Recomended pass through the study plan

Name of the pass: Specialization Electrical Drives - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering
Department:
Pass through the study plan: Electrical Engineering, Power Engineering and Management - Electrical Drives
Branch of study guranteed by the department: Welcome page
Guarantor of the study branch:
Program of study: Electrical Engineering, Power Engineering and Management
Type of study: Follow-up master full-time
Note on the pass:

Coding of roles of courses and groups of courses:
P - compulsory courses of the program, PO - compulsory courses of the branch, Z - compulsory courses, S - compulsory elective courses, PV - compulsory elective courses, F - elective specialized courses, V - elective courses, T - physical training courses

Coding of ways of completion of courses (KZ/Z/ZK) and coding of semesters (Z/L):
KZ - graded assesment, Z - assesment, ZK - examination, L - summer semester, Z - winter semester

Number of semester: 1

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
B1M15IAP	**Engineering Applications** *Jan Kyncl Jan Kyncl (Gar.)*	Z,ZK	5	2P+2C	Z	P
B1M13JAS1	**Quality and Reliability** *Pavel Mach, Denis Froš, Martin Molhanec **Pavel Mach** Pavel Mach (Gar.)*	Z,ZK	6	2P+2C	Z	P
B1M15PPE1	**Elements and Operation of Electrical Power Systems** *Ivo Doležel, Zdeněk Müller Zdeněk Müller (Gar.)*	Z,ZK	5	2P+2S	Z	P
B1M14SSE	**Machinery and Structures of Power Plants** *Petr Kočárník, Jiří Šťastný **Petr Kočárník** Petr Kočárník (Gar.)*	Z,ZK	5	2P+2C	Z	P
B1M13EKP	**Ecology and materials** *Ivan Kudláček, Eva Horynová, Jan Weinzettel, Branislav Dzurňák **Ivan Kudláček** Ivan Kudláček (Gar.)*	Z,ZK	5	2P+2L	Z	PZ
B1M14REP	**Control and Regulation of Electric Drives** *Radek Havlíček, Evžen Thöndel **Evžen Thöndel***	Z,ZK	5	2P+2L	Z	PZ

Number of semester: 2

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
B1M16EKE1	**Economy of Power Industry** *Jiří Vašíček, Oldřich Starý, Tomáš Králík **Tomáš Králík** Oldřich Starý (Gar.)*	Z,ZK	5	2P+2C	L	P
B1M14DEP	**Digital Control of Electric Drives** *Jan Bauer, Jiří Zděnek **Jiří Zděnek** Jiří Zděnek (Gar.)*	Z,ZK	5	2P+2L	L	PZ
B1M15TVN	**High Voltage Engineering** *Jan Koller, Jan Hlaváček*	Z,ZK	5	2P+2L	L	PZ
B1M14TVM	**Theory and Application of Power Converters** *Jiří Lettl **Jiří Lettl** Jiří Lettl (Gar.)*	Z,ZK	5	2P+2L	L	PZ
2018_MEEMPV1	**Povinně volitelné předměty specializace** *B1M16EUE1,B1M15ELS,..... (see the list of groups below)*	Min. cours. 2 Max. cours. 4	Min/Max 10/20			PV

Number of semester: 3

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
B1MPROJ	**Individual project** *Josef Černohous, Jan Kyncl, Zdeněk Müller, Jan Bauer, Jiří Vašíček, Oldřich Starý, Jan Jandera, Karel Künzel, Jaroslav Knápek, ...* ***Josef Černohous*** *Jan Jandera (Gar.)*	Z	5	0p+4s	Z	P
B1M13ASS	**Solar Systems Application** *Vítězslav Benda, Jakub Holovský* ***Jakub Holovský*** *Vítězslav Benda (Gar.)*	Z,ZK	5	2P+2L	Z	P
B1M14EPT1	**Electric Drives and Traction** *Jan Bauer, Jiří Lettl* ***Jan Bauer*** *Jiří Lettl (Gar.)*	Z,ZK	5	2P+2L	Z	PZ
B1M14ESP	**Electric Machinery and Apparatus** *Ondřej Lipčák, Pavel Mindl* ***Pavel Mindl*** *Pavel Mindl (Gar.)*	Z,ZK	5	2P+2L	Z	PZ
B1M15PRE1	**Transmission and Distribution of Electricity** *Ivo Doležel, Zdeněk Müller, Ladislav Musil Zdeněk Müller (Gar.)*	Z,ZK	5	2P+2S	Z	PZ
2018_MEEMH	**Humanitní předměty** *B0M16FIL,B0M16HVT,..... (see the list of groups below)*	Min. cours. 1 Max. cours. 1	Min/Max 5/5			P

Number of semester: 4

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	P
2018_MEEMVOL	**Volitelné odborné předměty**	Min. cours. 0	Min/Max 0/999			V

List of groups of courses of this pass with the complete content of members of individual groups

Kód	Name of the group of courses and codes of members of this group (for specification see here or below the list of courses)	Completion	Credits	Scope	Semester	Role
2018_MEEMH	**Humanitní předměty**	**Min. cours. 1 Max. cours. 1**	**Min/Max** 5/5			**P**

B0M16FIL		B0M16HVT	History of science and technolog ...	B0M16HSD1	History of economy and social st ...
B0M16PSM	Psychology	A003TV	Physical Education	B0M16TEO	Theology

		Completion	Credits	Scope	Semester	Role
2018_MEEMPV1	**Povinně volitelné předměty specializace**	**Min. cours. 2 Max. cours. 4**	**Min/Max** 10/20			**PV**

B1M16EUE1	Economy of Energy Use	B1M15ELS	Electrical Light	B1M14MDS1	Modeling of Dynamical Systems
B1M13VSE	Power components in electrical e ...				

2018_MEEMVOL	**Volitelné odborné předměty**	**Min. cours. 0**	**Min/Max** 0/999			**V**

List of courses of this pass:

Code	Name of the course	Completion	Credits
A003TV	Physical Education	Z	2
B0M16FIL		Z,ZK	5

B0M16HSD1	History of economy and social studies	Z,ZK	5
This subject deals with the history of the Czech society in the 19th - 21th centuries. It follows the forming of the Czech political representation, its aims and achieved results as well as the social and cultural development and coexistence of the various ethnical groups in the Czech countries.			
B0M16HVT	History of science and technology 2	Z,ZK	5
This subject traces historical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate students' 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 influence of technical engineers			
B0M16PSM	Psychology	Z,ZK	5
B0M16TEO	Theology	Z,ZK	5
This subject provides to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture the basic theologic disciplines 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 graws our civilization up.			
B1M13ASS	Solar Systems Application	Z,ZK	5
Solar energy. Photovoltaic phenomena. Photovoltaic cells and modules and their characteristics. Photovoltaic systems and their applications. Photo-thermal phenomena.Photo-thermal power stations. Significance, economic and environmental aspects of solar energy exploitation.			
B1M13EKP	Ecology and materials	Z,ZK	5
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.			
B1M13JAS1	Quality and Reliability	Z,ZK	6
Terminology and definitions from the area of quality and reliability and their control, philosophy of quality, systems of quality control in the world. Reliability as a part of quality. Basic definitions from the area of reliability, basic distributions used in reliability and their basic characteristics. Back-up using a warm and cold standby, types of warm and cold standbys. Reliability of components and systems, calculation of reliability using composition and decomposition. and using a method of a list. Basic statistical methods and tools joined with quality control, managerial tools for quality control. Techniques FMEA and QFFD, house of quality. Capability of a process. Taguchi loss function. Audits. Statistical inspection.			
B1M13VSE	Power components in electrical engineering	Z,ZK	5
Power semiconductor device (diodes, BJTs, thyristors, MOSFETs and IGBTs) and integraed structures (modules). Structures, function, characteristics and parameters, Passive components of powet electronic. Connection of devices in parallel and in series.			
B1M14DEP	Digital Control of Electric Drives	Z,ZK	5
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.			
B1M14EPT1	Electric Drives and Traction	Z,ZK	5
The first part of the course focuses on the basics of designing AC drives with AC motors at different power supply types and loads, their reliability, design for potentially explosive atmospheres and for special purposes as well as the necessary technical documentation. In the second part, students are introduced to mathematical modeling, control strategies (vector control, direct torque control) and basic techniques of induction motor parameter estimation. Furthermore, the control and nonlinear behavior of a two-level voltage-source inverter equipped with IGBT elements as the most commonly used power converter for induction motors is analyzed.			
B1M14ESP	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.			
B1M14MDS1	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 nonlinear models of dynamic systems. Seminars are focused on assembling of numeric models in Matlab / Simulink.			
B1M14REP	Control and Regulation of Electric Drives	Z,ZK	5
The course is an 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.			
B1M14SSE	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 structure, properties and characteristics.			
B1M14TVM	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.			
B1M15ELS	Electrical Light	Z,ZK	5
B1M15IAP	Engineering Applications	Z,ZK	5
B1M15PPE1	Elements and Operation of Electrical Power Systems	Z,ZK	5
B1M15PRE1	Transmission and Distribution of Electricity	Z,ZK	5
B1M15TVN	High Voltage Engineering	Z,ZK	5
B1M16EKE1	Economy of Power Industry	Z,ZK	5
Fundamentals of financing of power companies. Cost structure of power generation and distribution. Prices and tariff systems for power, heat and gas production and distribution. Examples of economic evaluation and investment appraisal of the typical project in power sector. Renewable energy sources, externalities. Energy policy and energy law in CR. Liberalization and power market development.			
B1M16EUE1	Economy of Energy Use	Z,ZK	5
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.			
B1MPROJ	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 defended within the framework of a subject.			
BDIP25	Diploma Thesis	Z	25
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.			

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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