Study plan

Name of study plan: Electrical Engineering, Power Engineering and Management - Applied Electrical Engineering 2016

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: Bachelor full-time
Required credits: 172
Elective courses credits: 8
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: 155
The role of the block: P

Code of the group: 2015_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)* *Tutors,* ***authors*** *and guarantors (gar.)*	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=2015_BEEMBAP Name=Bachelor Project

BBAP15	Bachelor thesis	Z	15

Code of the group: 2015_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)* *Tutors,* ***authors*** *and guarantors (gar.)*	Completion	Credits	Scope	Semester	Role
BEZB	**Safety in Electrical Engineering for a Bachelor´s Degree** *Ivana Nová, Radek Havlíček, Vladimír Kůla* ***Radek Havlíček*** *Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z,L	P
BEZZ	**Basic Health and Occupational Safety Regulations** *Ivana Nová, Radek Havlíček, Vladimír Kůla* ***Radek Havlíček*** *Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P

Characteristics of the courses of this group of Study Plan: Code=2015_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: 2015_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 Slámečka* ***Vladimír Slámečka*** *Vladimír Slámečka (Gar.)*	KZ	4	2P+2C	Z	P
B0B16FIL	**Philosophy** *Peter Zamarovský* ***Peter Zamarovský*** *Peter Zamarovský (Gar.)*	ZK	2	2P+0S	Z,L	P
B0B16FI1	**Philosophy 1** *Peter Zamarovský* ***Peter Zamarovský*** *Peter Zamarovský (Gar.)*	KZ	4	2P+2S	Z	P
B0B16HTE	**History of technology and economic** *Marcela Efmertová, Jan Mikeš* ***Marcela Efmertová*** *Marcela Efmertová (Gar.)*	ZK	2	2P+0S	Z,L	P
B0B16HT1	**History of science and technology 1** *Marcela Efmertová, Jan Mikeš* ***Marcela Efmertová*** *Marcela Efmertová (Gar.)*	KZ	4	2P+2S	Z	P
B0B16HI1	**History 1** *Milena Josefovičová* ***Milena Josefovičová*** *Milena Josefovičová (Gar.)*	KZ	4	2P+2S	Z	P
B0B16MPS	**Psychology** *Jan Fiala* ***Jan Fiala*** *Jan Fiala (Gar.)*	Z,ZK	4	2P+2S	Z,L	P
B0B16MPL	**Psychology for managers** *Jan Fiala* ***Jan Fiala*** *Jan Fiala (Gar.)*	ZK	2	2P+0S	Z,L	P
A003TV	**Physical Education** ***Jiří Drnek***	Z	2	0+2	L,Z	P

Characteristics of the courses of this group of Study Plan: Code=2015_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.			
B0B16HTE	History of technology and economic	ZK	2
B0B16HT1	History of science and technology 1	KZ	4
B0B16HI1	History 1	KZ	4
B0B16MPS	Psychology	Z,ZK	4
B0B16MPL	Psychology for managers	ZK	2
A003TV	Physical Education	Z	2

Code of the group: 2015_BEEMP
Name of the group: Compulsory subjects of the programme
Requirement credits in the group: In this group you have to gain 136 credits
Requirement courses in the group: In this group you have to complete 26 courses
Credits in the group: 136
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	**Differencial Equations and Numerical Analysis** *Petr Habala, Jakub Rondoš, Jakub Staněk, Daniel Gromada, Josef Dvořák* ***Petr Habala*** *Petr Habala (Gar.)*	Z,ZK	4	2P+2C	L	P
B1B38EMA	**Electrical Measurements** *Jakub Svatoš* ***Jakub Svatoš*** *Jakub Svatoš (Gar.)*	KZ	5	2P+2L	L	P
B1B31EOS	**Electric circuits** *Martin Pokorný, Michal Šimek* ***Martin Pokorný*** *Martin Pokorný (Gar.)*	Z,ZK	6	3P+2S	Z	P
B1B15EN1	**Power Engineering 1**	Z,ZK	6	3P+2S	L	P
B1B15EN2	**Power Engineering 2** *Ivo Doležel, Zdeněk Müller*	Z,ZK	5	2P+2L	Z	P

B1B17EMP	**Electromagnetic Field** *Vítězslav Pankrác* ***Vítězslav Pankrác*** *Vítězslav Pankrác (Gar.)*	Z,ZK	5	2P+2C	Z	P
B1B34EPS	**Elektronics for Heavy-current engeneering** *Vladimír Janíček, Adam Bouřa, Jan Novák, Tomáš Teplý, Tomáš Martan* ***Vladimír Janíček*** *Vladimír Janíček (Gar.)*	KZ	4	2P+2L	Z	P
B1B02FY1	**Physics 1** *Petr Koníček* ***Petr Koníček*** *Petr Koníček (Gar.)*	Z,ZK	8	4P+1L+2C	L	P
B1B02FY2	**Physics 2** *Petr Koníček, Marek Brothánek, Vojtěch Jandák* ***Petr Koníček*** *Petr Koníček (Gar.)*	Z,ZK	7	3P+1L+2C	Z	P
B0B01KAN	**Complex Analysis** *Zdeněk Mihula, Hana Turčinová* ***Zdeněk Mihula*** *Zdeněk Mihula (Gar.)*	Z,ZK	5	2P+2S	Z	P
B0B01LAG	**Linear Algebra** *Jakub Rondoš, Daniel Gromada, Josef Dvořák, Jiří Velebil, Natalie Žukovec, Matěj Dostál* ***Jiří Velebil*** *Jiří Velebil (Gar.)*	Z,ZK	8	4P+2S	Z	P
B0B16MME	**Macro and Microekonomics**	Z,ZK	4	2P+2S	Z	P
B0B01MA1	**Mathematical Analysis 1** *Josef Dvořák, Martin Křepela, Josef Tkadlec, Veronika Sobotíková* ***Josef Tkadlec*** *Josef Tkadlec (Gar.)*	Z,ZK	7	4P+2S	Z,L	P
B0B01MA2	**Mathematical Analysis 2** *Hana Turčinová, Miroslav Korbelář, Petr Hájek, Martin Bohata, Jaroslav Tišer, Karel Pospíšil, Paola Vivi* ***Petr Hájek*** *Jaroslav Tišer (Gar.)*	Z,ZK	7	4P+2S	L,Z	P
B1B13MVE	**Materials for Power Electrical Engineering**	Z,ZK	5	2P+2L	Z	P
B0B99PRP	**Procedural Programming**	Z,ZK	6	2P+2C	Z	P
B1BPROJ4	**Bachelor project** *Jan Mikeš, Zdeněk Müller, Jan Kyncl, Jan Bauer, Ivana Beshajová Pelikánová, Karel Künzel, Stanislav Bouček, Jiří Vašíček, Miroslav Vítek, ...* ***Jan Bauer*** *Jan Bauer (Gar.)*	Z	4	4s	Z,L	P
B1B13PPS	**Industrial computer systems** *Karel Künzel* ***Karel Künzel*** *Karel Künzel (Gar.)*	Z,ZK	4	2P+2L	L	P
B0B01STP	**Statistics and Probability** *Jakub Staněk, Miroslav Korbelář, Kateřina Helisová, Bogdan Radović* ***Kateřina Helisová*** *Kateřina Helisová (Gar.)*	Z,ZK	5	2P+2S	L	P
B1B13VST	**Technology in Electrical Engineering**	Z,ZK	5	3P+2L	L	P
B1B15VYA	**Computational Applications** *Jan Kyncl Jan Kyncl (Gar.)*	KZ	4	2P+2C	L	P
B1B13VVZ	**Manufacturing of Power Devices**	Z,ZK	5	2P+2L	Z	P
B1B14ZPO	**Fundametals 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
B1B14ZEL	**Fundamentals of Electrotechnical Engineering**	KZ	3	2P+2C	Z	P
B1B14ZVE	**Power Electronics** *Jan Bauer, Jiří Lettl* ***Jiří Lettl*** *Jiří Lettl (Gar.)*	Z,ZK	4	2P+2L	Z	P

Characteristics of the courses of this group of Study Plan: Code=2015_BEEMP Name=Compulsory subjects of the programme

B0B01DRN	Differencial Equations and Numerical Analysis	Z,ZK	4

This course introduces students to the classical theory of ordinary differential equations (separable and linear ODEs) and also to bsics of numerical methods (errors in calculations and stability, numerical solutions of algebraic and differential equations and their systems). The course takes advantage of the synnergy between theoretical and practical point of view.

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.

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.

B1B15EN1	Power Engineering 1	Z,ZK	6
B1B15EN2	Power Engineering 2	Z,ZK	5
B1B17EMP	Electromagnetic Field	Z,ZK	5

This course gets its students acquinted with principles and applied electromagnetic field theory basics.

B1B34EPS	Elektronics for Heavy-current engeneering	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.			
B0B01KAN	Complex Analysis	Z,ZK	5
The course is an introduction to the fundamentals of complex analysis and its applications. The basic principles of Fourier, Laplace, and Z-transform are explained, including their applications, particularly to solving differential and difference equations.			
B0B01LAG	Linear Algebra	Z,ZK	8
The course covers the initial parts of linear algebra. Firstly, the basic notions of a linear space and linear mappings are covered (linear dependence and independence, basis, coordinates, etc). The calculus of matrices (determinants, inverse matrices, matrices of a linear map, eigenvalues and eigenvectors, diagonalisation, etc) is covered next. The applications include solving systems of linear equations, the geometry of a 3D space (including the scalar product and the vector product) and SVD.			
B0B16MME	Macro and Microekonomics	Z,ZK	4
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.			
B0B01MA1	Mathematical Analysis 1	Z,ZK	7
The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.			
B0B01MA2	Mathematical Analysis 2	Z,ZK	7
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.			
B1B13MVE	Materials for Power Electrical Engineering	Z,ZK	5
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.			
B0B99PRP	Procedural Programming	Z,ZK	6
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.			
B0B01STP	Statistics and Probability	Z,ZK	5
The aim of the course is to introduce students to the fundamentals of probability theory and mathematical statistics, their computational methods as well as applications of these mathematical tools to practical examples.			
B1B13VST	Technology in Electrical Engineering	Z,ZK	5
Production systems in electrical engineering will be characterized, their arrangement and basic technologies for mechanical joints and plastic parts. Manufacturing of windings,drying and impregnation processes will also been presented. Next part of a course will be focused on basic technologies for semiconductors including power integration. Beam technologies, technologies using plasma, packaging and basic assembly technologies will also been presented.			
B1B15VYA	Computational Applications	KZ	4
B1B13VVZ	Manufacturing of Power Devices	Z,ZK	5
The topic of the subject is focused on manufacturing of power electrical machines and devices from construction and technological point of wiev. 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 manufactirung, lean management and planning of manufacturing.			
B1B14ZPO	Fundametals of Electric Drives	Z,ZK	5
The course provides the basic terms and knowledge in electric drives and in the issues related to this discipline as well. The lectures are focused on the basic of electric drives logic control, continuous control and also discrete control, and on the characteristics of used controllers in practice. Further, the basic control structures of drives with DC and AC machines are explained.			
B1B14ZSP	Electric Machines and Apparatuses Basics	Z,ZK	5
The course explains the principles of machines for convertsion 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.			
B1B14ZEL	Fundamentals of Electrotechnical Engineering	KZ	3
The course extends necessary knowledge of the technical documentation, technical text and its presentation. The second half of the semester isfocused 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** *Markéta Havlíčková, Pavla Péterová, Erik Peter Stadnik, Michael Ynsua, Dana Saláková, Petra Juna Jennings* ***Petra Juna Jennings*** *Petra Juna Jennings (Gar.)*	KZ	0	0C	Z,L	P
B0B04B2Z	**English language B2 - exam** *Markéta Havlíčková, Michael Ynsua, Dana Saláková, Petra Juna Jennings* ***Petra Juna Jennings*** *Petra Juna Jennings (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	KZ	0
verifying of the student´s skills of B1 level			
B0B04B2Z	English language B2 - exam	Z,ZK	0
I) The B2 English Exam is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the Study and Examination Rules and Regulations for Students at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully complete the study programme. In addition, this requires the passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common European Framework of Reference for Languages (CEFR), an international standard for describing language ability, the definition of an English language learner who has achieved the B2 (Upper-Intermediate) level is one who 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. III) Students who have successfully passed an approved international exam within the past five years may present their certificate to the Department of Languages, Faculty of Electrical Engineering.Upon approval, students are then exempt from both the Written Test and the Oral Part. For a list of approved international exams go the department website: http://jazyky.fel.cvut.cz/			

Name of the block: Compulsory courses of the specialization
Minimal number of credits of the block: 13
The role of the block: PO

Code of the group: 2015_BEEMPO1
Name of the group: Compulsory subjects of the branch
Requirement credits in the group: In this group you have to gain 13 credits
Requirement courses in the group: In this group you have to complete 3 courses
Credits in the group: 13
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
B1B13SEZ	**Electrochemical Sources and Photovoltaics**	Z,ZK	4	2P+2L	L	PO
B1B15EN3	**Power Engineering 3** *Jan Kyncl, Petr Žák, Petr Žák Jan Kyncl (Gar.)*	KZ	4	2P+2L	Z	PO
B1B14MIS	**Microprocessors for Power Systems** *Jan Bauer* ***Jan Bauer*** *Jiří Zděnek (Gar.)*	Z,ZK	5	2P+2L	Z	PO

Characteristics of the courses of this group of Study Plan: Code=2015_BEEMPO1 Name=Compulsory subjects of the branch

B1B13SEZ	Electrochemical Sources and Photovoltaics	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.			
B1B15EN3	Power Engineering 3	KZ	4
B1B14MIS	Microprocessors for Power Systems	Z,ZK	5
Power electronics control computer structure, digital signal processor and ALU added features for fast real time calculations. Interrupt system and DMA system, analog signal measurement, fast impulse signal measurement, fast impulse generation support, inter-computer communication, system and power management, programming languages for power systems software development, programming techniques, software development tools (simulators, emulators, monitors), input signal conditioning circuitry, conversion from analog signals to digital processing, time sampling, amplitude quatization, power electronics control block design and implementation, difference equations and control algorithms, fixed and floating point calculations, debugging methods, program parametrization, guides and rules for implementation and application of power system control computers. Real time operating system, scheduler, dispatcher and another features and guides for application			

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 4
The role of the block: PV

Code of the group: 2015_BEEMPV
Name of the group: Compulsory subjects of the programm
Requirement credits in the group: In this group you have to gain at least 4 credits (at most 12)

Requirement courses in the group: In this group you have to complete at least 1 course (at most 3)
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
B1B15EPR	**Projects in Power Engineering**	KZ	4	2P+2S	L	PV
B1B13PTE	**Advanced technology in electrical engineering**	Z,ZK	4	2P+2L	L	PV
B1B14TME	**Engineering mechanics**	Z,ZK	4	2P+2C	L	PV

Characteristics of the courses of this group of Study Plan: Code=2015_BEEMPV Name=Compulsory subjects of the programm

B1B15EPR	Projects in Power Engineering	KZ	4
B1B13PTE	Advanced technology in electrical engineering	Z,ZK	4
The topic of subject is oriented on selected materials and technics which are offering a new properties and facilities to electrical products.New superconductive materials,special pure polymers and their composites,materials with memory of form,inteligent polymers,materials and structures based on nanoparticles.Selected types of beam technics and their use in practice.			
B1B14TME	Engineering mechanics	Z,ZK	4
This course provides knowledge of applied mechanics for the industry practice. Analysis of constructional elements and their dimensioning. Kinematics of simple mechanisms. Dynamic behaviour of mechanical systems, mechanic vibrations. Thermodynamics of real gases and vapours, their processes an cycles, basic comparative cycles of heat machines. Fundamentals of hydrodynamics, transport losses in hydraulic systems.			

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** ***Dana Saláková***	Z		2s	Z	V
B0B04A22	**English Language A2-2** ***Dana Saláková***	Z	0	2s	L	V
B0B04B11	**English Language B1-1** ***Petra Juna Jennings*** *Petra Juna Jennings (Gar.)*	Z	0	2C	Z	V
B0B04B12	**English Language B1-2** ***Petra Juna Jennings*** *Petra Juna Jennings (Gar.)*	Z	0	2C	L	V
B0B04B21	**English Language B2-1** ***Petra Juna Jennings*** *Petra Juna Jennings (Gar.)*	Z	3	2C	Z	V
B0B04B22	**English Language B2-2** ***Petra Juna Jennings*** *Petra Juna Jennings (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
This course is designed as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 - zkouška - B0B04B2Z*). While the course is focused on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark), it also focuses more on the academic and technical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropriate level of English for Erasmus / International Study.			

B0B04B22	English Language B2-2	Z	3

This course is designed as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 - zkouška - B0B04B2Z *). While the course is focused on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark), it also focuses more on the academic and technical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropriate level of English for Erasmus / International Study.

Code of the group: BTV
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

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

TVV	Physical education	Z	0
TV-V1	Physical education	Z	1
TVV0	Physical education	Z	0

Code of the group: BTVK
Name of the group: Physical education 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
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=Physical education courses

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

Code of the group: 2015_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	Differencial Equations and Numerical Analysis	Z,ZK	4

This course introduces students to the classical theory of ordinary differential equations (separable and linear ODEs) and also to bsics of numerical methods (errors in calculations and stability, numerical solutions of algebraic and differential equations and their systems). The course takes advantage of the synnergy between theoretical and practical point of view.

B0B01KAN	Complex Analysis	Z,ZK	5
The course is an introduction to the fundamentals of complex analysis and its applications. The basic principles of Fourier, Laplace, and Z-transform are explained, including their applications, particularly to solving differential and difference equations.			
B0B01LAG	Linear Algebra	Z,ZK	8
The course covers the initial parts of linear algebra. Firstly, the basic notions of a linear space and linear mappings are covered (linear dependence and independence, basis, coordinates, etc). The calculus of matrices (determinants, inverse matrices, matrices of a linear map, eigenvalues and eigenvectors, diagonalisation, etc) is covered next. The applications include solving systems of linear equations, the geometry of a 3D space (including the scalar product and the vector product) and SVD.			
B0B01MA1	Mathematical Analysis 1	Z,ZK	7
The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.			
B0B01MA2	Mathematical Analysis 2	Z,ZK	7
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.			
B0B01STP	Statistics and Probability	Z,ZK	5
The aim of the course is to introduce students to the fundamentals of probability theory and mathematical statistics, their computational methods as well as applications of these mathematical tools to practical examples.			
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.			
B0B04B1K	English language B1 - classified assessment	KZ	0
verifying of the student´s skills of B1 level			
B0B04B21	English Language B2-1	Z	3
This course is designed as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 - zkouška - B0B04B2Z*). While the course is focused on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark), it also focuses more on the academic and technical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropriate level of English for Erasmus / International Study.			
B0B04B22	English Language B2-2	Z	3
This course is designed as a full-year, two semester preparation course for the universitys compulsory B2-level English Examination (Anglický jazyk B2 - zkouška - B0B04B2Z *). While the course is focused on helping students reach a level required to pass the B2-level English Examination (or improve their English for a higher mark), it also focuses more on the academic and technical vocabulary and grammar expected of students at the university level. *NOTE: This exam is also used for determining an appropriate level of English for Erasmus / International Study.			
B0B04B2Z	English language B2 - exam	Z,ZK	0
I) The B2 English Exam is a compulsory subject for all Faculty of Electrical Engineering students at the Czech Technical University. According to the Study and Examination Rules and Regulations for Students at CTU (Part III, Article 4), a compulsory subject is one whose completion is a necessary condition in order to successfully complete the study programme. In addition, this requires the passing of an examination evaluated on the scale A, B, C, D, or E (SERR Part III, Article 6). II) According to the Common European Framework of Reference for Languages (CEFR), an international standard for describing language ability, the definition of an English language learner who has achieved the B2 (Upper-Intermediate) level is one who 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. III) Students who have successfully passed an approved international exam within the past five years may present their certificate to the Department of Languages, Faculty of Electrical Engineering.Upon approval, students are then exempt from both the Written Test and the Oral Part. For a list of approved international exams go the department website: http://jazyky.fel.cvut.cz/			
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.			
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.			
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.			
B0B16HI1	History 1	KZ	4
B0B16HT1	History of science and technology 1	KZ	4
B0B16HTE	History of technology and economic	ZK	2
B0B16MME	Macro and Microekonomics	Z,ZK	4
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.			
B0B16MPL	Psychology for managers	ZK	2
B0B16MPS	Psychology	Z,ZK	4
B0B99PRP	Procedural Programming	Z,ZK	6
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.		
B1B13MVE	Materials for Power Electrical Engineering	Z,ZK	5
	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.		
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.		
B1B13PTE	Advanced technology in electrical engineering	Z,ZK	4
	The topic of subject is oriented on selected materials and technics which are offering a new properties and facilities to electrical products.New superconductive materials,special pure polymers and their composites,materials with memory of form,inteligent polymers,materials and structures based on nanoparticles.Selected types of beam technics and their use in practice.		
B1B13SEZ	Electrochemical Sources and Photovoltaics	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.		
B1B13VST	Technology in Electrical Engineering	Z,ZK	5
	Production systems in electrical engineering will be characterized, their arrangement and basic technologies for mechanical joints and plastic parts. Manufacturing of windings,drying and impregnation processes will also been presented. Next part of a course will be focused on basic technologies for semiconductors including power integration. Beam technologies, technologies using plasma, packaging and basic assembly technologies will also been presented.		
B1B13VVZ	Manufacturing of Power Devices	Z,ZK	5
	The topic of the subject is focused on manufacturing of power electrical machines and devices from construction and technological point of wiev. 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 manufactirung, lean management and planning of manufacturing.		
B1B14MIS	Microprocessors for Power Systems	Z,ZK	5
	Power electronics control computer structure, digital signal processor and ALU added features for fast real time calculations. Interrupt system and DMA system, analog signal measurement, fast impulse signal measurement, fast impulse generation support, inter-computer communication, system and power management, programming languages for power systems software development, programming techniques, software development tools (simulators, emulators, monitors), input signal conditioning circuitry, conversion from analog signals to digital processing, time sampling, amplitude quatization, power electronics control block design and implementation, difference equations and control algorithms, fixed and floating point calculations, debugging methods, program parametrization, guides and rules for implementation and application of power system control computers. Real time operating system, scheduler, dispatcher and another features and guides for application		
B1B14TME	Engineering mechanics	Z,ZK	4
	This course provides knowledge of applied mechanics for the industry practice. Analysis of constructional elements and their dimensioning. Kinematics of simple mechanisms. Dynamic behaviour of mechanical systems, mechanic vibrations. Thermodynamics of real gases and vapours, their processes an cycles, basic comparative cycles of heat machines. Fundamentals of hydrodynamics, transport losses in hydraulic systems.		
B1B14ZEL	Fundamentals of Electrotechnical Engineering	KZ	3
	The course extends necessary knowledge of the technical documentation, technical text and its presentation. The second half of the semester isfocused on an explanation and practicing of basics electrotechnics so that knowledge of students are increased to the level needed in the next semesters.		
B1B14ZPO	Fundametals of Electric Drives	Z,ZK	5
	The course provides the basic terms and knowledge in electric drives and in the issues related to this discipline as well. The lectures are focused on the basic of electric drives logic control, continuous control and also discrete control, and on the characteristics of used controllers in practice. Further, the basic control structures of drives with DC and AC machines are explained.		
B1B14ZSP	Electric Machines and Apparatuses Basics	Z,ZK	5
	The course explains the principles of machines for convertsion 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.		
B1B15EN1	Power Engineering 1	Z,ZK	6
B1B15EN2	Power Engineering 2	Z,ZK	5
B1B15EN3	Power Engineering 3	KZ	4
B1B15EPR	Projects in Power Engineering	KZ	4
B1B15VYA	Computational Applications	KZ	4
B1B17EMP	Electromagnetic Field	Z,ZK	5
	This course gets its students acquinted 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 engeneering	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.			
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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