

Recommended pass through the study plan

Name of the pass: Electrical Engineering, Electronics and Communication - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering

Department:

Pass through the study plan: Electrical Engineering, Electronics and Communications

Branch of study guaranteed by the department: Common courses

Guarantor of the study branch:

Program of study: Electrical Engineering, Electronics and Communications

Type of study: Bachelor combined

Note on the pass:

Coding of roles of courses and groups of courses:

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

Coding of ways of completion of courses (KZ/Z/ZK) and coding of semesters (Z/L):

KZ - graded assesment, Z - assesment, ZK - examination, L - summer semester, Z - winter semester

Number of semester: 1

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|-----------|---|------------|---------|----------|----------|------|
| BEZB | Safety in Electrical Engineering for a Bachelor's Degree Ivana Nová, Radek Havlí ek, Vladimír K la Radek Havlí ek Vladimír K la (Gar.) | Z | 0 | 2BP+2BC | Z,L | P |
| BD5B01LAG | Linear Algebra | Z,ZK | 8 | 28KP+6KC | Z | P |
| BD5B16MME | Macro and Microeconomics Helena Fialová | Z,ZK | 4 | 14KP+6KS | Z | P |
| BD5B01MA1 | Mathematical Analysis 1 Paola Vivi Josef Tkadlec Josef Tkadlec (Gar.) | Z,ZK | 8 | 28KP+6KC | Z | P |
| BD5B36PRP | Procedural Programming Ivan Jelínek Ivan Jelínek Ivan Jelínek (Gar.) | Z,ZK | 6 | 14KP+6KC | Z | P |
| BEZZ | Basic Health and Occupational Safety Regulations Ivana Nová, Radek Havlí ek, Vladimír K la Radek Havlí ek Vladimír K la (Gar.) | Z | 0 | 2BP+2BC | Z | P |
| BD5B14ZEL | Fundamentals of Electrotechnical Engineering Ivana Nová Ivana Nová | KZ | 4 | 14KP+6KC | Z | P |

Number of semester: 2

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|-----------|---|------------|---------|----------|----------|------|
| BD5B01DRN | Differential Equations and Numerical Analysis | Z,ZK | 6 | 14KP+6KC | L | P |
| BD5B31EO1 | Electronic Circuits 1 Roman mejla Roman mejla Roman mejla (Gar.) | Z,ZK | 5 | 14KP+6KC | L | P |
| BD5B34EPS | Electronics Lubor Jirásek Lubor Jirásek Lubor Jirásek (Gar.) | KZ | 4 | 14KP+6KL | L | P |
| BD5B02FY1 | Physics 1 Jaroslav Plocek Jaroslav Plocek Jaroslav Plocek (Gar.) | Z,ZK | 7 | 14KP+6KC | L | P |
| BD5B16MPS | Psychology Josef ernohous, Alena Klesalová, Jaroslav Knápek Jaroslav Knápek Alena Klesalová (Gar.) | Z | 4 | 14KP+6KS | L | P |
| BD5B01MA2 | Miroslav Korbela Miroslav Korbela Petr Hájek (Gar.) | Z,ZK | 8 | 28KP+6KC | L | P |

Number of semester: 3

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|---------------|---|---------------------------------------|------------------|----------|----------|------|
| BD5B17EMP | Electromagnetic Field Jan Machá , Zbyn k Škvor Zbyn k Škvor Jan Machá (Gar.) | Z,ZK | 5 | 14KP+6KS | Z | P |
| BD5B31EO2 | Electronic Circuits 2 Ji í Náhlík Ji í Hospodka Ji í Hospodka (Gar.) | Z,ZK | 5 | 14KP+6KC | Z | P |
| BD5B02FY2 | Physics 2 Jaroslav Plocek Jaroslav Plocek Jaroslav Plocek (Gar.) | Z,ZK | 7 | 14KP+6KC | Z | P |
| BD5B37PPC | C/C++ programming Stanislav Vítek Stanislav Vítek Stanislav Vítek (Gar.) | KZ | 4 | 14KP+6KC | Z | P |
| 2024_BEEKPV-K | Povinn volitelné p edm ty BD5B37AVT,BD5B31CZS,..... (see the list of groups below) | Min. cours. 9 Max. cours. 18 | Min/Max 36/72 | | | PV |

Number of semester: 4

| Code | Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.) | Completion | Credits | Scope | Semester | Role |
|----------------|---|---------------------------------------|------------------|----------|----------|------|
| BD5B38EMA | Electrical Measurements Vladimír Haasz Vladimír Haasz Vladimír Haasz (Gar.) | KZ | 5 | 14P+6L | L | P |
| BD5B99IN1 | Individual project Lubor Jirásek, Vladimír Janík ek Lubor Jirásek | Z | 4 | 0+4s | L | P |
| BD5B34MIK | Microcontrollers Tomáš Teplý, Vladimír Janík ek Tomáš Teplý Tomáš Teplý (Gar.) | Z,ZK | 4 | 14KP+6KL | L | P |
| BD5B01STP | Statistics and Probability Kate ina Helisová Kate ina Helisová Kate ina Helisová (Gar.) | Z,ZK | 6 | 14KP+6KC | L | P |
| 2024_BEEKPV-K | Povinn volitelné p edm ty BD5B37AVT,BD5B31CZS,..... (see the list of groups below) | Min. cours. 9 Max. cours. 18 | Min/Max 36/72 | | | PV |
| 2024_BEEKVOL-K | Volitelné p edm ty | Min. cours. 0 | Min/Max 0/999 | | | V |

Number of semester: 5

| 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 |
|----------------|---|---------------------------------------|------------------|-------|----------|------|
| BD5B99IN2 | Individual project Lubor Jirásek, Vladimír Janík ek | Z | 8 | 0+8s | Z | P |
| 2024_BEEKPV-K | Povinn volitelné p edm ty BD5B37AVT,BD5B31CZS,..... (see the list of groups below) | Min. cours. 9 Max. cours. 18 | Min/Max 36/72 | | | PV |
| 2024_BEEKVOL-K | Volitelné p edm ty | Min. cours. 0 | Min/Max 0/999 | | | V |

Number of semester: 6

| 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 Mejla Roman Mejla (Gar.) | Z | 20 | 12S | L,Z | P |
| BD5B16ZFM | Basics of Financial Management Blanka Ku erková, Old ich Starý Old ich Starý Old ich Starý (Gar.) | Z,ZK | 4 | 14KP+6KS | L | P |
| 2024_BEEKPV-K | Povinn volitelné p edm ty BD5B37AVT,BD5B31CZS,..... (see the list of groups below) | Min. cours. 9 | Min/Max 36/72 | | | PV |

Max. cours.

18

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

| Kód | Name of the group of courses and codes of members of this group (for specification see here or below the list of courses) | | | Completion | Credits | Scope | Semester | Role |
|----------------|---|-----------|--------------------------------------|---------------------------------------|--------------------------------------|-------|----------|------|
| 2024_BEEKPV-K | Povinn voliteľné p edm ty | | | Min. cours. 9 Max. cours. 18 | Min/Max 36/72 | | | PV |
| BD5B37AVT | Audiovisual Technology | BD5B31CZS | Digital Signal Processing | BD5B32DAT | Data Networks | | | |
| BD5B32DIT | Digital Technique | BD5B17ELD | Electrodynamics | BD5B15EN1 | Power Engineering 1 | | | |
| BD5B15EN2 | Power Engineering 2 | BD5B15EN3 | Power Engineering 3 | BD5B13MVE | Materials for Power Electrical E ... | | | |
| BD5B34MIT | Microelectronics | BD5B34SEE | Senzors in Electronics and Elect ... | BD5B37SAS | Signals and systems | | | |
| BD5B17TBK | Wireless Communication Technique | BD5B13VST | Power components and technology | BD5B13VVZ | Manufacturing of Power Devices | | | |
| BD5B14ZPO | Fundamentals of Electric Drives | BD5B14ZSP | Electric Machines and Apparatus ... | BD5B14ZVE | Power Electronics | | | |
| 2024_BEEKVOL-K | Voliteľné p edm ty | | | Min. cours. 0 | Min/Max 0/999 | | | V |

List of courses of this pass:

| Code | Name of the course | Completion | Credits |
|-----------|---|------------|---------|
| BBAP20 | Bachelor thesis | Z | 20 |
| BD5B01DRN | Differential Equations and Numerical Analysis This course introduces students to the classical theory of ordinary differential equations (separable and linear ODEs) and also to basics of numerical methods (errors in calculations and stability, numerical solutions of algebraic and differential equations and their systems). The course takes advantage of the synergy between theoretical and practical point of view. | Z,ZK | 6 |
| BD5B01LAG | Linear Algebra | Z,ZK | 8 |
| BD5B01MA1 | Mathematical Analysis 1 The aim of the course is to introduce students to basics of differential and integral calculus of functions of one variable. | Z,ZK | 8 |
| BD5B01MA2 | | Z,ZK | 8 |
| BD5B01STP | Statistics and Probability 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. | Z,ZK | 6 |
| BD5B02FY1 | Physics 1 The basic course of physics at the Faculty of Electrical Engineering - Physics 1, is devoted to the introduction into two important areas of physics. The first one is a classical mechanics and the second one is the electric and magnetic field. Within the framework of the classical mechanics, the students study the particle kinematics; dynamics of the mass particle, system of mass particles and rigid bodies. The students should be able to solve basic problems dealing with the description of mechanical systems, which they can meet during their further studies. The classical mechanics is followed by the relativistic mechanics, electric and magnetic field - both stationary as well as non-stationary. The students can use the facts gained in this course in the study of electrical circuits, theory of electrotechnical materials or radioelectronics. Apart of this, the knowledge gained in this course is required for the study of the consecutive course Physics 2. | Z,ZK | 7 |
| BD5B02FY2 | Physics 2 The course Physics 2 is closely linked with the course Physics 1. Within the framework of this course the students will first of all learn foundations of thermodynamics. Following topic - the theory of waves - will give to the students basic insight into the properties of waves and will help to the students to understand that the presented description of the waves has a universal character in spite of the waves character. Particular types of waves, such as acoustic or optical waves are the subjects of the following section. Quantum mechanics and nuclear physics will complete the student's general education in physics. The knowledge gained in this course will help to the students in study of such modern areas as robotics, computer vision, measuring technique and will allow them to understand the principles of novel technologies and functioning of new electronic devices. | Z,ZK | 7 |
| BD5B13MVE | Materials for Power Electrical Engineering At first a physical description of basic properties and basic types of materials for electrical engineering is carried out. Types of conductors, superconductors, insulators, magnetic materials and semiconductors, which are used in power electrical engineering, are presented. The stress is put on relationships between properties, technology and 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. | Z,ZK | 4 |
| BD5B13VST | Power components and technology 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 be 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 be presented. | Z,ZK | 4 |
| BD5B13VVZ | Manufacturing of Power Devices The topic of the subject is focused on manufacturing of power electrical machines and devices from construction and technological point of view. Main part of the subject is devoted to transformers and rotating machines, namely their magnetic circuits and windings. Second half of the subject is dedicated to manufacturing of power semiconductive devices and converters including diagnostics, reliable operation. Last part of lectures deals with layouts of manufacturing, lean management and planning of manufacturing. | Z,ZK | 4 |

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| 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 | Fundamentals of Electric Drives | Z,ZK | 4 |
| The course explains the basic building blocks of the electric drive. The design of 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 conversion of mechanical energy to electrical and back. It discusses the principles of basic functions and properties of rotating and non-rotating electric machines. Following the behavior of electrical machines are discussed basic devices for protection and switching, including behavioral and switching problems. | | | |
| 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 Microeconomics | 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 acquainted 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 | Sensors 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. | | | |

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| 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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