

Recommended pass through the study plan

Name of the pass: Communications and electronics - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering

Department: Department of Electromagnetic Field

Pass through the study plan: Komunikace, multimédia a elektronika - Komunikace a elektronika

Branch of study guaranteed by the department:

Guarantor of the study branch:

Program of study: Communications, Multimedia, Electronics

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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
AD2B14BP1	Safety in Electrical Engineering 1	Z	0	4+8j	Z,L	P
AD2B02FY1	Physics 1 for KME	Z,ZK	4	14+6L	Z	P
AD2B99KAM	Communication and Multimedia	Z	5	14+6c	Z	P
AD0B01LAA	Linear Algebra and its Applications	Z,ZK	8	21+9	Z	P
AD0B36PRI	Programming	Z,ZK	5	14KP+6KC	Z	P
AD2B14BPZS	Basic health and occupational safety regulations	Z	0	2+2j	Z	P
AD0B01MA1	Introduction to Calculus	Z,ZK	8	21+9	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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
AD2B17EPV	Electromagnetic Field, Waves and Lines	Z,ZK	5	14+6s	L	P
AD2B34ELP	Electron Devices	Z,ZK	5	14KP+6KL	L	P
AD2B99MAA	Mathematical Applications	KZ	4	14KP+6KC	L	P
AD2B99SAS	Signals and systems	Z,ZK	5	14+6c	L	P
AD2B01MA3	Multidimensional Calculus	Z,ZK	6	14+6	L	P
AD2B31ZEO	Fundamentals of Electrical Circuits	Z,ZK	5	14KP+6KS	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) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
AD2B31ANO	Analog Circuits	Z,ZK	5	14KP+6KC	Z	P
AD2B32DAT	Data networks	Z,ZK	5	14P + 6C	Z	P
AD2B99DIT	Digital Engineering	Z,ZK	5	14P + 6L	Z	P
AD0B16EPD	Business economics	KZ	4	14+6s	Z,L	P
AD2B38EMB	Electrical Measurements and Instrumentation	Z,ZK	5	14P+6L	Z	P
AD2B02FY2	Physics 2 for KME	KZ	3	14+3L	Z	P

BKMEPRO-K	Projekt I AD2B31IN1,AD2B34IN1,..... (see the list of groups below)	Min. cours. 1 Max. cours. 1	Min/Max 3/3			P
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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
AD2B99KOS	Communication Systems	Z,ZK	6	14P + 6L	L	P
AD2B37MMT	Multimedia Technology	Z,ZK	6	14+6L	L	P
AD2B17PMS	Fixed and Mobile Wireless Links	Z,ZK	6	14+6c	L	P
AD0B16PRS	Presentation skills	Z	2	0+6s	Z,L	P
AD2B34SEI	Sensors in Electronics and Informatics	Z,ZK	6	14KP+6KL	L	P
BKMEH-K	Humanitní p edm ty AD0B16ET1,AD0B16FI1,..... (see the list of groups below)	Min. cours. 2	Min/Max 8/24			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
AD2B13PEL	Industrial Electrical Engineering	Z,ZK	5	14KP+6KL	Z	P
AD2B31HPM	Hardware for Multimedia	Z,ZK	6	14KP+6KL	Z	P
AD2B34IAE	Smart Electronics	Z,ZK	6	14KP+6KL	Z	PO
AD2B37KMM	Communication and Measurement in Multimedia	Z,ZK	6	14+6L	Z	PO
AD2B32TSI	Telecommunication Systems and Networks	Z,ZK	6	14P + 6L	Z	PO
BKMEPRO2-K	Projekt II AD2B32IND,AD2B31IN2,..... (see the list of groups below)	Min. cours. 1 Max. cours. 1	Min/Max 3/3			P

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
ABAP20	Bachelor thesis	Z	20	28s	L,Z	P
AD2B17VFM	Radiofrequency Measurement	Z,ZK	6	14+6L	Z	PO
BKMEH-K	Humanitní p edm ty AD0B16ET1,AD0B16FI1,..... (see the list of groups below)	Min. cours. 2	Min/Max 8/24			V

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
BKMEH-K	Humanitní p edm ty	Min. cours. 2	Min/Max 8/24			V
AD0B16ET1	Ethic	AD0B16FI1	Philosophy I	AD0B16HI1	History I	
AD0B16HT1	History of science and technolog ...	AD0B16MPS	Psychology	A003TV	Physical Education	
BKMEPRO-K	Projekt I	Min. cours. 1 Max. cours.	Min/Max 3/3			P

AD2B14BPZS	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. Directive of the Dean No. 1/2007. This program is obligatory.			
AD2B17EPV	Electromagnetic Field, Waves and Lines	Z,ZK	5
This course presents fundamentals of electromagnetic field theory and its applications. Analysis methods proper for static, stationary as well as dynamic fields and waves in free space and on basic transmission lines are presented as well. This course provides students with physics - based view on studied effects, which is applied then on engineering problems. At the end of the course, all effects should not only be described, but quantified as well. Basic knowledge and insight into communication devices, systems and techniques is provided, applicable not only to systems currently taught in other courses, but to future systems as well.			
AD2B17IN1	Individual Project	KZ	3
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. Projects deals with microwave technique, antennas, propagation, optical communications, EMC, and medical applications.			
AD2B17IN2	Individual Project	KZ	3
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. Projects deals with microwave technique, antennas, propagation, optical communications, EMC, and medical applications.			
AD2B17PMS	Fixed and Mobile Wireless Links	Z,ZK	6
The goal of the course is to provide basic knowledge of the wireless transmission in real environments for specific applications, namely for the needs of the planning of wireless radio links. The key topics include: the wireless transmission, the link budget for various types of radio links, antenna parameters, basic types and applications of antennas, propagation of radio waves in the atmosphere for specific frequency bands and telecommunication services, propagation models for planning of fixed and mobile links for both terrestrial and satellite services, the interference and frequency planning, basics of cellular networks, ITU-R recommendations.			
AD2B17VFM	Radiofrequency Measurement	Z,ZK	6
The subject guides students to gain both theoretical and practical skills in radiofrequency and microwave measurements. It is focused on measurement methods and instruments applied e.g. in telecommunication, radio, radar, cable network, navigation, and other systems working in frequency band from units of MHz to 50 GHz, thus from classical radio to microwave area. Students are informed about basic principles and construction of generators, synthesizers, frequency counters, vector generators, spectrum, signal, scalar and vector analyzers and their applications in various measurement methods. Theoretical knowledge from lectures are supplemented by practical measurements in laboratories equipped with modern instruments applied in current professional practice.			
AD2B31ANO	Analog Circuits	Z,ZK	5
The course is designed to acquaint students with the basics of analog electronic circuits. The first part is devoted to fundamental transistor amplifiers and elemental structures of analog integrated circuits. Then the typical applications of operational amplifiers are introduced, including non-linear networks and basic frequency filter design and implementation. Problems of oscillators are discussed at the conclusion.			
AD2B31HPM	Hardware for Multimedia	Z,ZK	6
Subject provides concise basic overview of hardware used in multimedia (MM). It however does not try to achieve an encyclopedic completeness - instead of it, detailed analysis is carried out for selected blocks containing interesting technical solutions and more general principles. The main focus is specialization of digital function blocks for processing of MM data. Analog circuits are described mainly as a complement to digital core. Frequent examples of MM data are used to illustrate functions of individual HW blocks.			
AD2B31IN1	Project I.	KZ	3
AD2B31IN2	Project II.	KZ	3
AD2B31ZEO	Fundamentals of Electrical Circuits	Z,ZK	5
The subject describes fundamental methods of electrical circuit analysis. After a brief introductory part where the difference between an electrical device and its models is introduced, the basic ideal passive and active circuit elements are then defined. Next, basic circuit quantities are defined; lectures are then focused on important laws and methods of analysis of electrical circuits. Circuit theorems, an analysis of DC circuits, AC circuits, first-order and second-order circuits are described. Finally, a brief description of more sophisticated methods of analysis (Laplace transform, pulse excitation) is done. The seminars are focused on getting a theoretical experience in analysis of electrical circuits, supplemented with simulations and simple measurement.			
AD2B32DAT	Data networks	Z,ZK	5
The course introduces students to the basics of communication in a variety of data networks. The aim of the course is to provide a more comprehensive view of communication protocol for specific types most commonly used data networks according to the RM-layer OSI model. The course also allows students to look into ways of communicating with TCP/IP in the Internet, including the possibility of a practical realization of the data network in laboratory conditions using real equipment.			
AD2B32IND	Individual Project	KZ	3
Independent final work for the Bachelor's degree study programme. 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.			
AD2B32TPR	Team Project	KZ	3
Teamwork in the form of project. The theme of work, the student selects from a menu of topics related to the specialization studied. Choice of theme, the student becomes a member of the team. Its task is to participate in collaboration with colleagues to solve the task.			
AD2B32TSI	Telecommunication Systems and Networks	Z,ZK	6
The subject discusses principles of the telecommunication systems both digital transmission systems and digital switching systems. The subject will allow students to gain overview in broad telecommunication domain and they will be able to solve partial problems related with network traffic. Furthermore, students will also obtain knowledge in VoIP technology, QoS and signaling systems that are used in modern wired and wireless networks.			
AD2B34ELP	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.			
AD2B34IAE	Smart Electronics	Z,ZK	6
The aim of the course is to show and present to the students the modern trends used in electronics design. It will practically show the usage of electronic devices, circuits and functional blocks. Typical methods, errors and mistakes during the design process flow will be shown. During the exercises students will design a concept and select appropriate electronic components for circuit realization. Simulation software will help to compare the designed circuit with the realized one. Evaluation boards with complete software support from STMicroelectronics will help the students to understand the basic function of presented integrated circuits.			
AD2B34IN1	Individual project	KZ	3
Independent work in the form of a project. A student will choose a topic related to his or her branch of study, which will be specified department or branch departments. The project will be defended within the framework of a subject.			

AD2B34IN2	Individual project	KZ	3
Independent work in the form of a project. A student will choose a topic related to his or her branch of study, which will be specified department or branch departments. The project will be defended within the framework of a subject.			
AD2B34SEI	Sensors in Electronics and Informatics	Z,ZK	6
The subject describes basic physical, electronic as well as optoelectronic behaviours using in sensors and microsensors, static and dynamic parameters, improvement of parameters, sensor data processing, intelligent sensors, applications of basic principles in sensors (temperature, pressure, optoelectronic and fibre optic, radiation, chemical, mechanical, level, flow, ultrasound, etc.). There are showed principles and applications of MEMS and microsystems in the subject. Principles are demonstrated on actual sensor datasheets and applications.			
AD2B37IN1	Individual Project I	KZ	3
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.			
AD2B37IN2	Individual Project II	KZ	3
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.			
AD2B37KMM	Communication and Measurement in Multimedia	Z,ZK	6
The aim of the subject is to give basic overview of present and perspective communication systems, mainly in relation to signal transmission and measurement. Lectures and practices make students familiar with technical principles of systems, basic conception of transmitter and receiver and measurement of these systems. Subject is focused on multimedia systems; it means systems for voice, audio, video and generally data transmission. Practices are based on laboratory measurements.			
AD2B37MMT	Multimedia Technology	Z,ZK	6
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.			
AD2B38EMB	Electrical Measurements and Instrumentation	Z,ZK	5
Methods of measurement of electrical physical 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 of several basic electronic measuring instruments and explaining fundamentals of magnetic measurements and basic information concerning measurement systems.			
AD2B99DIT	Digital Engineering	Z,ZK	5
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.			
AD2B99KAM	Communication and Multimedia	Z	5
The subject is focused on an introduction of 1st term students (Bc. study) to the field of communication and multimedia technology and electronics. This field is very broad and offers to students multidisciplinary (interdisciplinary) education. At the beginning of study it is important to inform students about different parts. The task is to do it in popular and acceptable form and show the most important parts of this very broad industrial and research branch. The area is covered by five departments providing educational and research inputs. This interdisciplinary subject demonstrates as an introduction to study expected job opportunities in IT, assistive, biomedical and other technologies.			
AD2B99KOS	Communication Systems	Z,ZK	6
The course gives an overview of the basic principles and methods used in digital communications in a variety of transmission environments (radio systems, metallic telecommunication lines, optical fiber). The students will learn the basic functional blocks of the communication systems, encoding and decoding, modulation and demodulation methods. The students obtain the idea about sources of errors in the transmission and ways for their detection and correction. They will learn how to calculate the theoretical and practical communication channel capacity, the basic parameters on digital interfaces measurement, including error rate and jitter.			
AD2B99MAA	Mathematical Applications	KZ	4
AD2B99SAS	Signals and systems	Z,ZK	5
Course explains basic terms and methods for continuous-time and discrete-time signal and system analysis.			

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

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