Study plan

Name of study plan: Electrical Enginnering, Electronics and Communications

Faculty/Institute/Others: Faculty of Electrical Engineering
Department:
Branch of study guaranteed by the department: Common courses
Garantor of the study branch:
Program of study: Electrical Engineering, Electronics and Communications
Type of study: Bachelor combined
Required credits: 167
Elective courses credits: 13
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: 131
The role of the block: P

Code of the group: 2024_BEEKBAP-K
Name of the group: Bachelor Project
Requirement credits in the group: In this group you have to gain 20 credits
Requirement courses in the group: In this group you have to complete 1 course
Credits in the group: 20
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
BBAP20	**Bachelor thesis** *Roman Čmejla Roman Čmejla (Gar.)*	Z	20	12S	L,Z	P

Characteristics of the courses of this group of Study Plan: Code=2024_BEEKBAP-K Name=Bachelor Project

BBAP20	Bachelor thesis	Z	20

Code of the group: 2024_BEEKBBE-K
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 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=2024_BEEKBBE-K 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: 2024_BEEKP-K
Name of the group: Compulsory subjects of the branch
Requirement credits in the group: In this group you have to gain 111 credits
Requirement courses in the group: In this group you have to complete 21 courses
Credits in the group: 111
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
BD5B01DRN	**Differencial Equations and Numerical Analysis**	Z,ZK	6	14KP+6KC	L	P
BD5B38EMA	**Electrical Measurements** *Vladimír Haasz* ***Vladimír Haasz*** *Vladimír Haasz (Gar.)*	KZ	5	14P+6L	L	P
BD5B17EMP	**Electromagnetic Field** *Jan Macháč, Zbyněk Škvor* ***Zbyněk Škvor*** *Jan Macháč (Gar.)*	Z,ZK	5	14KP+6KS	Z	P
BD5B31EO1	**Electronic Circuits 1** ***Roman Čmejla***	Z,ZK	5	14KP+6KC	L	P
BD5B31EO2	**Electronic Circuits 2** *Jiří Náhlík* ***Jiří Hospodka*** *Jiří Hospodka (Gar.)*	Z,ZK	5	14KP+6KC	Z	P
BD5B34EPS	**Electronics** ***Lubor Jirásek***	KZ	4	14KP+6KL	L	P
BD5B02FY1	**Physics 1** *Jaroslav Plocek* ***Jaroslav Plocek*** *Jaroslav Plocek (Gar.)*	Z,ZK	7	14KP+6KC	L	P
BD5B02FY2	**Physics 2** *Jaroslav Plocek* ***Jaroslav Plocek*** *Jaroslav Plocek (Gar.)*	Z,ZK	7	14KP+6KC	Z	P
BD5B99IN1	**Individual project** *Lubor Jirásek, Vladimír Janíček* ***Lubor Jirásek***	Z	4	0+4s	L	P
BD5B99IN2	**Individual project** *Lubor Jirásek, Vladimír Janíček*	Z	8	0+8s	Z	P
BD5B01LAG	**Linear Algebra**	Z,ZK	8	28KP+6KC	Z	P
BD5B16MME	**Macro and Microekonomics**	Z,ZK	4	14KP+6KS	Z	P
BD5B16MPS	**Psychology** *Josef Černohous, Alena Klesalová, Jaroslav Knápek* ***Jaroslav Knápek*** *Alena Klesalová (Gar.)*	Z	4	14KP+6KS	L	P
BD5B01MA1	**Mathematical Analysis 1**	Z,ZK	8	28KP+6KC	Z	P
BD5B01MA2		Z,ZK	8	28KP+6KC	L	P
BD5B34MIK	**Microcontrollers** ***Tomáš Teplý***	Z,ZK	4	14KP+6KL	L	P
BD5B36PRP	**Procedural Programming** *Ivan Jelínek* ***Ivan Jelínek*** *Ivan Jelínek (Gar.)*	Z,ZK	6	14KP+6KC	Z	P
BD5B37PPC	**C/C++ programming** *Stanislav Vítek* ***Stanislav Vítek*** *Stanislav Vítek (Gar.)*	KZ	4	14KP+6KC	Z	P
BD5B01STP	**Statistics and Probability**	Z,ZK	6	14KP+6KC	L	P
BD5B14ZEL	**Fundamentals of Electrotechnical Engineering** ***Ivana Nová***	KZ	4	14KP+6KC	Z	P
BD5B16ZFM	**Basics of Financial Management** *Blanka Kučerková, Oldřich Starý* ***Oldřich Starý*** *Oldřich Starý (Gar.)*	Z,ZK	4	14KP+6KS	L	P

Characteristics of the courses of this group of Study Plan: Code=2024_BEEKP-K Name=Compulsory subjects of the branch

BD5B01DRN	Differencial Equations and Numerical Analysis	Z,ZK	6
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.			
BD5B38EMA	Electrical Measurements	KZ	5
BD5B17EMP	Electromagnetic Field	Z,ZK	5
This course gets its students acquinted with principles and applied electromagnetic field theory basics.			
BD5B31EO1	Electronic Circuits 1	Z,ZK	5
BD5B31EO2	Electronic Circuits 2	Z,ZK	5
BD5B34EPS	Electronics	KZ	4
BD5B02FY1	Physics 1	Z,ZK	7
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.			

BD5B02FY2	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.			
BD5B99IN1	Individual project	Z	4
BD5B99IN2	Individual project	Z	8
BD5B01LAG	Linear Algebra	Z,ZK	8
BD5B16MME	Macro and Microekonomics	Z,ZK	4
BD5B16MPS	Psychology	Z	4
Psychology of personality, psychology of work and organization. Psychology in human resources management. The manager, his role and competencies. Motivation and engagement. Skills development. Communication and conflict resolution. Work group and team, conducting meetings. Time management and delegation. Dealing with stress and emotions. Company culture and organizational change.			
BD5B01MA1	Mathematical Analysis 1	Z,ZK	8
The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.			
BD5B01MA2		Z,ZK	8
BD5B34MIK	Microcontrollers	Z,ZK	4
The goal of this course is to make students acquainted with recent interesting applications, smart sensors circuits and peripherals handled by microcontrollers. In a lab students will program their own applications and measure actual properties. Because of usage of a programming language C it will be possible to focus on the practical part of the realization.			
BD5B36PRP	Procedural Programming	Z,ZK	6
The course accompanies basic programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and processing user inputs are developed. Students master the practical implementation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable and reusable programs. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C programming language is used that provides a direct link between the program data structures and their representation in the computer memory. Students will get acquainted not only with program compilation and linking but also with debugging and profiling. Labs aim to acquire practical skills of implementing simple individual tasks, emphasizing functionality and accuracy of implementation. Student independence is developed by a set of homework with the possibility of optional and bonus assignments. The final task is an integration of a larger program using existing implementations. Evaluation of coding style motivated by writing legible, understandable, and maintainable codes is also a part of the selected tasks.			
BD5B37PPC	C/C++ programming	KZ	4
BD5B01STP	Statistics and Probability	Z,ZK	6
The aim is to introduce the students to the theory of probability and mathematical statistics, and show them the computing methods together with their applications of praxis.			
BD5B14ZEL	Fundamentals of Electrotechnical Engineering	KZ	4
The course extends necessary knowledge of creating technical documentation, including oral and written presentation of technical information. The second half of the semester is focused on explaining and practicing the basic parts of electrical engineering, so that the students' initial knowledge is increased to the level needed in the following semesters.			
BD5B16ZFM	Basics of Financial Management	Z,ZK	4

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, 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, Petra Juna Jennings, Dana Saláková **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 to the department website: http://jazyky.fel.cvut.cz/			

Name of the block: Compulsory elective courses
Minimal number of credits of the block: 36

The role of the block: PV

Code of the group: 2024_BEEKPV-K
Name of the group: Compulsory subjects of the branch
Requirement credits in the group: In this group you have to gain at least 36 credits (at most 72)
Requirement courses in the group: In this group you have to complete at least 9 courses (at most 18)
Credits in the group: 36
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
BD5B37AVT	**Audiovisual Technology** *Petr Páta, Miloš Klíma, Libor Husník, František Rund, Karel Fliegel **Karel Fliegel** Petr Páta (Gar.)*	Z,ZK	4	14KP+6KL	L	PV
BD5B31CZS	**Digital Signal Processing** *Petr Pollák, Petr Krýže **Pavel Sovka** Petr Pollák (Gar.)*	Z,ZK	4	14KP+6KC	Z	PV
BD5B32DAT	**Data Networks** *Pavel Bezpalec, Leoš Boháč **Pavel Bezpalec** Leoš Boháč (Gar.)*	Z,ZK	4	14P + 6L	Z	PV
BD5B32DIT	**Digital Technique** *Tomáš Zeman, Pavel Lafata **Pavel Lafata** Pavel Lafata (Gar.)*	Z,ZK	4	1P + 1L	Z	PV
BD5B17ELD	**Electrodynamics** *Jan Macháč **Jan Macháč** Jan Macháč (Gar.)*	KZ	4	14KP+6KS	L	PV
BD5B15EN1	**Power Engineering 1**	Z,ZK	4	1,5	Z	PV
BD5B15EN2	**Power Engineering 2**	Z,ZK	4	1,5	Z	PV
BD5B15EN3	**Power Engineering 3**	KZ	4	1,5	L	PV
BD5B13MVE	**Materials for Power Electrical Engineering**	Z,ZK	4	14KP+6KL	Z	PV
BD5B34MIT	**Microelectronics** *Vladimír Janíček, Tomáš Teplý, Jan Novák, Jiří Jakovenko **Jiří Jakovenko** Jiří Jakovenko (Gar.)*	Z,ZK	4	14KP+6KL	Z	PV
BD5B34SEE	**Senzors in Electronics and Electrotechnology** *Miroslav Husák, Adam Bouřa **Miroslav Husák** Miroslav Husák (Gar.)*	Z,ZK	4	14KP+6KL	Z	PV
BD5B37SAS	**Signals and systems** *Karel Fliegel, Pavel Puričer **Karel Fliegel** Karel Fliegel (Gar.)*	Z,ZK	4	14KP+6KC	L	PV
BD5B17TBK	**Wireless Communication Technique** *Přemysl Hudec, Pavel Pechač **Pavel Pechač** Přemysl Hudec (Gar.)*	Z,ZK	4	14KP+6KL	L	PV
BD5B13VST	**Power components and technology**	Z,ZK	4	14KP+6KL	L	PV
BD5B13VVZ	**Manufacturing of Power Devices**	Z,ZK	4	14KP+6KL	Z	PV
BD5B14ZPO	**Fundametals of Electric Drives** *Pavel Kobrle **Pavel Kobrle***	Z,ZK	4	14KP+6KL	Z	PV
BD5B14ZSP	**Electric Machines and Apparatuses Basics** ***Pavel Kobrle***	Z,ZK	4	14KP+6KL	L	PV
BD5B14ZVE	**Power Electronics** *Jiří Lettl **Jiří Lettl** Jiří Lettl (Gar.)*	Z,ZK	4	14KP+6KL	Z	PV

Characteristics of the courses of this group of Study Plan: Code=2024_BEEKPV-K Name=Compulsory subjects of the branch

BD5B37AVT	Audiovisual Technology	Z,ZK	4
This course is the introduction to multimedia technology (audio and video). It overviews sound and picture acquisition, signal processing, transmission and distribution, recording and reproduction including physiology of hearing and vision. It provides fundamental information for understanding the main principles for system solutions in the field.			
BD5B31CZS	Digital Signal Processing	Z,ZK	4
BD5B32DAT	Data Networks	Z,ZK	4
The course introduces students with the fundamentals of data communication networks. The course objective is to provide broader understanding of various communication protocols used in specific types of data networks based on the layered OSI model. The course also provides students with fundamental understanding of TCP/IP protocol family as it is used in the Internet era of networking, including practical experience with the data networks in laboratory.			
BD5B32DIT	Digital Technique	Z,ZK	4
The goal of this course is to provide the introduction into designing and realization of digital circuits. First, necessary mathematical apparatus, such as the Boolean algebra, Karnaugh maps, minimization and realization of logical functions is presented, followed by brief introduction into basics of logical circuits, such as the logical gates, flip-flops, TTL and CMOS logic etc. The second part is dedicated mainly to modern designing techniques of digital circuits using programmable FPGA and VHDL language. During these lessons, the basics of VHDL together with numerous examples are evaluated to provide a complex insight into this hardware description language and modern methods of designing and realization of digital circuits.			
BD5B17ELD	Electrodynamics	KZ	4
This subject empowers its students with a unified approach to time-varying electromagnetic fields and waves.			
BD5B15EN1	Power Engineering 1	Z,ZK	4
BD5B15EN2	Power Engineering 2	Z,ZK	4
BD5B15EN3	Power Engineering 3	KZ	4
BD5B13MVE	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 using. 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.			

BD5B34MIT	Microelectronics	Z,ZK	4
Students become familiar with the latest trends in the field of microelectronics. The course provide students with the microelectronic structures and technologies of integrated circuits; micro sensors and micro-electro-mechanical systems. The course introduces students to the design of nanoelectronics and integrated circuits.			
BD5B34SEE	Senzors in Electronics and Electrotechnology	Z,ZK	4
BD5B37SAS	Signals and systems	Z,ZK	4
Introductory course focused on a description of continuous- and discrete-time signals and systems in time and frequency domains. The course also introduces the basic characteristics of bandpass signals, analog modulations and random signals.			
BD5B17TBK	Wireless Communication Technique	Z,ZK	4
Wireless communications belong to the fastest developing technical fields. Besides widely used mobile telephony systems, this field also includes many other both mobile and stationary communicating systems. Different types of radio modems are also built in the majority of electronic devices like PCs, tablets, notebooks, cameras, etc. With expected fast development of Internet of Things, operation of billions of wireless sensors is expected. The subject is common to all students of the Electronics and Communication study program, its main purpose is to teach all important aspects of this technical branch. Obtained knowledge should enable the students to design, project, adjust or manufacture any wireless communication system or its components. Besides wireless system analysis, the lectures include review of physical backgrounds, survey of the most important existing radio systems together with corresponding operational frequencies, description of electromagnetic wave propagation and related antennas. Instructions concerning propagation also cover behavior of EM waves in an urban environment or inside buildings. Lectures concerning analysis of typical wireless systems also cover description of related radio-frequency, microwave and mm-wave circuits and components. Exercises include practical calculations of wireless systems, computer analysis and synthesis of important structures and circuits, and related laboratory measurements.			
BD5B13VST	Power components and technology	Z,ZK	4
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.			
BD5B13VVZ	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 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.			
BD5B14ZPO	Fundametals of Electric Drives	Z,ZK	4
The course explains the basic building blocks of the electric drive. The designof components, electrical drives, typical load characteristics. Further are discussed the basic control structures for drives with DC and AC motors and components required for their implementation as the structure of a control computer circuits to switch from analog signals to digital and implementation regulators themselves in digital form.			
BD5B14ZSP	Electric Machines and Apparatuses Basics	Z,ZK	4
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.			
BD5B14ZVE	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.			

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** ***Markéta Havlíčková*** *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: 2024_BEEKVOL-K
Name of the group: Elective subjects
Requirement credits in the group:
Requirement courses in the group:
Credits in the group: 0
Note on the group: ~Nabídku 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
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 to the department website: http://jazyky.fel.cvut.cz/			
BBAP20	Bachelor thesis	Z	20
BD5B01DRN	Differencial Equations and Numerical Analysis	Z,ZK	6
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.			
BD5B01LAG	Linear Algebra	Z,ZK	8
BD5B01MA1	Mathematical Analysis 1	Z,ZK	8
The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable.			

BD5B01MA2		Z,ZK	8
BD5B01STP	Statistics and Probability	Z,ZK	6
The aim is to introduce the students to the theory of probability and mathematical statistics, and show them the computing methods together with their applications of praxis.			
BD5B02FY1	Physics 1	Z,ZK	7
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.			
BD5B02FY2	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.			
BD5B13MVE	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 using. 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.			
BD5B13VST	Power components and technology	Z,ZK	4
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.			
BD5B13VVZ	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 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.			
BD5B14ZEL	Fundamentals of Electrotechnical Engineering	KZ	4
The course extends necessary knowledge of creating technical documentation, including oral and written presentation of technical information. The second half of the semester is focused on explaining and practicing the basic parts of electrical engineering, so that the students' initial knowledge is increased to the level needed in the following semesters.			
BD5B14ZPO	Fundametals of Electric Drives	Z,ZK	4
The course explains the basic building blocks of the electric drive. The designof components, electrical drives, typical load characteristics. Further are discussed the basic control structures for drives with DC and AC motors and components required for their implementation as the structure of a control computer circuits to switch from analog signals to digital and implementation regulators themselves in digital form.			
BD5B14ZSP	Electric Machines and Apparatuses Basics	Z,ZK	4
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.			
BD5B14ZVE	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.			
BD5B15EN1	Power Engineering 1	Z,ZK	4
BD5B15EN2	Power Engineering 2	Z,ZK	4
BD5B15EN3	Power Engineering 3	KZ	4
BD5B16MME	Macro and Microekonomics	Z,ZK	4
BD5B16MPS	Psychology	Z	4
Psychology of personality, psychology of work and organization. Psychology in human resources management. The manager, his role and competencies. Motivation and engagement. Skills development. Communication and conflict resolution. Work group and team, conducting meetings. Time management and delegation. Dealing with stress and emotions. Company culture and organizational change.			
BD5B16ZFM	Basics of Financial Management	Z,ZK	4
BD5B17ELD	Electrodynamics	KZ	4
This subject empowers its students with a unified approach to time-varying electromagnetic fields and waves.			
BD5B17EMP	Electromagnetic Field	Z,ZK	5
This course gets its students acquinted with principles and applied electromagnetic field theory basics.			
BD5B17TBK	Wireless Communication Technique	Z,ZK	4
Wireless communications belong to the fastest developing technical fields. Besides widely used mobile telephony systems, this field also includes many other both mobile and stationary communicating systems. Different types of radio modems are also built in the majority of electronic devices like PCs, tablets, notebooks, cameras, etc. With expected fast development of Internet of Things, operation of billions of wireless sensors is expected. The subject is common to all students of the Electronics and Communication study program, its main purpose is to teach all important aspects of this technical branch. Obtained knowledge should enable the students to design, project, adjust or manufacture any wireless communication system or its components. Besides wireless system analysis, the lectures include review of physical backgrounds, survey of the most important existing radio systems together with corresponding operational frequencies, description of electromagnetic wave propagation and related antennas. Instructions concerning propagation also cover behavior of EM waves in an urban environment or inside buildings. Lectures concerning analysis of typical wireless systems also cover description of related radio-frequency, microwave and mm-wave circuits and components. Exercises include practical calculations of wireless systems, computer analysis and synthesis of important structures and circuits, and related laboratory measurements.			
BD5B31CZS	Digital Signal Processing	Z,ZK	4
BD5B31EO1	Electronic Circuits 1	Z,ZK	5
BD5B31EO2	Electronic Circuits 2	Z,ZK	5
BD5B32DAT	Data Networks	Z,ZK	4
The course introduces students with the fundamentals of data communication networks. The course objective is to provide broader understanding of various communication protocols used in specific types of data networks based on the layered OSI model. The course also provides students with fundamental understanding of TCP/IP protocol family as it is used in the Internet era of networking, including practical experience with the data networks in laboratory.			

BD5B32DIT	Digital Technique	Z,ZK	4
The goal of this course is to provide the introduction into designing and realization of digital circuits. First, necessary mathematical apparatus, such as the Boolean algebra, Karnaugh maps, minimization and realization of logical functions is presented, followed by brief introduction into basics of logical circuits, such as the logical gates, flip-flops, TTL and CMOS logic etc. The second part is dedicated mainly to modern designing techniques of digital circuits using programmable FPGA and VHDL language. During these lessons, the basics of VHDL together with numerous examples are evaluated to provide a complex insight into this hardware description language and modern methods of designing and realization of digital circuits.			
BD5B34EPS	Electronics	KZ	4
BD5B34MIK	Microcontrollers	Z,ZK	4
The goal of this course is to make students acquainted with recent interesting applications, smart sensors circuits and peripherals handled by microcontrollers. In a lab students will program their own applications and measure actual properties. Because of usage of a programming language C it will be possible to focus on the practical part of the realization.			
BD5B34MIT	Microelectronics	Z,ZK	4
Students become familiar with the latest trends in the field of microelectronics. The course provide students with the microelectronic structures and technologies of integrated circuits; micro sensors and micro-electro-mechanical systems. The course introduces students to the design of nanoelectronics and integrated circuits.			
BD5B34SEE	Senzors in Electronics and Electrotechnology	Z,ZK	4
BD5B36PRP	Procedural Programming	Z,ZK	6
The course accompanies basic programming emphasizing the data representation in computer memory. Furthermore, the concepts of linked data structures and processing user inputs are developed. Students master the practical implementation of simple individual tasks. The course emphasizes acquiring programming habits for creating readable and reusable programs. At the same time, the effort is to build students an overview of the program operation, data model, memory access, and management. Therefore, the C programming language is used that provides a direct link between the program data structures and their representation in the computer memory. Students will get acquainted not only with program compilation and linking but also with debugging and profiling. Labs aim to acquire practical skills of implementing simple individual tasks, emphasizing functionality and accuracy of implementation. Student independence is developed by a set of homework with the possibility of optional and bonus assignments. The final task is an integration of a larger program using existing implementations. Evaluation of coding style motivated by writing legible, understandable, and maintainable codes is also a part of the selected tasks.			
BD5B37AVT	Audiovisual Technology	Z,ZK	4
This course is the introduction to multimedia technology (audio and video). It overviews sound and picture acquisition, signal processing, transmission and distribution, recording and reproduction including physiology of hearing and vision. It provides fundamental information for understanding the main principles for system solutions in the field.			
BD5B37PPC	C/C++ programming	KZ	4
BD5B37SAS	Signals and systems	Z,ZK	4
Introductory course focused on a description of continuous- and discrete-time signals and systems in time and frequency domains. The course also introduces the basic characteristics of bandpass signals, analog modulations and random signals.			
BD5B38EMA	Electrical Measurements	KZ	5
BD5B99IN1	Individual project	Z	4
BD5B99IN2	Individual project	Z	8
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.			

For updated information see http://bilakniha.cvut.cz/en/f3.html
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