Recomended pass through the study plan

Name of the pass: Specialization Electronics - Passage through study

Faculty/Institute/Others: Faculty of Electrical Engineering
Department:
Pass through the study plan: Electronics and Communications - Electronics
Branch of study guranteed by the department: Welcome page
Guarantor of the study branch:
Program of study: Electronics and Communications
Type of study: Follow-up master full-time
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
BEZM	**Safety in Electrical Engineering for a master´s degree** *Vladimír Kůla, Radek Havlíček, Ivana Nová, Josef Černohous, Pavel Mlejnek **Radek Havlíček** Vladimír Kůla (Gar.)*	Z	0	2BP+2BC	Z	P
B2M34SST	**Solid State Physics** *Jan Voves **Jan Voves** Jan Voves (Gar.)*	Z,ZK	6	3P+1L	Z	P
B2M37MAM	**Microprocessors** *Petr Skalický, Stanislav Vítek **Stanislav Vítek** Stanislav Vítek (Gar.)*	Z,ZK	6	2P+2L	Z	P
B2M34NSV	**VLSI System Design** *Pavel Hazdra, Jakub Jirsa **Pavel Hazdra** Pavel Hazdra (Gar.)*	Z,ZK	6	2P+2L	Z	P
B2M31DSP	**Advanced DSP methods** *Pavel Sovka, Petr Pollák **Pavel Sovka** Pavel Sovka (Gar.)*	Z,ZK	6	2P+2C	Z,L	P
B2M34SIS	**Integrated System Structures** *Jiří Jakovenko, Vladimír Janíček **Vladimír Janíček** Jiří Jakovenko (Gar.)*	Z,ZK	6	2P+2C	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
B2M32BTSA	**Wireless Technologies** *Zdeněk Bečvář, Lukáš Vojtěch, Zbyněk Kocur, Pavel Mach **Ján Kučerák** Zdeněk Bečvář (Gar.)*	Z,ZK	6	2P + 2L	L	P
B2M34MST	**Microsystems** *Michal Kočí, Miroslav Husák, Adam Bouřa, Alexandr Laposa **Miroslav Husák** Miroslav Husák (Gar.)*	Z,ZK	6	2P+2L	L	P
B2M34NIS	**Design of Integrated Circuits** *Jiří Jakovenko, Jan Novák **Jan Novák** Jiří Jakovenko (Gar.)*	Z,ZK	6	2P+2C	L	P
2018_MEKPV1	**Povinně volitelné předměty programu** *B2M31AEDA,B2M17CADA,..... (see the list of groups below)*	Min. cours. 5 Max. cours. 5	Min/Max 30/30			PV

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
B2MPROJ6	**Project** *Jiří Jakovenko, Pavel Máša, Ivan Pravda, František Rund, Jan Šístek, Lubor Jirásek, Tomáš Zeman, Ladislav Oppl **František Rund** František Rund (Gar.)*	Z	6	0p+6s	Z,L	P

2018_MEKPV1	**Povinně volitelné předměty programu** *B2M31AEDA,B2M17CADA,..... (see the list of groups below)*	Min. cours. 5 Max. cours. 5	Min/Max 30/30			PV
2018_MEKVOL	**Volitelné odborné předměty2018**	Min. cours. 0	Min/Max 0/999			V

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
BDIP25	**Diploma Thesis**	Z	25	22s	L	P
2018_MEKVOL	**Volitelné odborné předměty2018**	Min. cours. 0	Min/Max 0/999			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
2018_MEKPV1	**Povinně volitelné předměty programu**	**Min. cours. 5** **Max. cours. 5**	**Min/Max** 30/30			**PV**

B2M31AEDA	Experimental Data Analysis	B2M17CADA	CAD in HF Technique	B2M34EZSA	Electronic Security Systems
B2M31IASA	Implementation of analog systems	B2M34NANA	Nanoelectronics and Nanotechnolo ...	B2M34ZETA	Custom Electronics Design
B2M34PIOA	Planar integrated optics	B2M34PNIS	Advanced Integrated System Desig ...	B2M34VKEA	Power Electronics
B2M31ZASA	Analog Signal Processing				

2018_MEKVOL	**Volitelné odborné předměty2018**	**Min. cours. 0**	**Min/Max** 0/999			**V**

List of courses of this pass:

Code	Name of the course	Completion	Credits
B2M17CADA	CAD in HF Technique	Z,ZK	6
	Introduction into principles and techniques used in modern microwave circuit design.		
B2M31AEDA	Experimental Data Analysis	Z,ZK	6
	In the course of subject "Experimental Data Analysis", students will acquire knowledge regarding fundamental methods for data analysis and machine learning for evaluation and interpretation of data. In the course of practical lectures, students will solve individual tasks using real data from signal processing in neuroscience research. In the course of semestral project, student will solve complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental statistical methods as well as to teach students to use critical thinking and to acquire additional knowledge in solution of practical tasks.		
B2M31DSP	Advanced DSP methods	Z,ZK	6
	The course follows the basic course in signal processing and introduces advanced methods of analysis and digital signal processing. Graduates will learn the methods of digital signals analysis and be able to practically use them. They learn to know the conditions of use of correlation, spectral and coherent analysis of random signals. They will became familiar with methods of signal decomposition and independent component analysis and the time-frequency transformations. Emphasis will be placed on an ability to interpret the results of signal analyses.		
B2M31IASA	Implementation of analog systems	Z,ZK	6
	The goal of the subject is to make students familiar with the new trends and concepts in analog circuits with an emphasis on the applications in the digital system peripherals. Here, the stress is placed on the design and implementation procedures of Application Specific Integrated Circuits (ASICs). Current design trends are discussed, including the analysis and test of analog and mixed signal circuits. The course provides knowledge for the development and design of electronic systems taking into account the aspects of current manufacturing technology of integrated circuits.		
B2M31ZASA	Analog Signal Processing	Z,ZK	6
	The course deals with analog input-output blocks for signal transmission and processing. They discussed circuit solution of amplifiers and filters, including their design process, simulation and measurement. Students learn the circuit concepts and possibilities for solving the contemporary analogue structures. The second part of the course describes the design and implementation of analog filters, including discrete-time circuits. The conclusion is devoted to the possibilities of computer optimization of electronic circuits and filters.		

B2M32BTSA	Wireless Technologies	Z,ZK	6
The lectures give overview of fundamental principles of wireless networks in various areas of their application. Students will understand architecture, principles and protocols used in different wireless technologies and learn how these technologies can be exploited in real world applications. The goal is to teach students how to solve problems related to deployment of wireless networks, their operation or development of wireless networks components.			
B2M34EZSA	Electronic Security Systems	Z,ZK	6
The subject describes the system design, electronic solutions, conception characteristics, reliability and its increasing of electronic security and safety systems. It reports solutions of electronic sensor systems and methods of security system design, usage of modern electronic components and microprocessors. It offers practical applications suitable for safety systems of houses, cars, industry companies.			
B2M34MST	Microsystems	Z,ZK	6
The course deals with system integration applied in the design of digital and analog systems. It demonstrates the new possibilities of implementation and application of integrated microelectronic devices based on various physical and biochemical principles. It presents primarily MEMS technology that increases reliability with all its attributes. The course presents the modern action elements and microactuators, whose operation is based on fundamental physical and biochemical principles, including basic applications in micromanipulation, microrobots, microdrives, microsurgery, multimedia, medical, industrial control, automotive, etc. In the course are presented the principles of touch screens, microgenerators of electrical energy. There are mentioned basic elements of the use of nanotechnology and nanoelectronic structures and basic microsystem technologies.			
B2M34NANA	Nanoelectronics and Nanotechnology	Z,ZK	6
The subject is oriented on the present nanotechnologies in the connection with their electronic, photonic and spintrinic applications. Quantum theory basics are used to explain the effects observed in nanostructures. Basic nanoelectronic structures are described with their possible applications. Modern computer methods and models, which are able to simulate the operation of nanoelectronic structures and which are the important tools for their design and optimalisation, are studied.			
B2M34NIS	Design of Integrated Circuits	Z,ZK	6
Main tasks of integrated circuits designer; design abstraction levels - Y chart. Definitions of specification, feasibility study, criteria for technology and design kits selection. Integrated systems design and simulation methodologies. Main features of full custom design, gate array, standard cells, programmable array logic. Design aspects of RF and mobile low power systems. Verilog-A, Verilog-AMS, VHDL-A. Logic and physical synthesis. Frond End and Back End design. Floorplanning, place and route, layout, parasitic extraction, time analysis, testbenches design and verification.			
B2M34NSV	VLSI System Design	Z,ZK	6
Introduction to basic building blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analogue integrated circuit subsystems. Integrated system description and synthesis using cell libraries and IP cores. Synchronization, power consumption and parasitics reduction issues. Testing and reliability of integrated systems. In seminars and labs, the hardware description language VHDL will be explained and used for practical design, synthesis and testing of a system on chip.			
B2M34PIOA	Planar integrated optics	Z,ZK	6
he subject describes theoretical and technological principles and design of planar integrated optics and optoelectronics as optical dividers, The students get acquainted with the principles of the light propagation in planar waveguide and with basic devices and structures of integrated optics and optoelectronics as coupling elements, optical microresonators, planar optical transmitters an receivers with SS-LD, WG-PD . In the course are integrated devices and structures for telecommunication for multiplexing and signal processing. There are optical elements for physical and chemical sensor application and basic important measurement and diagnostic methods.			
B2M34PNIS	Advanced Integrated System Design	Z,ZK	6
Students will gain advanced knowledge in analog and digital integrated circuit design. The subject itself deals with the hierarchical design of integrated circuits in BCD technologies compared to CMOS technologies. The subject further emphasizes good design practices, advanced building blocks in BCD technologies, advanced IP blocks and their design process. An integral part of the subject are topics focused on the design of power MOSFETs, Linear voltage regulators (LDO), electronic fuses eFUSE, switching power supplies on a chip (SMPS) digital Front-end (FE) and digital Back-end (BE) design and detailed analysis of layouts. The subject is dealt with further advanced error analysis methods, using analytical methods such as optical and electron microscopy, (Optical Beam Induced Resistance Change - Obirch and Emission Microscopy EmMi).			
B2M34SIS	Integrated System Structures	Z,ZK	6
Student learn main design methodologies of analog, digital and optoelectronic integrated systems; Detailed description of the technological process for the IC production; CMOS technologies and its advanced sub-micron trends; IC chip topology, layout and design rules; Technology of micro-electro-mechanical systems MEMS.			
B2M34SST	Solid State Physics	Z,ZK	6
The subject is aimed on solid state physics including some parts of statistical physics.			
B2M34VKEA	Power Electronics	Z,ZK	6
The course introduces into the problematic of power electronics. First part of lectures deals with principles and structures of contemporary semiconductor power devices. The impact of novel semiconductor materials is discussed, as well. Circuit models of particular devices will be then explained, driving circuits, switching of the resistive, inductive and capacitive loads, power losses and device operation reliability will be thoroughly discussed. Second part of lectures is dedicated to the problematic of power converters, their topologies, control techniques and circuits. Electromagnetic compatibility and PCB design for power converters will be discussed, as well.			
B2M34ZETA	Custom Electronics Design	KZ	6
The course deals with the design methodology of advanced custom electronics. The aim is to convert theoretical knowledge of previous studies into specific proposals for practical applications. Student are getting familiar with the problems encountered in the professional electronic design and manufacturing. This course is based on real experience in development and production, showing the latest technological trends and component base.			
B2M37MAM	Microprocessors	Z,ZK	6
The aim is to make students acquainted with the properties of microprocessor systems, make students familiar with on-chip peripherals, connect external circuit to the processor bus, and with implementation of the memory or I/O space address extension. Next, taught the students to make simple program in the assembly language, C language and combination of both. After completion of this subject student should be able to design and implement simpler microprocessor system including connection of necessary peripherals and software design.			
B2MPROJ6	Project	Z	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. Project list http://www.fel.cvut.cz/en/education/semestral-projects.html			
BDIP25	Diploma Thesis	Z	25
Independent final comprehensive work for the Master'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. The diploma thesis will be defended in front of the board of examiners for the comprehensive final examination.			
BEZM	Safety in Electrical Engineering for a master´s degree	Z	0
The course provides for students of all programs periodic training guidelines for health and occupational safety and gives knowledge of electrical hazard of given branch of study. Students receive indispensable qualification according to the current Directive of the Dean.			

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