14ESP	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric le systems of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems	ocomotives, as v Z,ZK with modern ser	well as the 5
BD1M14ESP The course is focused devices and their prof	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric le systems of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems tection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundam	ocomotives, as v Z,ZK with modern ser nentals of comm	well as the 5 miconducto utation. Th
BD1M14ESP The course is focused devices and their prot transformer efficien	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric le systems of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems tection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundar ncy, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines.	Z,ZK with modern ser nentals of comm A rotating magr	well as the 5 miconducto utation. The netic field.
BD1M14ESP The course is focused devices and their prot transformer efficien	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric le systems of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems tection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundam rev, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines. tarting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a network	Z,ZK with modern ser nentals of comm A rotating magr	well as the 5 miconducto utation. The netic field.
BD1M14ESP The course is focused devices and their prot transformer efficien Induction machine, st	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric leaves of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems tection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundam recy, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines. tarting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a networ capacity.	Z,ZK with modern ser nentals of comm A rotating magr rk. Torque, stabil	well as the 5 miconducto uutation. The netic field. ity, overload
BD1M14ESP The course is focused devices and their prot transformer efficien Induction machine, st BD1M14MDS1	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric leaves of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems tection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundamic, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines. tarting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a networ capacity. Modeling of Dynamical Systems	Z,ZK with modern ser nentals of comm A rotating magr rk. Torque, stabil Z,ZK	well as the 5 miconducto utation. The netic field. ity, overload
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BD1M14ESP The course is focused devices and their prot transformer efficien Induction machine, st BD1M14MDS1 The course deals with	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric least systems of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems tection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundamic, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines. tarting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a networ capacity. Modeling of Dynamical Systems n combining knowledge of the dynamics of rigid bodies, fluid mechanics, aerodynamics, gas dynamics and thermodynamics in the communication.	Z,ZK with modern ser hentals of comm A rotating magr rk. Torque, stabil Z,ZK apilation of nonlir	well as the 5 miconducto utation. The netic field. ity, overload
BD1M14ESP The course is focused devices and their prot transformer efficien Induction machine, st BD1M14MDS1 The course deals with BD1M14REP	ecessary technical documentation. Students learn the basics of electric traction drives for trams in public transport systems, electric less systems of hybrid cars and electric vehicles. Electric Machinery and Apparatus d on contact and solid-state switching devices in LV networks. Basic topologies AC switches and stress of their components, systems tection circuits, testing electrical devices. The course also deals with the general theory of electrical machines. Magnetic field. Fundamic, voltage drop. Transients - switch to the network, a short circuit. Mathematical model of synchronous and asynchronous machines. tarting and speed control. Influence of harmonic magnetic field. Single-phase induction motor. Work synchronous machine on a networ capacity. Modeling of Dynamical Systems n combining knowledge of the dynamics of rigid bodies, fluid mechanics, aerodynamics, gas dynamics and thermodynamics in the comof dynamic systems. Seminars are focused on assembling of numeric models in Matlab / Simulink.	Z,ZK with modern ser hentals of comm A rotating magr rk. Torque, stabil Z,ZK apilation of nonlir Z,ZK	well as the 5 miconducto utation. The netic field. ity, overload 5 near model 5
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BD1MPROJ	Individual project	Z	5		
Independent work	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 defended within the framework of a				
	subject.				
BDIP25	Diploma Thesis	Z	25		
Independent final	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 b	y branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the compreh	ensive final exami	nation.		
TV-V1	Physical education	Z	1		
TVKLV	Physical Education Course	Z	0		
TVKZV	Physical Education Course	Z	0		
TVV	Physical education	Z	0		
TVV0	Physical education	Z	0		

For updated information see <u>http://bilakniha.cvut.cz/en/f3.html</u> Generated: day 2025-07-19, time 18:18.