Study plan

Name of study plan: Electronics and Communications 2018

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: Electronics and Communications
Type of study: Bachelor full-time
Required credits: 176
Elective courses credits: 4
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: 156
The role of the block: P

Code of the group: 2018_BEKBAP
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=2018_BEKBAP Name=Bachelor Project

BBAP20	Bachelor thesis	Z	20

Code of the group: 2018_BEKBBE
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=2018_BEKBBE Name=Safety of the bachelor's studies

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

Code of the group: 2018_BEKH
Name of the group: Humanities subjects
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
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

Characteristics of the courses of this group of Study Plan: Code=2018_BEKH 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

Code of the group: 2018_BEKP
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 28 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
B2B37AVT	**Audiovisual Technology** *František Rund, Petr Páta, Libor Husník, Miloš Klíma, Karel Fliegel* ***Karel Fliegel*** *Petr Páta (Gar.)*	KZ	4	2P+2L	L	P
B2B31CZS	**Digital Signal processing** *Petr Pollák, Petr Kryže* ***Pavel Sovka*** *Pavel Sovka (Gar.)*	Z,ZK	4	2P+2C	Z	P
B2B32DATA	**Data Networks** *Pavel Bezpalec, Petr Hampl, Jiří Holeček, Petr Jareš* ***Petr Hampl*** *Leoš Boháč (Gar.)*	KZ	5	2P + 2L	Z	P
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
B2B32DITA	**Digital Technique** *Pavel Lafata, Tomáš Zeman* ***Pavel Lafata*** *Pavel Lafata (Gar.)*	KZ	4	2P + 2L	Z	P
B2B38EMB	**Electrical Measurements** *Jakub Svatoš, Vladimír Haasz* ***Jakub Svatoš*** *Jakub Svatoš (Gar.)*	Z,ZK	4	2P+2L	Z	P

B2B17ELD	**Electrodynamics** *Zbyněk Škvor* ***Zbyněk Škvor*** *Zbyněk Škvor (Gar.)*	Z,ZK	4	2P+2C	L	P
B2B17EMPA	**Electromagnetic Field** *Vítězslav Pankrác* ***Vítězslav Pankrác*** *Vítězslav Pankrác (Gar.)*	Z,ZK	5	2P+2C	Z	P
B2B31EO1	**Electronic Circuits 1** *Jiří Hospodka, Michal Šimek, Jan Havlík* ***Jiří Hospodka*** *Jiří Hospodka (Gar.)*	Z,ZK	4	2P+2L	L	P
B2B34ELPA	**Electron Devices** *Pavel Hazdra, Alexandr Pošta, Tomáš Martan, Alexandr Laposa, Jan Novák, Tomáš Teplý, Vít Záhlava, Michal Kočí* ***Pavel Hazdra*** *Pavel Hazdra (Gar.)*	Z,ZK	5	2P+2L	Z	P
B2B02FY1	**Physics 1** *Petr Kulhánek, Petr Koníček* ***Petr Kulhánek*** *Petr Kulhánek (Gar.)*	Z,ZK	8	4P+1L+2C	L	P
B2B02FY2	**Physics 2** *Petr Kulhánek, Petr Koníček* ***Petr Kulhánek*** *Petr Kulhánek (Gar.)*	Z,ZK	7	3P+1L+2C	Z	P
B0B01KANA	**Complex Analysis** *Zdeněk Mihula, Hana Turčinová* ***Zdeněk Mihula*** *Zdeněk Mihula (Gar.)*	Z,ZK	4	2P+2S	Z	P
B0B01LAGA	**Linear Algebra** *Jakub Rondoš, Josef Dvořák, Jiří Velebil, Daria Pavlova, Alena Gollová, Matěj Dostál* ***Jiří Velebil*** *Jiří Velebil (Gar.)*	Z,ZK	7	4P+2S	Z	P
B0B01MA1A	**Mathematical Analysis 1** *Jakub Staněk, Josef Dvořák, Veronika Sobotíková, Natalie Žukovec* ***Veronika Sobotíková*** *Veronika Sobotíková (Gar.)*	Z,ZK	6	4P+2S	Z	P
B0B01MA2A	**Mathematical Analysis 2** *Veronika Sobotíková, Jaroslav Tišer, Martin Křepela, Miroslav Korbelář* ***Jaroslav Tišer*** *Jaroslav Tišer (Gar.)*	Z,ZK	6	4P+2S	L	P
B2B34MIT	**Microelectronics** *Jiří Jakovenko, Vladimír Janíček* ***Vladimír Janíček*** *Jiří Jakovenko (Gar.)*	KZ	4	2P+2L	Z	P
B2B99PPC	**Practical C/C++ programming** *Stanislav Vítek* ***Stanislav Vítek*** *Stanislav Vítek (Gar.)*	KZ	6	2P+2C	L	P
B0B99PRPA	**Procedural Programming** *Stanislav Vítek* ***Stanislav Vítek*** *Stanislav Vítek (Gar.)*	KZ	4	2P+2C	Z	P
B2BPROJ6	**Bachelor project** *František Rund, Vladimír Janíček, Pavel Máša, Lubor Jirásek, Jan Šístek, Ivan Pravda* ***František Rund*** *František Rund (Gar.)*	KZ	6	4s	Z,L	P
B2B34SEE	**Sesors in Electronics** *Miroslav Husák, Alexandr Laposa, Tomáš Teplý, Adam Bouřa* ***Miroslav Husák*** *Miroslav Husák (Gar.)*	Z,ZK	4	2P+2L	L	P
B2B37SAS	**Signals and systems** *Karel Fliegel, Václav Navrátil, Pavel Puričer* ***Karel Fliegel*** *Karel Fliegel (Gar.)*	Z,ZK	5	2P+2C	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
B2B99TPS	**Technical Writing** *Ivana Nová, František Rund, Jan Šístek* ***František Rund*** *Jan Šístek (Gar.)*	KZ	4	2P+2C	Z	P
B2B17TBK	**Wireless Communication Technique** *Jan Šístek, Přemysl Hudec, Pavel Pechač, Viktor Adler, Jan Spáčil, Tomáš Kořínek* ***Přemysl Hudec*** *Přemysl Hudec (Gar.)*	KZ	4	2P+2L	L	P
B2B32TSI	**Telecommunication Systems and Networks** *Petr Jareš, Ivan Pravda* ***Ivan Pravda***	KZ	4	2P + 2L	Z	P
B2B31ZEOA	**Fundamentals of Electric Circuits** *Roman Čmejla, Pavel Máša* ***Roman Čmejla*** *Roman Čmejla (Gar.)*	Z,ZK	5	2P+2L	L	P
B2B14ZEK	**Fundamentals of electrotechnics** *Jan Bauer, David Bušek* ***Jan Bauer*** *Jan Bauer (Gar.)*	KZ	4	2P+1L		P

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

B2B37AVT	Audiovisual Technology	KZ	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.

B2B31CZS	Digital Signal processing	Z,ZK	4

The subject gives overview about basic methods of digital signal processing and their applications (examples from speech and biological signal processing): disrete-time signals and systems, signal characteristics in time and frequency domain, Fourier transform, fast algorithms for DFT computation, introduction to digital filter design, digital filtering in time and frequency domain, decimation and interpolation and their usage in filter banks, basics of LPC analysis. Further details can be found at http://noel.feld.cvut.cz/vyu/ae2m99czs

B2B32DATA	Data Networks	KZ	5

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.

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.

B2B32DITA	Digital Technique	KZ	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.

B2B38EMB	Electrical Measurements	Z,ZK	4
Methods of measurement of electrical quantities (voltage, current, power, frequency, resistance, capacitance, and inductance) are explained together with principles of their correct application and accuracy estimation. The course is closed by presenting information on several basic electronic measuring instruments and explaining the fundamentals of magnetic measurements and basic information concerning measurement systems.			
B2B17ELD	Electrodynamics	Z,ZK	4
This subject empowers its students with a unified approach to time-varying electromagnetic fields and waves.			
B2B17EMPA	Electromagnetic Field	Z,ZK	5
This course gets its students acquinted with principles and applied electromagnetic field theory basics.			
B2B31EO1	Electronic Circuits 1	Z,ZK	4
The course introduces basic circuits with operational amplifiers, continues with the description of linear systems, analysis of their characteristics and fundamentals of synthesis frequency filters. It deals with the principles and features of circuits for generating signals and a controlled oscillator including the PLL circuit and its use. The last part of the course is devoted to basic amplifier stages with transistors.			
B2B34ELPA	Electron Devices	Z,ZK	5
This course introduces the basic theory, principles of operation and properties of electron devices. Physical principles of operation, device structures and characteristics are explained together with adequate models for small- and large-signal. Basic applications in analogue and digital electronics are examined. In seminars and labs, students are introduced to basic principles of device simulation, measurement of device characteristics and extraction of device parameters. Operation of electron devices in electronic devices is then analyzed using the PSpice simulator.			
B2B02FY1	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.			
B2B02FY2	Physics 2	Z,ZK	7
The course Physics 2 is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundations of thermodynamics. Following topic - the theory of waves - will give to the students basic insight into the properties of waves and will help to the students to understand that the presented description of the waves has a universal character in spite of the waves character. Particular types of waves, such as acoustic or optical waves are the subjects of the following section. Quantum mechanics and nuclear physics will complete the student?s general education in physics. The knowledge gained in this course will help to the students in study of such modern areas as robotics, computer vision, measuring technique and will allow them to understand the principles of novel technologies and functioning of new electronic devices.			
B0B01KANA	Complex Analysis	Z,ZK	4
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.			
B0B01LAGA	Linear Algebra	Z,ZK	7
The course covers introductory topics of linear algebra. It begins with fundamental concepts related to vector spaces and linear transform (such as linear dependence and independence of vectors, bases, coordinates of vectors, etc.). The next part of the course is devoted to matrix theory (determinants, inverse matrix, matrices of linear transformation, eigenvalues and eigenvectors). Applications include solving systems of linear equations, geometry in three-dimensional space (including dot and cross products), and the singular value decomposition of a matrix.			
B0B01MA1A	Mathematical Analysis 1	Z,ZK	6
This is an introductory course to differential and integral calculus of functions of one real variable.			
B0B01MA2A	Mathematical Analysis 2	Z,ZK	6
The subject covers an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals. Other part contains function series and power series with application to Taylor and Fourier series.			
B2B34MIT	Microelectronics	KZ	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.			
B2B99PPC	Practical C/C++ programming	KZ	6
The course introduces students to the C ++ and develops their practical skills in programming in C/C++ with an emphasis on solving computational tasks and multi-threaded applications using parallel programming. The first part of the course is devoted to the object-oriented programming in C++ and provides students with basic data containers of standard library STL. Students learn the principles of parallel programming, multi-threaded applications, synchronization mechanisms and models of multi-threaded applications. The second part is dedicated to develop an algorithmic thinking to solve computational problems by searching the problem state space. Two main approaches are considered: the deterministic search of a graph representation of the state space; and local optimization techniques. Additionally, students will be familiarized with models of arbitrary precision data representations, representation of matrices, and matrix calculations.			
B0B99PRPA	Procedural Programming	KZ	4
B2BPROJ6	Bachelor project	KZ	6
Independent work in the form of a project. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or branch departments. The project will be defended within the framework of a subject.			
B2B34SEE	Sesors in Electronics	Z,ZK	4
B2B37SAS	Signals and systems	Z,ZK	5
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.			
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.			
B2B99TPS	Technical Writing	KZ	4
The course aims to help students with various technical or scientific reports (lab report, article, final thesis etc.) Also important is, in addition to language and stylistic skills, to show how to obtain and present scientific information. Given are also up-to-date methods for efficient typing and document automation, including LaTeX. All topics are practiced by related tasks in the Moodle.			

B2B17TBK	Wireless Communication Technique	KZ	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.

B2B32TSI	Telecommunication Systems and Networks	KZ	4

The course introduces principles and functions of digital telecommunications systems, both transmission and switching systems as well as converged packet-oriented systems interconnected into universal telecommunication networks.

B2B31ZEOA	Fundamentals of Electric Circuits	Z,ZK	5

The course describes the basic methods of analysis of electrical circuits. In the lectures, students are introduced to the basic active and passive circuit elements, circuit quantities, important circuit theorems and methods of circuit analysis in stationary and harmonic steady state as well as during transients caused by changes in the circuit. The seminars are aimed at practicing knowledge in the analysis of basic electrical circuits, supplemented by simulations and simple measurements.

B2B14ZEK	Fundamentals of electrotechnics	KZ	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: 20
The role of the block: PV

Code of the group: 2018_BEKPV
Name of the group: Compulsory subjects of the programme
Requirement credits in the group: In this group you have to gain at least 16 credits (at most 45)
Requirement courses in the group: In this group you have to complete at least 4 courses (at most 11)
Credits in the group: 16
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
B2B31EO2	**Electronic Circuits 2** *Jiří Hospodka **Jiří Hospodka** Jiří Hospodka (Gar.)*	Z,ZK	4	2P+2L	Z	PV

B2B34MIK	**Microcontrollers** *Jan Novák, Tomáš Teplý, Vladimír Janíček* ***Tomáš Teplý*** *Vladimír Janíček (Gar.)*	Z,ZK	4	2P+2C	Z	PV
B0B37NSI	**Design of IoT systems** *Stanislav Vítek* ***Stanislav Vítek*** *Stanislav Vítek (Gar.)*	Z,ZK	5	2P + 2L + 2D	L	PV
B2B17OKS	**Optical Communication Systems** *Stanislav Zvánovec, Jan Šístek, Matěj Komanec* ***Matěj Komanec*** *Stanislav Zvánovec (Gar.)*	Z,ZK	4	2P+2C	Z	PV
B2B34OZD	**Optical sources and detectors of radiation** *Tomáš Martan, Václav Prajzler, Vítězslav Jeřábek, David Mareš* ***Václav Prajzler*** *Václav Prajzler (Gar.)*	Z,ZK	4	2P+2L	L	PV
B2B32PPS	**Network Planning and Operation** *Jiří Holeček, Jiří Vodrážka* ***Jiří Holeček*** *Jiří Vodrážka (Gar.)*	Z,ZK	4	2P + 2C	L	PV
B2B37ROZ	**Radio Circuits and Devices** *Josef Dobeš, Karel Ulovec* ***Karel Ulovec*** *Josef Dobeš (Gar.)*	Z,ZK	4	2P+2L	L	PV
B2B32STE	**Network Technologies** *Petr Hampl, Leoš Boháč, Ivan Pravda* ***Ivan Pravda*** *Leoš Boháč (Gar.)*	Z,ZK	4	2P + 2C	Z	PV
B0B02UAK	**Introduction to Acoustic** *Marek Brothánek, Ondřej Jiříček* ***Ondřej Jiříček*** *Ondřej Jiříček (Gar.)*	KZ	4	2P+2L	L	PV
B2B17VDP	**Transmission Lines for Data Transfer** *Ladislav Oppl, Milan Polívka* ***Milan Polívka*** *Milan Polívka (Gar.)*	Z,ZK	4	2P+2L	L	PV
B2B37ZST	**Principles of Studio Technology** *František Rund, Jan Bednář, Martin Bernas, Miloslav Novák* ***Jan Bednář*** *František Rund (Gar.)*	Z,ZK	4	2P+2L	Z	PV

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

B2B31EO2	Electronic Circuits 2	Z,ZK	4

The course builds on the basic electric circuits course. It introduces multistage transistor amplifiers and basic applications in the field of electronic systems. Students become familiar with design and measurement of electronic systems, including nonlinear applications with regard to the real characteristics of operational amplifiers. Next operating principles and parameters of power amplifiers, linear stabilizers, switching power supply and D/A and A/D converters are presents.

B2B34MIK	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.

B0B37NSI	Design of IoT systems	Z,ZK	5
B2B17OKS	Optical Communication Systems	Z,ZK	4

The aim of the course is to introduce students with principles of optical systems. The course covers both theoretical background of optics and practical approaches for the design of optical systems. Students extend their knowledge from the ray optics through the matrix optics, subsequently and further by the description of optical systems using Gaussian beams, towards wave and quantum optics. Then students will learn the basic mechanisms and principles of fiber optics.

B2B34OZD	Optical sources and detectors of radiation	Z,ZK	4

The aim of the course is to explain the principle of optical sources, optical amplifiers and photodetectors and their technology. Then discuss their use for informatics and sensors, including optical integrated circuits, both from a theoretical and a broader application point of view. Attention is also paid to components for optical communication and to components for physical and chemical quantities, important measuring and diagnostic methods are given.

B2B32PPS	Network Planning and Operation	Z,ZK	4

The subject expands knowledge obtained in precedent studies on such issues as network planning, network design, network constructions and network operation. Knowledge of telecommunications systems are developed in model tasks focused on the design of selected parts of the telecommunications network. Special attention is given to the legislation in telecommunications and to the business aspects of telecommunications.

B2B37ROZ	Radio Circuits and Devices	Z,ZK	4

The first part contains a basic but systematical description of fundamental types of analog and digital modulations. A description of the building blocks of radio communication systems and basic types of radio receivers follows. A description of passive and active elements with non-distributed and distributed parameters follows from the point of view their usage in radio circuits. Attention is devoted to contemporary structures with distributed parameters, microwave transistors of various types, power unipolar transistors. A description of radio function blocks is a fundamental part of the subject: radio-frequency amplifiers and their noise properties, distributed amplifiers, power amplifiers, oscillators, phase noise, crystal oscillators, mixers, double and multiply-balanced mixers.

B2B32STE	Network Technologies	Z,ZK	4

The primary task of this subject is to move further already acquired fundamental networking knowledge in the context of Data Networks subject. Students will comprehend working principles of various methods to access common shared physical media, Ethernet switching technologies and WiFi networks and last but not least they will also master an essential networking theory as used in real practice. Students will be given a chance to get in touch with technology to implement simple routed and switched networks in the university network lab.

B0B02UAK	Introduction to Acoustic	KZ	4

The subject provides overview of main parts of acoustics. In first lectures there is introduction to basic types of sound fields, its solutions and properties. Next chapter deals with introduction to building and room acoustics. The second half of the course deals with introductions to physiological acoustics, psychoacoustics, musical acoustics, hygiene legislation and ultrasound, infrasound and their measurement.

B2B17VDP	Transmission Lines for Data Transfer	Z,ZK	4
B2B37ZST	Principles of Studio Technology	Z,ZK	4

The course gives basic knowledge of elements and systems used in television and radio professional and semiprofessional studio technology and of technology of radio and television production and broadcasting. Laboratory exercises are situated in a small school studio and are completed with professional excursions.

Code of the group: 2018_BEKP2
Name of the group: Compulsory subjects of the programme
Requirement credits in the group: In this group you have to gain at least 4 credits (at most 8)
Requirement courses in the group: In this group you have to complete at least 1 course (at most 2)
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
B2B16EPO	**Business economics** *Oldřich Starý, Josef Černohous, Blanka Kučerková* ***Josef Černohous*** *Oldřich Starý (Gar.)*	KZ	4	2P+2S	Z	PV
B2B99EKP	**Electronics and communication practically** *Vladimír Janíček* ***Vladimír Janíček*** *Vladimír Janíček (Gar.)*	KZ	4	2P+2L	Z	PV

Characteristics of the courses of this group of Study Plan: Code=2018_BEKP2 Name=Compulsory subjects of the programme

B2B16EPO	Business economics	KZ	4
Basic course of Business Economics deals with the subject from wide angle of view, discussing all particular aspects of Business Economics, and relationships between them.			
B2B99EKP	Electronics and communication practically	KZ	4
The course is devoted to practical experiments with the ESP 32 SoC board and a set of external add-on modules. Students will get acquainted with the rules of application design in ArduinoIDE and Visual Code Studio using libraries for operating internal and external peripherals. Sample applications are focused on standardized issues that cover the professional focus of the Electronics and Communications program. Part of the exercise will be devoted to the description of the design of printed circuit boards, their production and mounting. Students will get a board with SoC ESP32 for experimentation, which they can also use for home preparation.			

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: 2018_BEKVOL
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
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.			
B0B01KANA	Complex Analysis	Z,ZK	4
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.			
B0B01LAGA	Linear Algebra	Z,ZK	7
The course covers introductory topics of linear algebra. It begins with fundamental concepts related to vector spaces and linear transform (such as linear dependence and independence of vectors, bases, coordinates of vectors, etc.). The next part of the course is devoted to matrix theory (determinants, inverse matrix, matrices of linear transformation, eigenvalues and			

	eigenvectors). Applications include solving systems of linear equations, geometry in three-dimensional space (including dot and cross products), and the singular value decomposition of a matrix.		
B0B01MA1A	Mathematical Analysis 1	Z,ZK	6
	This is an introductory course to differential and integral calculus of functions of one real variable.		
B0B01MA2A	Mathematical Analysis 2	Z,ZK	6
	The subject covers an introduction to the differential and integral calculus in several variables and basic relations between curve and surface integrals. Other part contains function series and power series with application to Taylor and Fourier series.		
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.		
B0B02UAK	Introduction to Acoustic	KZ	4
	The subject provides overview of main parts of acoustics. In first lectures there is introduction to basic types of sound fields, its solutions and properties. Next chapter deals with introduction to building and room acoustics. The second half of the course deals with introductions to physiological acoustics, psychoacoustics, musical acoustics, hygiene legislation and ultrasound, infrasound and their measurement.		
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/		
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
B0B16MPL	Psychology for managers	ZK	2
B0B16MPS	Psychology	Z,ZK	4
B0B37NSI	Design of IoT systems	Z,ZK	5
B0B99PRPA	Procedural Programming	KZ	4
B2B02FY1	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.		

B2B02FY2	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.			
B2B14ZEK	Fundamentals of electrotechnics	KZ	4
B2B16EPO	Business economics	KZ	4
Basic course of Business Economics deals with the subject from wide angle of view, discussing all particular aspects of Business Economics, and relationships between them.			
B2B17ELD	Electrodynamics	Z,ZK	4
This subject empowers its students with a unified approach to time-varying electromagnetic fields and waves.			
B2B17EMPA	Electromagnetic Field	Z,ZK	5
This course gets its students acquinted with principles and applied electromagnetic field theory basics.			
B2B17OKS	Optical Communication Systems	Z,ZK	4
The aim of the course is to introduce students with principles of optical systems. The course covers both theoretical background of optics and practical approaches for the design of optical systems. Students extend their knowledge from the ray optics through the matrix optics, subsequently and further by the description of optical systems using Gaussian beams, towards wave and quantum optics. Then students will learn the basic mechanisms and principles of fiber optics.			
B2B17TBK	Wireless Communication Technique	KZ	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.			
B2B17VDP	Transmission Lines for Data Transfer	Z,ZK	4
B2B31CZS	Digital Signal processing	Z,ZK	4
The subject gives overview about basic methods of digital signal processing and their applications (examples from speech and biological signal processing): disrete-time signals and systems, signal characteristics in time and frequency domain, Fourier transform, fast algorithms for DFT computation, introduction to digital filter design, digital filtering in time and frequency domain, decimation and interpolation and their usage in filter banks, basics of LPC analysis. Further details can be found at http://noel.feld.cvut.cz/vyu/ae2m99czs			
B2B31EO1	Electronic Circuits 1	Z,ZK	4
The course introduces basic circuits with operational amplifiers, continues with the description of linear systems, analysis of their characteristics and fundamentals of synthesis frequency filters. It deals with the principles and features of circuits for generating signals and a controlled oscillator including the PLL circuit and its use. The last part of the course is devoted to basic amplifier stages with transistors.			
B2B31EO2	Electronic Circuits 2	Z,ZK	4
The course builds on the basic electric circuits course. It introduces multistage transistor amplifiers and basic applications in the field of electronic systems. Students become familiar with design and measurement of electronic systems, including nonlinear applications with regard to the real characteristics of operational amplifiers. Next operating principles and parameters of power amplifiers, linear stabilizers, switching power supply and D/A and A/D converters are presents.			
B2B31ZEOA	Fundamentals of Electric Circuits	Z,ZK	5
The course describes the basic methods of analysis of electrical circuits. In the lectures, students are introduced to the basic active and passive circuit elements, circuit quantities, important circuit theorems and methods of circuit analysis in stationary and harmonic steady state as well as during transients caused by changes in the circuit. The seminars are aimed at practicing knowledge in the analysis of basic electrical circuits, supplemented by simulations and simple measurements.			
B2B32DATA	Data Networks	KZ	5
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.			
B2B32DITA	Digital Technique	KZ	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.			
B2B32PPS	Network Planning and Operation	Z,ZK	4
The subject expands knowledge obtained in precedent studies on such issues as network planning, network design, network constructions and network operation. Knowledge of telecommunications systems are developed in model tasks focused on the design of selected parts of the telecommunications network. Special attention is given to the legislation in telecommunications and to the business aspects of telecommunications.			
B2B32STE	Network Technologies	Z,ZK	4
The primary task of this subject is to move further already acquired fundamental networking knowledge in the context of Data Networks subject. Students will comprehend working principles of various methods to access common shared physical media, Ethernet switching technologies and WiFi networks and last but not least they will also master an essential networking theory as used in real practice. Students will be given a chance to get in touch with technology to implement simple routed and switched networks in the university network lab.			
B2B32TSI	Telecommunication Systems and Networks	KZ	4
The course introduces principles and functions of digital telecommunications systems, both transmission and switching systems as well as converged packet-oriented systems interconnected into universal telecommunication networks.			
B2B34ELPA	Electron Devices	Z,ZK	5
This course introduces the basic theory, principles of operation and properties of electron devices. Physical principles of operation, device structures and characteristics are explained together with adequate models for small- and large-signal. Basic applications in analogue and digital electronics are examined. In seminars and labs, students are introduced to basic principles of device simulation, measurement of device characteristics and extraction of device parameters. Operation of electron devices in electronic devices is then analyzed using the PSpice simulator.			

B2B34MIK	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.			
B2B34MIT	Microelectronics	KZ	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.			
B2B34OZD	Optical sources and detectors of radiation	Z,ZK	4
The aim of the course is to explain the principle of optical sources, optical amplifiers and photodetectors and their technology. Then discuss their use for informatics and sensors, including optical integrated circuits, both from a theoretical and a broader application point of view. Attention is also paid to components for optical communication and to components for physical and chemical quantities, important measuring and diagnostic methods are given.			
B2B34SEE	Sesors in Electronics	Z,ZK	4
B2B37AVT	Audiovisual Technology	KZ	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.			
B2B37ROZ	Radio Circuits and Devices	Z,ZK	4
The first part contains a basic but systematical description of fundamental types of analog and digital modulations. A description of the building blocks of radio communication systems and basic types of radio receivers follows. A description of passive and active elements with non-distributed and distributed parameters follows from the point of view their usage in radio circuits. Attention is devoted to contemporary structures with distributed parameters, microwave transistors of various types, power unipolar transistors. A description of radio function blocks is a fundamental part of the subject: radio-frequency amplifiers and their noise properties, distributed amplifiers, power amplifiers, oscillators, phase noise, crystal oscillators, mixers, double and multiply-balanced mixers.			
B2B37SAS	Signals and systems	Z,ZK	5
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.			
B2B37ZST	Principles of Studio Technology	Z,ZK	4
The course gives basic knowledge of elements and systems used in television and radio professional and semiprofessional studio technology and of technology of radio and television production and broadcasting. Laboratory exercises are situated in a small school studio and are completed with professional excursions.			
B2B38EMB	Electrical Measurements	Z,ZK	4
Methods of measurement of electrical quantities (voltage, current, power, frequency, resistance, capacitance, and inductance) are explained together with principles of their correct application and accuracy estimation. The course is closed by presenting information on several basic electronic measuring instruments and explaining the fundamentals of magnetic measurements and basic information concerning measurement systems.			
B2B99EKP	Electronics and communication practically	KZ	4
The course is devoted to practical experiments with the ESP 32 SoC board and a set of external add-on modules. Students will get acquainted with the rules of application design in ArduinoIDE and Visual Code Studio using libraries for operating internal and external peripherals. Sample applications are focused on standardized issues that cover the professional focus of the Electronics and Communications program. Part of the exercise will be devoted to the description of the design of printed circuit boards, their production and mounting. Students will get a board with SoC ESP32 for experimentation, which they can also use for home preparation.			
B2B99PPC	Practical C/C++ programming	KZ	6
The course introduces students to the C ++ and develops their practical skills in programming in C/C++ with an emphasis on solving computational tasks and multi-threaded applications using parallel programming. The first part of the course is devoted to the object-oriented programming in C++ and provides students with basic data containers of standard library STL. Students learn the principles of parallel programming, multi-threaded applications, synchronization mechanisms and models of multi-threaded applications. The second part is dedicated to develop an algorithmic thinking to solve computational problems by searching the problem state space. Two main approaches are considered: the deterministic search of a graph representation of the state space; and local optimization techniques. Additionally, students will be familiarized with models of arbitrary precision data representations, representation of matrices, and matrix calculations.			
B2B99TPS	Technical Writing	KZ	4
The course aims to help students with various technical or scientific reports (lab report, article, final thesis etc.) Also important is, in addition to language and stylistic skills, to show how to obtain and present scientific information. Given are also up-to-date methods for efficient typing and document automation, including LaTeX. All topics are practiced by related tasks in the Moodle.			
B2BPROJ6	Bachelor project	KZ	6
Independent work in the form of a project. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or branch departments. The project will be defended within the framework of a subject.			
BBAP20	Bachelor thesis	Z	20
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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