

Study plan

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

Faculty/Institute/Others: Faculty of Electrical Engineering

Department: Department of Economics, Management and Humanities

Branch of study guaranteed by the department:

Garantor of the study branch: prof. Ing. Jaroslav Knápek, CSc.

Program of study: Electrical Engineering, Power Engineering and Management

Type of study: Bachelor full-time

Required credits: 178

Elective courses credits: 2

Sum of credits in the plan: 180

Note on the plan:

Name of the block: Compulsory courses in the program

Minimal number of credits of the block: 133

The role of the block: P

Code of the group: 2018_BEEMBAP

Name of the group: Bachelor Project

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 1 course

Credits in the group: 15

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
BBAP15	Bachelor thesis	Z	15	15s	L,Z	P

Characteristics of the courses of this group of Study Plan: Code=2018_BEEMBAP Name=Bachelor Project

BBAP15	Bachelor thesis	Z	15
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Code of the group: 2018_BEEMBBE

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

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete at least 2 courses

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
BEZB	Safety in Electrical Engineering for a bachelor's degree <i>Vladimír K la, Ivana Nová, Radek Havlí ek Radek Havlí ek Vladimír K la (Gar.)</i>	Z	0	2BP+2BC	Z,L	P
BEZZ	Basic health and occupational safety regulations <i>Vladimír K la, Ivana Nová, Radek Havlí ek Radek Havlí ek Vladimír K la (Gar.)</i>	Z	0	2BP+2BC	Z	P

Characteristics of the courses of this group of Study Plan: Code=2018_BEEMBBE Name=Safety of the bachelor's studies

BEZB	Safety in Electrical Engineering for a bachelor's degree	Z	0
The purpose of the safety course is to give the students basic knowledge of electrical equipment and installation as to avoid danger arising from operation of it. This introductory course contains fundamentals of Safety Electrical Engineering. In this way the students receive qualification of instructed person that enables them to work on electrical equipment.			
BEZZ	Basic health and occupational safety regulations	Z	0
The guidelines were worked out based on The Training Scheme for Health and Occupational Safety designed for employees and students of the Czech Technical University in Prague, which was provided by the Rector's Office of the CTU. Safety is considered one of the basic duties of all employees and students. The knowledge of Health and Occupational Safety regulations forms an integral and permanent part of qualification requirements. This program is obligatory.			

Code of the group: 2018_BEEMP

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 118 credits

Requirement courses in the group: In this group you have to complete 24 courses

Credits in the group: 118

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
B0B01DRN	Differential Equations and Numerical Analysis Petr Habala, Aleš N me ek, Veronika Sobotíková, Karel Pospíšil Petr Habala Petr Habala (Gar.)	Z,ZK	4	2P+2C	L	P
B1B38EMA	Electrical Measurements Petr Kašpar, Jakub Svatoš Petr Kašpar Petr Kašpar (Gar.)	KZ	5	2P+2L	L	P
B1B31EOS	Electric circuits Martin Pokorný Martin Pokorný (Gar.)	Z,ZK	6	3P+2S	Z	P
B1B15EN11	Power Engineering 1 Zden k Müller, Ladislav Musil	Z,ZK	5	3P+2S	L	P
B1B15EN2	Power Engineering 2 Radek Procházka Radek Procházka (Gar.)	Z,ZK	5	2P+2L	Z	P
B1B17EMP	Electromagnetic Field Vít zslav Pankrác Vít zslav Pankrác Vít zslav Pankrác (Gar.)	Z,ZK	5	2P+2C	Z	P
B1B34EPS	Elektronics for Heavy-current engineering Adam Bou a, Vít Záhlava, Vladimír Janí ek, Jan Novák, Tomáš Teplý Vladimír Janí ek Vladimír Janí ek (Gar.)	KZ	4	2P+2L	Z	P
B1B02FY1	Physics 1 Petr Koní ek Petr Koní ek Petr Koní ek (Gar.)	Z,ZK	8	4P+1L+2C	L	P
B1B02FY2	Physics 2 Petr Koní ek, Petr Kulhánek Petr Kulhánek Petr Koní ek (Gar.)	Z,ZK	7	3P+1L+2C	Z	P
B0B01KANA	Complex Analysis Martin Bohata, Zden k Mihula, Externista Mihula Zden k Martin Bohata Jan Hamhalter (Gar.)	Z,ZK	4	2P+2S	Z	P
B0B01LAGA	Linear Algebra Ji í Velebil, Kate ina Helisová, Natalie Žukovec, Mat j Dostál Ji í Velebil Ji í Velebil (Gar.)	Z,ZK	7	4P+2S	Z	P
B0B01MA1A	Mathematical Analysis 1 Veronika Sobotíková, Karel Pospíšil Veronika Sobotíková Veronika Sobotíková (Gar.)	Z,ZK	6	4P+2S	Z	P
B0B01MA2A	Mathematical Analysis 2 Martin Bohata, Paola Vivi, Natalie Žukovec, Jaroslav Tišer, Josef Hekrdla Petr Hájek Petr Hájek (Gar.)	Z,ZK	6	4P+2S	L	P
B1B13MVE1	Materials for Power Electrical Engineering Pavel Mach, Josef Sedlá ek, Pavel Ctibor, Karel Dušek Karel Dušek Pavel Mach (Gar.)	Z,ZK	4	2P+2L	Z	P
B0B99PRPA	Procedural Programming Stanislav Vítek Stanislav Vítek Stanislav Vítek (Gar.)	KZ	4	2P+2C	Z	P
B1BPROJ4	Bachelor project Zden k Müller, Ivana Beshajová Pelikánová, Jan Mikeš, Jan Kyncl, Jan Bauer, Karel Künzel, Vít Klein, Stanislav Bou ek, Ji í Vaší ek, Jan Bauer Jan Bauer (Gar.)	Z	4	4s		P
B1B13PPS	Industrial computer systems Karel Künzel Karel Künzel Karel Künzel (Gar.)	Z,ZK	4	2P+2L	L	P
B1B13TEP	Electrical engineering technological processes Pavel Mach, Karel Dušek, Jan Kuba Karel Dušek Pavel Mach (Gar.)	Z,ZK	4	3P+2L	L	P
B1B15VYA	Computational Applications Jan Kyncl Jan Kyncl (Gar.)	KZ	4	2P+2C	L	P
B1B13VVZ1	Manufacturing of Power Devices Jan Kuba, Ji í Hájek, Petr Gric Ji í Hájek Ji í Hájek (Gar.)	Z,ZK	4	2P+2L	Z	P
B1B14ZPO	Fundamentals of Electric Drives Pavel Kobrle Pavel Kobrle	Z,ZK	5	2P+2L	Z	P
B1B14ZSP	Electric Machines and Apparatuses Basics Pavel Kobrle, Pavel Mindl Pavel Kobrle Pavel Kobrle (Gar.)	Z,ZK	5	3P+2L	L	P
B1B14ZEL1	Fundamentals of Electrotechnical Engineering Ivana Nová, Vít Hlinovský, Ji í Beranovský Ivana Nová	KZ	4	2P+2C	Z	P
B1B14ZVE	Power Electronics Jan Bauer, Ji í Lettl Ji í Lettl Ji í Lettl (Gar.)	Z,ZK	4	2P+2L	Z	P

Characteristics of the courses of this group of Study Plan: Code=2018_BEEMP Name=Compulsory subjects of the programme

B0B01DRN	Differential Equations and Numerical Analysis	Z,ZK	4
B1B38EMA	Electrical Measurements	KZ	5

The subject is focused to fundamentals of measurement and instrumentation. Based on the principle of the methods of electrical quantities measurement (voltage, current, power, frequency, resistance, capacitance and inductance) a structure and properties of measuring instruments are explained including principles of their correct application and an accuracy estimation. Fundamentals of magnetic measurements close the course. Výsledek studentské ankety p edm tu je zde: <http://www.fel.cvut.cz/anketa/aktualni/courses/AE1B38EMA>

B1B31EOS	Electric circuits	Z,ZK	6
The subject describes fundamental methods of electrical circuit analysis. The aim is to unify different level of knowledge of students coming from schools of different categories and form the basis of knowledge necessary for next subjects. It presents the difference among physical circuit and its models, and then it presents the behavior of basic ideal circuit elements in DC circuits and in sinusoidal steady state as well as transients, caused by changes in the circuit. Acquired knowledge should, among other things, also be used for critical assessment of the results of the analysis and simulation of electrical circuits by means of software tools.			
B1B15EN11	Power Engineering 1	Z,ZK	5
B1B15EN2	Power Engineering 2	Z,ZK	5
B1B17EMP	Electromagnetic Field	Z,ZK	5
This course gets its students acquainted with principles and applied electromagnetic field theory basics.			
B1B34EPS	Elektronics for Heavy-current engineering	KZ	4
Knowledge of current basic passive and active electronic components. Structure, physical and circuit properties of components. Component behavior when working with both small and large analog, digital and optical signals. More complex circuit systems and communication technologies. Measuring the most important applications of modern semiconductor devices.			
B1B02FY1	Physics 1	Z,ZK	8
The basic course of physics at the Faculty of Electrical Engineering - Physics 1, is devoted to the introduction into two important areas of physics. The first one is a classical mechanics and the second one is the electric and magnetic field. Within the framework of the classical mechanics, the students study the particle kinematics; dynamics of the mass particle, system of mass particles and rigid bodies. The students should be able to solve basic problems dealing with the description of mechanical systems, which they can meet during their further studies. The classical mechanics is followed by the relativistic mechanics, electric and magnetic field - both stationary as well as non-stationary. The students can use the facts gained in this course in the study of electrical circuits, theory of electrotechnical materials or radioelectronics. Apart of this, the knowledge gained in this course is required for the study of the consecutive course Physics 2.			
B1B02FY2	Physics 2	Z,ZK	7
The course Physics 2 is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundations of thermodynamics. Following topic - the theory of waves - will give to the students basic insight into the properties of waves and will help to the students to understand that the presented description of the waves has a universal character in spite of the waves character. Particular types of waves, such as acoustic or optical waves are the subjects of the following section. Quantum mechanics and nuclear physics will complete the student's general education in physics. The knowledge gained in this course will help to the students in study of such modern areas as robotics, computer vision, measuring technique and will allow them to understand the principles of novel technologies and functioning of new electronic devices.			
B0B01KANA	Complex Analysis	Z,ZK	4
B0B01LAGA	Linear Algebra	Z,ZK	7
B0B01MA1A	Mathematical Analysis 1	Z,ZK	6
This is an introductory course to differential and integral calculus of functions of one real variable.			
B0B01MA2A	Mathematical Analysis 2	Z,ZK	6
The subject covers an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals. Other part contains function series and power series with application to Taylor and Fourier series.			
B1B13MVE1	Materials for Power Electrical Engineering	Z,ZK	4
At first a physical description of basic properties and basic types of materials for electrical engineering is carried out. Types of conductors, superconductors, insulators, magnetic materials and semiconductors, which are used in power electrical engineering, are presented. The stress is put on relationships between properties, technology and the use. The student will meet, in higher detail, with ceramics for electrical engineering, with properties of mica, glass and their applications, with environmental conductive joining, with materials for thin and thick films and with selected nanomaterials and their applications.			
B0B99PRPA	Procedural Programming	KZ	4
B1BPROJ4	Bachelor project	Z	4
B1B13PPS	Industrial computer systems	Z,ZK	4
The subject is focused on basic knowledges about computer control systems used in electrotechnic engineering and energetics. Students works with hardware for data acquisition and data processing, software tools and application examples. There are presented elementary digital circuits, the representation of numbers and their processing in microcomputer and fundamental block of microprocessor and microcomputer. The single chip microcomputer, embedded application, industrial PC and design to industrial condition are presented.			
B1B13TEP	Electrical engineering technological processes	Z,ZK	4
Technologies used in electronics, laser, and other beam technologies and IC packaging will be characterized. There will also be discussed fundamentals of winding, drying and impregnation processes. The subject is also the basis for producing single-crystal Si. Technology using plasma technology, packaging, and basic assembly technologies are also presented.			
B1B15VYA	Computational Applications	KZ	4
B1B13VVZ1	Manufacturing of Power Devices	Z,ZK	4
The topic of the subject is focused on manufacturing of power electrical machines and devices from construction and technological point of view. Main part of the subject is devoted to transformers and rotating machines, namely their magnetic circuits and windings. Second half of the subject is dedicated to manufacturing of power semiconductive devices and converters including diagnostics, reliable operation. Last part of lectures deals with layouts of manufacturing, lean management and planning of manufacturing.			
B1B14ZPO	Fundamentals of Electric Drives	Z,ZK	5
B1B14ZSP	Electric Machines and Apparatuses Basics	Z,ZK	5
The course explains the principles of machines for conversion of mechanical energy to electrical and back. It discusses the principles of basic functions and properties of rotating and non-rotating electric machines. Following the behavior of electrical machines are discussed basic devices for protection and switching, including behavioral and switching problems.			
B1B14ZEL1	Fundamentals of Electrotechnical Engineering	KZ	4
The course extends necessary knowledge of the technical documentation, technical text and its presentation. The second half of the semester is focused on an explanation and practicing of basics electrotechnics so that knowledge of students are increased to the level needed in the next semesters.			
B1B14ZVE	Power Electronics	Z,ZK	4
The course focuses on the basic types of power semiconductor converters, which are used to change the parameters of electricity. Students are introduced to the basic principles, properties and applications of power electronic converters, their advantages, disadvantages, and fuse sizing.			

Code of the group: 2015_BZAJ

Name of the group: Exam from the english language

Requirement credits in the group:

Requirement courses in the group: In this group you have to complete 2 courses

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
B0B04B1K	English language B1 - classified assessment Petra Jennings, Dana Saláková, Markéta Havlíková, Pavla Péterová Dana Saláková (Gar.)	KZ	0	0C	Z,L	P
B0B04B2Z	English language B2 - exam Petra Jennings, Dana Saláková, Markéta Havlíková, Erik Peter Stadnik, Jonathan Michael Daly, Pavla Péterová, Michael Ynsua Pavla Péterová Dana Saláková (Gar.)	Z,ZK	0	0C	Z,L	P

Characteristics of the courses of this group of Study Plan: Code=2015_BZAJ Name=Exam from the english language

B0B04B1K	English language B1 - classified assessment verifying of the student's skills of B1 level	KZ	0			
B0B04B2Z	English language B2 - exam B2 Common European Framework: Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. Grammar and Vocabulary: word families, verb-noun collocations, complex noun phrases, countable and uncountable nouns, prefixes, it-clauses, reporting verbs, questions, modal verbs, conjunctions and sentence connectors, articles, prepositions, wh-noun clauses, relative clauses, if-clauses, passive voice, past perfect, -ing nouns Listening: picking up information, transferring information Reading: A technical text is presented. Students are required to show understanding the concept and vocabularies. Writing: Emphasis is put on the expression of ideas in the independent writing of paragraphs and short essays. Students should be able to present a short basic argument in written English. Oral Skills: Students are supposed to use the language independently and effectively in all situations giving their own opinions and defending their ideas and beliefs. A mixture of research and development, career oriented and general topics is presented. Examination: The examination consists of two parts: a) Written test ? based on grammar and lexicology, NOT TAKEN by the students whose success rate in both the summer semester tests (Midterm and Final) is above 80%. The written test is followed by the oral part. b) Oral part ? reading a technical text with understanding (study reading techniques ? skimming and scanning, comprehension and discussion questions based on the text, translation), oral interaction, comprehending the content of the spoken message.	Z,ZK	0			

Name of the block: Povinné předměty zaměřené

Minimal number of credits of the block: 36

The role of the block: PZ

Code of the group: 2018_BEEMPS2

Name of the group: Compulsory subjects of the branch

Requirement credits in the group: In this group you have to gain 36 credits

Requirement courses in the group: In this group you have to complete 7 courses

Credits in the group: 36

Note on the group:

Specializace - elektrotechnika a management

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
B1B16MME	Macro and Microeconomics Helena Fialová, Lubomír Lízal, Alena Ambrožová Alena Ambrožová Lubomír Lízal (Gar.)	Z,ZK	5	2P+2S	Z	PZ
B1B01MEK	Mathematics for Economy Kateřina Helisová Kateřina Helisová Kateřina Helisová (Gar.)	Z,ZK	5	3P+2S	L	PZ
B1B16PPP	Business Law Petr Košík Petr Košík (Gar.)	Z,ZK	5	2P+2C	L	PZ
B1B13VEZ	Manufacturing of Electronic Equipment Tomáš Tichý, David Bušek, Jan Urbánek David Bušek David Bušek (Gar.)	Z,ZK	6	2P+2L	L	PZ
B1B16ZFM1	Basics of Financial Management Oldřich Starý	Z,ZK	5	2P+2C	L	PZ
B1B16ZPU	Basics of Business Economics Josef Ernohous, Oldřich Starý, Blanka Kůrková, Michaela Makešová Michaela Makešová Oldřich Starý (Gar.)	KZ	5	2P+2C	Z	PZ
B1B16UEE1	Economy of Power Industry Jiří Vašíček, Miroslav Vítek, Jaroslav Knápek Miroslav Vítek Jaroslav Knápek (Gar.)	Z,ZK	5	2P+2C	Z	PZ

Characteristics of the courses of this group of Study Plan: Code=2018_BEEMPS2 Name=Compulsory subjects of the branch

B1B16MME	Macro and Microeconomics Basic economic terms, market, law of demand, law of supply, market equilibrium, price regulation, price and income elasticities, consumer's behavior, producer's behavior, cost, revenue, profit, market failure, monopoly, government macroeconomic policy, gross domestic product, multipliers, money, inflation, banking system, monetary policy, labor market, business cycle, fiscal policy, foreign trade policy, comparative advantage, CR and EU, Euro.	Z,ZK	5			
B1B01MEK	Mathematics for Economy The aim is to introduce the basic theory of probability and statistics, familiarise students with basic terms properties and methods used in working with random processes, especially with Markov chains, and show applications of these mathematical tools in economics and insurance. At the end of the course, basic procedures of cluster analysis will be presented.	Z,ZK	5			
B1B16PPP	Business Law	Z,ZK	5			

B1B13VEZ	Manufacturing of Electronic Equipment Mechanical and electrical design. The electric contact. Joining of conductors. Cooling of components and equipment. Printed circuit boards fabrication. Soldering in electronics. Electromagnetic compatibility of electronic equipment. Protection of components and equipment sensitive on electrostatic field. Certification, accreditation, quality control and quality assurance.	Z,ZK	6
B1B16ZFM1	Basics of Financial Management	Z,ZK	5
B1B16ZPU	Basics of Business Economics	KZ	5
B1B16UEE1	Economy of Power Industry	Z,ZK	5

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 9

The role of the block: PV

Code of the group: 2018_BEEMH

Name of the group: Humanities subjects

Requirement credits in the group: In this group you have to gain at least 4 credits (at most 28)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 9)

Credits in the group: 4

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
B0B16ET1	Ethic 1 Vladimír Sláma ka Vladimír Sláma ka Vladimír Sláma ka (Gar.)	KZ	4	2P+2C	Z	PV
B0B16FIL	Philosophy Peter Zamarovský Josef ernohous Peter Zamarovský (Gar.)	ZK	2	2P+0S	Z,L	PV
B0B16FI1	Philosophy 1 Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)	KZ	4	2P+2S	Z	PV
B0B16HI1	History 1 Roman Elner, Milena Josefovi ová Milena Josefovi ová Milena Josefovi ová (Gar.)	KZ	4	2P+2S	Z	PV
B0B16HTE	History of technology and economic Jan Mikeš, Marcela Efmertová Marcela Efmertová Marcela Efmertová (Gar.)	ZK	2	2P+0S	Z,L	PV
B0B16HT1	History of science and technology 1 Jan Mikeš, Marcela Efmertová Jan Mikeš Marcela Efmertová (Gar.)	KZ	4	2P+2S	Z	PV
B0B16MPS	Psychology Jan Fiala Jan Fiala (Gar.)	Z,ZK	4	2P+2S	Z,L	PV
B0B16MPL	Psychology for managers Jan Fiala Jan Fiala Jan Fiala (Gar.)	ZK	2	2P+0S	Z,L	PV
A003TV	Physical Education	Z	2	0+2	L,Z	PV

Characteristics of the courses of this group of Study Plan: Code=2018_BEEMH Name=Humanities subjects

B0B16ET1	Ethic 1	KZ	4
Aim of this subject is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various situations of human life. Essential parts of the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the communal answers.			
B0B16FIL	Philosophy	ZK	2
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics.			
B0B16FI1	Philosophy 1	KZ	4
We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics.			
B0B16HI1	History 1	KZ	4
B0B16HTE	History of technology and economic	ZK	2
B0B16HT1	History of science and technology 1	KZ	4
B0B16MPS	Psychology	Z,ZK	4
B0B16MPL	Psychology for managers	ZK	2
A003TV	Physical Education	Z	2

Code of the group: 2018_BEEMPV2

Name of the group: Compulsory subjects of the programm

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:

Specializace - Elektrotechnika a management

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
B1B16EOB	Lightning protection economy Jan Mikeš	Z,ZK	5	2P+2L	L	PV
B1B13SSE	Solar Systems and Electrochemical Sources Jakub Holovský, Pavel Hrzina, Vít zslav Benda Jakub Holovský Vít zslav Benda (Gar.)	Z,ZK	4	2P+2L	L	PV

Characteristics of the courses of this group of Study Plan: Code=2018_BEEMPV2 Name=Compulsory subjects of the program

B1B16EOB	Lightning protection economy	Z,ZK	5	The course aims are to provide knowledge on the effects of atmospheric electricity, to familiarize them with the phenomenology of lightning discharge, fundamentals of physics distribution of electric charge in the cloud and between cloud and ground for students of master degree program at CTU Prague. Based on the study of theoretical characteristics of storm activity (isokeraunic maps, number of storm days, numerical, mathematical and physical models) to create a suitable choice of external and internal protection against direct and indirect effects of atmospheric electricity and show the economic context of the design concept. The course also covers the basic principles of risk assessment of damage caused by a lightning discharge by computational methods and their verification through IEC 62305 standards (students learn the principles of graphic and sequential detection of risk components). The theoretical training is also an economic analysis of loss events, predictive dialling protection, conclusive insurance schemes, etc.		
B1B13SSE	Solar Systems and Electrochemical Sources	Z,ZK	4	The course familiarizes students with the basic principles of electrochemical sources and photovoltaic cells and systems. At the beginning, the emphasis is on understanding the basic principle using the equivalent circuits and mathematical description. In the next section, the basic types of electrochemical sources and their technical parameters are explored separately. Similarly, students become familiar with the technology of photovoltaic cells and modules. Another chapter is devoted to the basic applications such as solar-thermal. At the end of the course, students become familiar with economical and technological implications of the combination of solar systems and electrochemical sources.		

Name of the block: Elective courses

Minimal number of credits of the block: 0

The role of the block: V

Code of the group: 2015_BJKA

Name of the group: English language courses

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
B0B04A21	English Language A2-1 Pavla Péterová	Z		2s	Z	v
B0B04A22	English Language A2-2 Markéta Havlíková	Z	0	2s	L	v
B0B04B11	English Language B1-1 Pavla Péterová Dana Saláková (Gar.)	Z	0	2s	Z	v
B0B04B12	English Language B1-2 Pavla Péterová	Z	0	2C	L	v
B0B04B21	English Language B2-1 Pavla Péterová Dana Saláková (Gar.)	Z	3	2C	Z	v
B0B04B22	English Language B2-2 Pavla Péterová Dana Saláková (Gar.)	Z	3	2C	Z,L	v

Characteristics of the courses of this group of Study Plan: Code=2015_BJKA Name=English language courses

B0B04A21	English Language A2-1	Z		The course is open to students who are beginners in their second language. Course objective: Achieving competence in basic English.		
B0B04A22	English Language A2-2	Z	0	The course is open to students who are beginners in their second foreign language. The course objective is to develop and sustain their basic knowledge of the English language.		
B0B04B11	English Language B1-1	Z	0	Course objective: Broadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary expansion; understanding spoken English.		
B0B04B12	English Language B1-2	Z	0	Course objective: Broadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary expansion; understanding spoken English.		
B0B04B21	English Language B2-1	Z	3	The course is suitable for students who have good knowledge of the material covered in secondary school in that language. Course objective: The course focuses on academic English and practising difficult grammar concepts.		
B0B04B22	English Language B2-2	Z	3	The course is suitable for students who have good knowledge of the material covered in secondary school. Course objective: The course focuses on technical English and practising difficult grammar.		

Code of the group: BTV

Name of the group: T lesná výchova

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) <i>Tutors, authors and guarantors (gar.)</i>	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
TVV0	Physical education	Z	0	0+2	Z,L	v
TV-V1	Physical education	Z	1	0+2	Z,L	v

Characteristics of the courses of this group of Study Plan: Code=BTV Name=T lesná výchova

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

Code of the group: BTVK

Name of the group: T lovýchovné kurzy

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
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=BTVK Name=T lovýchovné kurzy

TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0

Code of the group: 2018_BEEMVOL

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
A003TV	Physical Education	Z	2
B0B01DRN	Differential Equations and Numerical Analysis	Z,ZK	4
B0B01KANA	Complex Analysis	Z,ZK	4
B0B01LAGA	Linear Algebra	Z,ZK	7
B0B01MA1A	Mathematical Analysis 1	Z,ZK	6

This is an introductory course to differential and integral calculus of functions of one real variable.

B0B01MA2A	Mathematical Analysis 2 The subject covers an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals. Other part contains function series and power series with application to Taylor and Fourier series.	Z,ZK	6
B0B04A21	English Language A2-1 The course is open to students who are beginners in their second language. Course objective: Achieving competence in basic English.	Z	
B0B04A22	English Language A2-2 The course is open to students who are beginners in their second foreign language. The course objective is to develop and sustain their basic knowledge of the English language.	Z	0
B0B04B11	English Language B1-1 Course objective: Broadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary expansion; understanding spoken English.	Z	0
B0B04B12	English Language B1-2 Course objective: Broadening the basic knowledge of general English; mastering basic specialised language; focusing on text analysis and vocabulary expansion; understanding spoken English.	Z	0
B0B04B1K	English language B1 - classified assessment verifying of the student's skills of B1 level	KZ	0
B0B04B21	English Language B2-1 The course is suitable for students who have good knowledge of the material covered in secondary school in that language. Course objective: The course focuses on academic English and practising difficult grammar concepts.	Z	3
B0B04B22	English Language B2-2 The course is suitable for students who have good knowledge of the material covered in secondary school. Course objective: The course focuses on technical English and practising difficult grammar.	Z	3
B0B04B2Z	English language B2 - exam B2 Common European Framework: Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options. Grammar and Vocabulary: word families, verb-noun collocations, complex noun phrases, countable and uncountable nouns, prefixes, it-clauses, reporting verbs, questions, modal verbs, conjunctions and sentence connectors, articles, prepositions, wh-noun clauses, relative clauses, if-clauses, passive voice, past perfect, -ing nouns Listening: picking up information, transferring information Reading: A technical text is presented. Students are required to show understanding the concept and vocabularies. Writing: Emphasis is put on the expression of ideas in the independent writing of paragraphs and short essays. Students should be able to present a short basic argument in written English. Oral Skills: Students are supposed to use the language independently and effectively in all situations giving their own opinions and defending their ideas and beliefs. A mixture of research and development, career oriented and general topics is presented. Examination: The examination consists of two parts: a) Written test ? based on grammar and lexicology, NOT TAKEN by the students whose success rate in both the summer semester tests (Midterm and Final) is above 80%. The written test is followed by the oral part. b) Oral part ? reading a technical text with understanding (study reading techniques ? skimming and scanning, comprehension and discussion questions based on the text, translation), oral interaction, comprehending the content of the spoken message.	Z,ZK	0
B0B16ET1	Ethic 1 Aim of this subject is to provide the students an orientation not only in general problems of ethics but above all to offer instructions for solving various situations of human life. Essential parts of the subject are discussions in which students can react to lectures but also to actual questions coming with news and look for the communal answers.	KZ	4
B0B16F11	Philosophy 1 We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics.	KZ	4
B0B16FIL	Philosophy We deal with the most important persons, schools and ideas of ancient philosophy. We are concerned especially on transdisciplinary nature of philosophy and connection of old philosophical thoughts with recent problems of science, technology, economics and politics.	ZK	2
B0B16HI1	History 1	KZ	4
B0B16HT1	History of science and technology 1	KZ	4
B0B16HTE	History of technology and economic	ZK	2
B0B16MPL	Psychology for managers	ZK	2
B0B16MPS	Psychology	Z,ZK	4
B0B99PRPA	Procedural Programming	KZ	4
B1B01MEK	Mathematics for Economy The aim is to introduce the basic theory of probability and statistics, familiarise students with basic terms properties and methods used in working with random processes, especially with Markov chains, and show applications of these mathematical tools in economics and insurance. At the end of the course, basic procedures of cluster analysis will be presented.	Z,ZK	5
B1B02FY1	Physics 1 The basic course of physics at the Faculty of Electrical Engineering - Physics 1, is devoted to the introduction into two important areas of physics. The first one is a classical mechanics and the second one is the electric and magnetic field. Within the framework of the classical mechanics, the students study the particle kinematics; dynamics of the mass particle, system of mass particles and rigid bodies. The students should be able to solve basic problems dealing with the description of mechanical systems, which they can meet during their further studies. The classical mechanics is followed by the relativistic mechanics, electric and magnetic field - both stationary as well as non-stationary. The students can use the facts gained in this course in the study of electrical circuits, theory of electrotechnical materials or radioelectronics. Apart of this, the knowledge gained in this course is required for the study of the consecutive course Physics 2.	Z,ZK	8
B1B02FY2	Physics 2 The course Physics 2 is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundations of thermodynamics. Following topic - the theory of waves - will give to the students basic insight into the properties of waves and will help to the students to understand that the presented description of the waves has a universal character in spite of the waves character. Particular types of waves, such as acoustic or optical waves are the subjects of the following section. Quantum mechanics and nuclear physics will complete the student's general education in physics. The knowledge gained in this course will help to the students in study of such modern areas as robotics, computer vision, measuring technique and will allow them to understand the principles of novel technologies and functioning of new electronic devices.	Z,ZK	7
B1B13MVE1	Materials for Power Electrical Engineering At first a physical description of basic properties and basic types of materials for electrical engineering is carried out. Types of conductors, superconductors, insulators, magnetic materials and semiconductors, which are used in power electrical engineering, are presented. The stress is put on relationships between properties, technology and the use. The student will meet, in higher detail, with ceramics for electrical engineering, with properties of mica, glass and their applications, with environmental conductive joining, with materials for thin and thick films and with selected nanomaterials and their applications.	Z,ZK	4

B1B13PPS	Industrial computer systems	Z,ZK	4
The subject is focused on basic knowledges about computer control systems used in electrotechnic engineering and energetics. Students works with hardware for data acquisition and data processing, software tools and application examples. There are presented elementary digital circuits, the representation of numbers and their processing in microcomputer and fundamental block of microprocessor and microcomputer. The single chip microcomputer, embedded application, industrial PC and design to industrial condition are presented.			
B1B13SSE	Solar Systems and Electrochemical Sources	Z,ZK	4
The course familiarizes students with the basic principles of electrochemical sources and photovoltaic cells and systems. At the beginning, the emphasis is on understanding the basic principle using the equivalent circuits and mathematical description. In the next section, the basic types of electrochemical sources and their technical parameters are explored separately. Similarly, students become familiar with the technology of photovoltaic cells and modules. Another chapter is devoted to the basic applications such as solar-thermal. At the end of the course, students become familiar with economical and technological implications of the combination of solar systems and electrochemical sources.			
B1B13TEP	Electrical engineering technological processes	Z,ZK	4
Technologies used in electronics, laser, and other beam technologies and IC packaging will be characterized. There will also be discussed fundamentals of winding, drying and impregnation processes. The subject is also the basis for producing single-crystal Si. Technology using plasma technology, packaging, and basic assembly technologies are also presented.			
B1B13VEZ	Manufacturing of Electronic Equipment	Z,ZK	6
Mechanical and electrical design. The electric contact. Joining of conductors. Cooling of components and equipment. Printed circuit boards fabrication. Soldering in electronics. Electromagnetic compatibility of electronic equipment. Protection of components and equipment sensitive on electrostatic field. Certification, accreditation, quality control and quality assurance.			
B1B13VVZ1	Manufacturing of Power Devices	Z,ZK	4
The topic of the subject is focused on manufacturing of power electrical machines and devices from construction and technological point of view. Main part of the subject is devoted to transformers and rotating machines, namely their magnetic circuits and windings. Second half of the subject is dedicated to manufacturing of power semiconductive devices and converters including diagnostics, reliable operation. Last part of lectures deals with layouts of manufacturing, lean management and planning of manufacturing.			
B1B14ZEL1	Fundamentals of Electrotechnical Engineering	KZ	4
The course extends necessary knowledge of the technical documentation, technical text and its presentation. The second half of the semester is focused on an explanation and practicing of basics electrotechnics so that knowledge of students are increased to the level needed in the next semesters.			
B1B14ZPO	Fundamentals of Electric Drives	Z,ZK	5
B1B14ZSP	Electric Machines and Apparatuses Basics	Z,ZK	5
The course explains the principles of machines for conversion of mechanical energy to electrical and back. It discusses the principles of basic functions and properties of rotating and non-rotating electric machines. Following the behavior of electrical machines are discussed basic devices for protection and switching, including behavioral and switching problems.			
B1B14ZVE	Power Electronics	Z,ZK	4
The course focuses on the basic types of power semiconductor converters, which are used to change the parameters of electricity. Students are introduced to the basic principles, properties and applications of power electronic converters, their advantages, disadvantages, and fuse sizing.			
B1B15EN11	Power Engineering 1	Z,ZK	5
B1B15EN2	Power Engineering 2	Z,ZK	5
B1B15VYA	Computational Applications	KZ	4
B1B16EOB	Lightning protection economy	Z,ZK	5
The course aims are to provide knowledge on the effects of atmospheric electricity, to familiarize them with the phenomenology of lightning discharge, fundamentals of physics distribution of electric charge in the cloud and between cloud and ground for students of master degree program at CTU Prague. Based on the study of theoretical characteristics of storm activity (isokeraunic maps, number of storm days, numerical, mathematical and physical models) to create a suitable choice of external and internal protection against direct and indirect effects of atmospheric electricity and show the economic context of the design concept. The course also covers the basic principles of risk assessment of damage caused by a lightning discharge by computational methods and their verification through IEC 62305 standards (students learn the principles of graphic and sequential detection of risk components). The theoretical training is also an economic analysis of loss events, predictive dialling protection, conclusive insurance schemes, etc.			
B1B16MME	Macro and Microeconomics	Z,ZK	5
Basic economic terms, market, law of demand, law of supply, market equilibrium, price regulation, price and income elasticities, consumer's behavior, producer's behavior, cost, revenue, profit, market failure, monopoly, government macroeconomic policy, gross domestic product, multipliers, money, inflation, banking system, monetary policy, labor market, business cycle, fiscal policy, foreign trade policy, comparative advantage, CR and EU, Euro.			
B1B16PPP	Business Law	Z,ZK	5
B1B16UEE1	Economy of Power Industry	Z,ZK	5
B1B16ZFM1	Basics of Financial Management	Z,ZK	5
B1B16ZPU	Basics of Business Economics	KZ	5
B1B17EMP	Electromagnetic Field	Z,ZK	5
This course gets its students acquainted with principles and applied electromagnetic field theory basics.			
B1B31EOS	Electric circuits	Z,ZK	6
The subject describes fundamental methods of electrical circuit analysis. The aim is to unify different level of knowledge of students coming from schools of different categories and form the basis of knowledge necessary for next subjects. It presents the difference among physical circuit and its models, and then it presents the behavior of basic ideal circuit elements in DC circuits and in sinusoidal steady state as well as transients, caused by changes in the circuit. Acquired knowledge should, among other things, also be used for critical assessment of the results of the analysis and simulation of electrical circuits by means of software tools.			
B1B34EPS	Elektronics for Heavy-current engineering	KZ	4
Knowledge of current basic passive and active electronic components. Structure, physical and circuit properties of components. Component behavior when working with both small and large analog, digital and optical signals. More complex circuit systems and communication technologies. Measuring the most important applications of modern semiconductor devices.			
B1B38EMA	Electrical Measurements	KZ	5
The subject is focused to fundamentals of measurement and instrumentation. Based on the principle of the methods of electrical quantities measurement (voltage, current, power, frequency, resistance, capacitance and inductance) a structure and properties of measuring instruments are explained including principles of their correct application and an accuracy estimation. Fundamentals of magnetic measurements close the course. Výsledek studentské ankety p edm tu je zde: http://www.fel.cvut.cz/anketa/aktualni/courses/AE1B38EMA			
B1BPROJ4	Bachelor project	Z	4
BBAP15	Bachelor thesis	Z	15
BEZB	Safety in Electrical Engineering for a bachelor's degree	Z	0
The purpose of the safety course is to give the students basic knowledge of electrical equipment and installation as to avoid danger arising from operation of it. This introductory course contains fundamentals of Safety Electrical Engineering. In this way the students receive qualification of instructed person that enables them to work on electrical equipment.			

BEZZ	Basic health and occupational safety regulations	Z	0
The guidelines were worked out based on The Training Scheme for Health and Occupational Safety designed for employees and students of the Czech Technical University in Prague, which was provided by the Rector's Office of the CTU. Safety is considered one of the basic duties of all employees and students. The knowledge of Health and Occupational Safety regulations forms an integral and permanent part of qualification requirements. This program is obligatory.			
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 <http://bilakniha.cvut.cz/en/f3.html>

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