Study plan

Name of study plan: Electronics and Communications - Technology of the Internet of Things

Faculty/Institute/Others: Faculty of Electrical Engineering Department: Branch of study guaranteed by the department: Welcome page Garantor of the study branch: Program of study: Electronics and Communications Type of study: Follow-up master full-time Required credits: 109 Elective courses credits: 11 Sum of credits in the plan: 120 Note on the plan:

Name of the block: Compulsory courses in the program Minimal number of credits of the block: 79 The role of the block: P

Code of the group: 2018 MEKDIP Name of the group: Diploma Thesis Requirement credits in the group: In this group you have to gain 25 credits Requirement courses in the group: In this group you have to complete 1 course Credits in the group: 25 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
BDIP25	Diploma Thesis	Z	25	22s	L	Р

Characteristics of the courses of this group of Study Plan: Code=2018_MEKDIP Name=Diploma Thesis

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.						

Code of the group: 2018_MEKP4

Name of the group: Compulsory subjects of the programme Requirement credits in the group: In this group you have to gain 54 credits Requirement courses in the group: In this group you have to complete 9 courses Credits in the group: 54 Note on the group: Specializace technologie internetu věcí

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 Zden k Be vá , Lukáš Vojt ch, Zbyn k Kocur, Pavel Mach Ján Ku erák Zden k Be vá (Gar.)	Z,ZK	6	2P + 2L	L	Ρ
B2M37MAM	Microprocessors Petr Skalický, Stanislav Vítek Stanislav Vítek (Gar.)	Z,ZK	6	2P+2L	Z	Р
B2M34MST	Microsystems Michal Ko í, Miroslav Husák, Adam Bou a, Alexandr Laposa Miroslav Husák Miroslav Husák (Gar.)	Z,ZK	6	2P+2L	L	Ρ
B2M32MKSA	Mobile Networks Zden k Be vá, Pavel Mach, Robert Bešák Pavel Mach Zden k Be vá (Gar.)	Z,ZK	6	2P + 2L	Z	Р
B2M31DSP	Advanced DSP methods Pavel Sovka, Petr Pollák Pavel Sovka Pavel Sovka (Gar.)	Z,ZK	6	2P+2C	Z,L	Р

B2M32PST	Advanced Networking Technologies Zbyn k Kocur, Leoš Bohá Leoš Bohá Leoš Bohá (Gar.)	Z,ZK	6	2P + 2C + 4D	Z	Ρ	
B2MPROJ6	Project Ji í 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	Р	
B2M34SIS	Integrated System Structures Ji í Jakovenko, Vladimír Janí ek Vladimír Janí ek Ji í Jakovenko (Gar.)	Z,ZK	6	2P+2C	Z	Р	
B2M17SBS	Wave Propagation for Wireless Links Pavel Pecha Pavel Pecha Pavel Pecha (Gar.)	Z,ZK	6	2P+2C	L	Р	
Characteristics of the	courses of this group of Study Plan: Code=2018_MEKP4 Nam	e=Compulso	ry subje	cts of the	e progra	mme	
B2M32BTSA Wir The lectures give overview of	reless Technologies f fundamental principles of wireless networks in various areas of their application. Stud	dents will understa	and archited	ture, princip	,ZK	6 tocols used in	
of wireless networks, their or	is and learn now these technologies can be exploited in real world applications. The go	al is to teach stud	ients now to	solve proble	ems related	to deployment	
				7	71/	6	
BZIVI37 IVIAIVI IVIIC	COPROCESSORS	h on chin norinha	rale connor	L A L	, ZN	0 processor bus	
and with implementation of th	acquainted with the properties of microprocessor systems, make students familiar with the memory or I/O space address extension. Next, taught the students to make simple is	nrogram in the as	sembly land			combination of	
both After completion of this	subject student should be able to design and implement simpler microprocessor syste	em including conn	ection of ne	cessarv per	ipherals an	d software	
design.		sin nordanig com		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ipitoralo an	a continuito	
B2M34MST Mic	crosystems			7	.7K	6	
The course deals with system	n integration applied in the design of digital and analog systems. It demonstrates the n	ew possibilities of	f implement	ation and ap	plication of	integrated	
microelectronic devices base	d on various physical and biochemical principles. It presents primarily MEMS technology	y that increases r	eliability wit	h all its attrib	outes. The c	ourse presents	
the modern action elements	and microactuators, whose operation is based on fundamental physical and biochemic	cal principles, incl	uding basic	applications	in microm	anipulation,	
microrobots, microdrives, mic	crosurgery, multimedia, medical, industrial control, automotive, etc. In the course are pre	sented the princip	oles of touch	n screens, m	crogenerat	ors of electrical	
energy. There are mentioned	basic elements of the use of nanotechnology and nanoelectronic structures and basic	c microsystem tec	hnologies.				
B2M32MKSA Mo	bile Networks			Z	,ZK	6	
The lectures introduce princip	ples and functionalities of mobile networks with special focus on currently deployed tec	chnologies and fu	ture mobile	networks. F	urthermore	architecture	
and fundamental principles o	f GSM, UMTS, LTE/LTE-A, and 5G will be explained. Then, selected key technologies	for future mobile	networks (6	G) will be ex	plained.		
B2M31DSP Adv	vanced DSP methods			Z	,ZK	6	
The course follows the basic	course in signal processing and introduces advanced methods of analysis and digital s	ignal processing.	Graduates	will learn the	methods o	f digital signals	
analysis and be able to pract	ically use them. They learn to know the conditions of use of correlation, spectral and c	oherent analysis	of random s	ignals. They	will becam	e familiar with	
methods of signal decompos	ition and independent component analysis and the time-frequency transformations. Er	mphasis will be pla	aced on an	ability to inte	erpret the re	esults of signal	
B2M32PST Adv	vanced Networking Technologies			7	7K	6	
Subject Advanced Network T	echnologies expands students' knowledge of modern network technologies. The course	se is practically or	iented and t	focused on e	, <u> </u>	e function of	
advanced network protocols	as used in modern data networks of today and tomorrow. Students will gain practical e	experience with th	e issues like	e Internet ro	utina. softw	are-defined	
networks, multicast routing, I	Pv6, and MPLS networks. Part of the course is also devoted to a detailed explanation	of transport proto	cols TCP/U	DP and a m	anner in wh	ich software	
applications can access trans	sportation services of TCP/IP data networks.						
B2MPROJ6 Pro	piect				7	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 pro	ject will be defended within the framework of a subject. Project list http://www.fel.cvut.	cz/en/education/s	emestral-pr	ojects.html			
B2M34SIS Inte	egrated System Structures			Z	,ZK	6	
Student learn main design m	ethodologies of analog, digital and optoelectronic integrated systems; Detailed descrip	otion of the techno	ological proc	cess for the	C productio	on; CMOS	
technologies and its advanced sub-micron trends; IC chip topology, layout and design rules; Technology of micro-electro-mechanical systems MEMS.							
B2M17SBS Wa	ve Propagation for Wireless Links			Z	,ZK	6	
The aim of the course is to stu	udy the wireless transmission channel in real environments focusing on wave propagati	ion for planning of	terrestrial a	nd satellite v	vireless link	s. The syllabus	
includes both deeper theoretic	cal foundations of radio wave propagation in the atmosphere as well as ITU-R design pro	cedures for terres	trial and sat	ellite, fixed a	nd mobile c	ommunications	
in various frequency bands.							

Name of the block: Compulsory elective courses Minimal number of credits of the block: 30 The role of the block: PV

Code of the group: 2018_MEKPV4

Name of the group: Compulsory subjects of the programme

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete 5 courses Credits in the group: 30

Note on the group:

Specializace technologie internetu věcí

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
B2M31ADAA	Adaptive signal processing Pavel Sovka, Radoslav Bortel Radoslav Bortel (Gar.)	Z,ZK	6	2P+2C	Z	PV
B2M31AEDA	Experimental Data Analysis Jan Rusz Jan Rusz Jan Rusz (Gar.)	Z,ZK	6	2P+2C	Z	PV

B2M17ANT	Antennas Pavel Hazdra, Miloš Mazánek, Jan Kra ek Jan Kra ek Pavel Hazdra (Gar.)	Z,ZK	6	2P+2L	L	PV
B2M37ART	Architecture of radio receivers and transmitters Josef Dobeš, Pavel Ková Karel Ulovec Pavel Ková (Gar.)	Z,ZK	6	2P+2L	Z	PV
B2M32DSAA	Network Application Diagnostics Radek Ma ik Radek Ma ik Radek Ma ik (Gar.)	Z,ZK	6	2P + 2C	Z	PV
B2M37DKM	Digital communications Jan Sýkora Jan Sýkora Jan Sýkora (Gar.)	Z,ZK	6	3P+1C	Z	PV
B2M32IBEA	Information Security Tomáš Van k Petr Hampl Leoš Bohá (Gar.)	Z,ZK	6	2P + 2C	L	PV
B2M37KDKA	Coding in digital communications Jan Sýkora Jan Sýkora Jan Sýkora (Gar.)	Z,ZK	6	3P+1C	L	PV
B2M34NIS	Design of Integrated Circuits Ji í Jakovenko, Jan Novák Jan Novák Ji í Jakovenko (Gar.)	Z,ZK	6	2P+2C	L	PV
B2M34NSV	VLSI System Design Pavel Hazdra, Jakub Jirsa Pavel Hazdra Pavel Hazdra (Gar.)	Z,ZK	6	2P+2L	Z	PV
B2M34ZETA	Custom Electronics Design Vít Záhlava Vít Záhlava Vít Záhlava (Gar.)	KZ	6	2P+2L	Z	PV
B2M37OBFA	Image Photonics Lukáš Krauz, Petr Páta Petr Páta Petr Páta (Gar.)	Z,ZK	6	2P+2L	Z	PV
B3M35PSR	Real -Time Systems Programming Michal Sojka Michal Sojka Michal Sojka (Gar.)	Z,ZK	6	2P+2C	Z	PV
Characteristics of the	courses of this group of Study Plan: Code=2018_MEKPV4 Na	me=Compuls	ory sub	jects of tl	ne progra	mme
B2M31ADAA Ad	aptive signal processing			Z	,ZK	6
This course provides a basic	c discourse on adaptive algorithms for filtering, decorrelation, separation and beamform	ning.				
B2M31AEDA Ex	perimental Data Analysis			Z	,ZK	6
In the course of subject "Exp	perimental Data Analysis", students will acquire knowledge regarding fundamental met	hods for data ana	lysis and m	achine learn	ing for evaluation	ation and
interpretation of data. In the	course of practical lectures, students will solve individual tasks using real data from sign	nal processing in	neuroscien	ce research.	In the course	e of semestral
project, student will solve co	mplex task and present obtained results. The aim of the subject is to introduce practica	al application of fu	ndamental	statistical me	ethods as we	Il as to teach
students to use critical thinki	ng and to acquire additional knowledge in solution of practical tasks.					
B2M17ANT An	tennas			Z	,ZK	6
Student will get strong know	ledge about theory of electromagnetic field radiation and basic principles of antenna de	esign. Methods of	analysis ar	re demonstra	ted on vario	us types of
antennas and their arrays. S	eminars are both theoretical (analytical and numerical calculation using MATLAB and B	EM simulators CS	T) and prac	ctical (measu	rement of ar	itenna
parameters).						
B2M37ART Arc	chitecture of radio receivers and transmitters			7	7K	6
The subject deals with the a	rchitecture of the radio receivers and transmitters and software radio. The student's far	niliarize with the c	lesian and t	the modern r	nethods of o	ntimization of
the radio receivers and trans	mitters' functional blocks and with the phonomona related with frequency conversion		d noise ana	lycoc Thoy I		
receiver and transmitter desi	in the previous and with the previous and their antimization. The course also dec	lowith the digital		iyses. They i	e of the mod	orn radio
receiver and their practical	ign, including the level and frequency plans and their optimization. The course also dea	als with the digital	signal proc			ennaulo
Teceivers and their practical					71/	
B2M32DSAA Ne	twork Application Diagnostics			Z	,ZK	6
The first part of the course d	eals with complex network structures, their characteristics identification, with recognition	on of both structu	ral static an	d dynamic p	atterns, and	anomaly
detection. The second part o	t the course is focused on specification methods of static and dynamic behavior and the	ir verification. The	use of the	methods is d	emonstrated	on examples
dealing with network applica	tion issues. The special treatment is dedicated not only to network and cloud application	ons, but also to po	sibilities of	diagnostic p	rocess auton	nation. The
students gain sufficient skills	in seminars where they solve practical problems in digital network domain.					
B2M37DKM Dig	gital communications			Z	,ZK	6
The course provides fundam	entals of digital communications theory: modulation, classical coding, channel models	, and basic princip	oles of deco	oding. The ex	position is sy	stematically/
built along the theoretical line	es which allow to reveal all inner connections and principles. This allows students to de	evelop the knowle	dge and us	e it in an acti	ve way in a c	lesign and
construction of the communi	cation systems. The course provides a necessary fundamental background for subseq	uent more advance	ced commu	nications the	ory courses.	
B2M32IBEA Infe	ormation Security			Z	,ZK	6
The Information Security cou	irse provides a complete source of information on the field of security of information sys	tems and informa	tion techno	logies. The m	nost of inform	ation in today
society is created, transferre	d, stored in electronic form so information security is very important part of it. Technica	I background for i	nformation	security is p	rovided by cr	yptology.
B2M37KDKA Co	ding in digital communications			Z	,ZK	6
This course extends and dee	epens the topics of the basic communication theory courses in the following main areas	. 1) Advanced info	ormation the	eory in coding	g and Netwo	k Information
Theory develop a framework	for understanding the principles of the channel coding in single-user and multi-node/mu	ulti-user scenarios	s. 2) The alg	ebraic codin	g presents cl	assical topics
of block and convolutional co	odes. 3) Advanced coding technique focuses on turbo, LDPC, Space-Time codes and V	Vireless Network	Coding. 4)	Advanced de	coding techr	nique, namely
iterative and multi-user deco	ding is a fundamental tool for decoding capacity approaching channel codes.					
B2M34NIS De	aire of late grated Circuite			Z	,ZK	6
Main tasks of integrated circ	sign of integrated Circuits					1.4
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						. Integrated
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,						
	Sign of Integrated Circuits uits designer; design abstraction levels - Y chart. Definitions of specification, feasibility on methodologies. Main features of full custom design, gate array, standard cells, prog MS, VHDL-A. Logic and physical synthesis. Frond End and Back End design. Floorpla	study, criteria for rammable array lo nning, place and	technology ogic. Desigr route, layou	and design l aspects of it, parasitic e	kits selection RF and mobi xtraction, tim	le low power e analysis,
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B3M35PSR Real -Time Systems Programming

Z,ZK

6

The goal of this course is to provide students with basic knowledge about software development for real-time systems, for example in control and embedded applications. The focus is on embedded systems equipped with a real-time operating system (RTOS). Lectures will cover real-time systems theory, which can be used to formally verify timing correctness of such systems. Another set of lectures will introduce methods and techniques used for development of safety-critical systems, whose failure may have catastrophic consequences. During labs, students will first solve a few simple tasks to familiarize themselves with basic components of VxWorks RTOS and to benchmark the used OS and hardware (Xilinx Zynq). The obtained metrics represent the typical criteria for assessing the suitability of a given platform for the given application. After the simple tasks, students will solve a complex task of time-critical motion control application which will require full utilization of RTOS features. All the tasks at the labs will be implemented in C (or C++) language.

Name of the block: Elective courses Minimal number of credits of the block: 0 The role of the block: V

Code of the group: 2018_MEKH 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:

U 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
B0M16FIL	Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)	Z,ZK	5	2P+2S	Z,L	V
B0M16HVT	History of science and technology 2 Marcela Efmertová, Jan Mikeš Marcela Efmertová Marcela Efmertová (Gar.)	Z,ZK	5	2P+2S	Z,L	V
B0M16HSD1	History of economy and social studies Marcela Efmertová	Z,ZK	5	2P+2S	Z,L	V
B0M16PSM	Psychology Jan Fiala Jan Fiala Jan Fiala (Gar.)	Z,ZK	5	2P+2S	Z,L	V
B0M16TEO	Theology Vladimír Sláme ka Vladimír Sláme ka Vladimír Sláme ka (Gar.)	Z,ZK	5	2P+2S	Z,L	V

Characteristics of the courses of this group of Study Plan: Code=2018_MEKH Name=Humanities subjects

B0M16FIL		Z,ZK	5			
B0M16HVT	History of science and technology 2	Z,ZK	5			
This subject traces histo	prical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate st	udents' interest in	n the history and			
traditions of the subject,	while highlighting the developments in technical education and professional organizations, the process of shaping scientific	life and the influe	nce of technical			
engineers						
B0M16HSD1	History of economy and social studies	Z,ZK	5			
This subject deals with	he history of the Czech society in the 19th - 21th centuries. It follows the forming of the Czech political representation, its aim	ns and achieved r	esults as well as			
the social and cultural d	evelopment and coexistence of the various ethnical groups in the Czech countries.					
B0M16PSM	Psychology	Z,ZK	5			
B0M16TEO	Theology	Z,ZK	5			
This subject provides to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture the basic theologic disciplines						
are gone through. The subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones who want to get know Christianity						
- religion from which graws our civilization up.						

Code of the group: MTV

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
TVKZV	Physical Education Course	Z	0	7dní	Z	V
TVKLV	Physical Education Course	Z	0	7dní	L	V

Characteristics of the courses of this group of Study Plan: Code=MTV Name=Physical education

|--|

TV-V1	Physical education	Z	1
TVV0	Physical education	Z	0
TVKZV	Physical Education Course	Z	0
TVKLV	Physical Education Course	Z	0

Code of the group: 2018_MEKVOL 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: ~Nabío

~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
B0M16FIL		Z,ZK	5
B0M16HSD1	History of economy and social studies	Z,ZK	5
This subject deals	with the history of the Czech society in the 19th - 21th centuries. It follows the forming of the Czech political representation, its aims a	nd achieved result	s as well as
	the social and cultural development and coexistence of the various ethnical groups in the Czech countries.		
B0M16HVT	History of science and technology 2	Z,ZK	5
This subject traces	historical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate stude	ents' interest in the	history and
traditions of the sul	bject, while highlighting the developments in technical education and professional organizations, the process of shaping scientific life	and the influence	of technical
	engineers		
B0M16PSM	Psychology	Z,ZK	5
B0M16TEO	Theology	Z,ZK	5
This subject provid	tes to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture t	he basic theologic	disciplines
are gone through. T	he subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones wh	o want to get know	Christianity
	- religion from which graws our civilization up.		
B2M17ANT	Antennas	Z,ZK	6
Student will get st	rong knowledge about theory of electromagnetic field radiation and basic principles of antenna design. Methods of analysis are dem	onstrated on variou	us types of
antennas and th	neir arrays. Seminars are both theoretical (analytical and numerical calculation using MATLAB and EM simulators CST) and practical	(measurement of	antenna
	parameters).		
B2M17SBS	Wave Propagation for Wireless Links	Z.ZK	6
The aim of the cour	se is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satel	lite wireless links.	The syllabus
includes both deepe	er theoretical foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite, fix	ed and mobile com	munications
·	in various frequency bands.		
B2M31ADAA	Adaptive signal processing	7 7K	6
BEING IN (B) & (This course provides a basic discourse on adaptive algorithms for filtering, decorrelation, separation and beamforming.	_,	Ū
B2M31AEDA	Experimental Data Analysis	7 7K	6
In the course of s	subject "Experimental Data Analysis" students will acquire knowledge regarding fundamental methods for data analysis and machine	e learning for evalu	lation and
interpretation of dat	a In the course of practical leadures, students will solve individual tasks using real data from signal processing in neuroscience resea	rch. In the course (of semestral
project. student wil	solve complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental statistical	al methods as well	as to teach
1	students to use critical thinking and to acquire additional knowledge in solution of practical tasks.		
B2M31DSP	Advanced DSP methods	7 7K	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 di	dital signals
analysis and be ab	le to practically use them. They learn to know the conditions of use of correlation, spectral and coherent analysis of random signals.	They will became f	amiliar with
methods of signal of	decomposition and independent component analysis and the time-frequency transformations. Emphasis will be placed on an ability to	o interpret the resu	lts of signal
	analyses.	·	•
B2M32BTSA	Wireless Technologies	7.7K	6
The lectures give of	verview of fundamental principles of wireless networks in various areas of their application. Students will understand architecture, or	inciples and proto	cols used in
different wireless te	chnologies and learn how these technologies can be exploited in real world applications. The goal is to teach students how to solve p	roblems related to	deployment
	of wireless networks, their operation or development of wireless networks components.		
B2M32DSAA	Network Application Diagnostics	7 7K	6
The first part of t	be course deals with complex network structures their characteristics identification, with recognition of both structural static and dyn	amic patterns and	anomaly
detection. The seco	ind part of the course is focused on specification methods of static and dynamic behavior and their verification. The use of the methods	is demonstrated o	on examples
dealing with netwo	ork application issues. The special treatment is dedicated not only to network and cloud applications, but also to posibilities of diagno	stic process auton	nation. The
j j	students gain sufficient skills in seminars where they solve practical problems in digital network domain.		
B2M32IBEA	Information Security	7.7K	6
The Information Se	curity course provides a complete source of information on the field of security of information systems and information technologies T	he most of informa	tion in today
society is created	d, transferred, stored in electronic form so information security is very important part of it. Technical background for information security	ty is provided by c	ryptology.
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B2M32MKSA	Mobile Networks	Z,ZK	6
The lectures intro and funda	duce principles and functionalities of mobile networks with special focus on currently deployed technologies and future mobile network (mental principles of GSM, UMTS, LTE/LTE-A, and 5G will be explained. Then, selected key technologies for future mobile networks (ks. Furthermore, a 6G) will be explaine	rchitecture ed.
B2M32PST	Advanced Networking Technologies	7.7K	6
Subject Advanced	Network Technologies expands students' knowledge of modern network technologies. The course is practically oriented and focused	on explaining the	function of
advanced network protocols as used in modern data networks of today and tomorrow. Students will gain practical experience with the issues like Internet routing, software-defined			
networks, multicast routing, IPV6, and MPLS networks. Part of the course is also devoted to a detailed explanation of transport protocols ICP/UDP and a manner in which software			
DOMONNET	applications can access transportation services of TCP/IP data networks.	7 71/	6
DZIVI34IVI3 I The course deals	IVIICIOSYSTETTIS with system integration applied in the design of digital and analog systems. It demonstrates the new possibilities of implementation a	∠,∠n And application of i	0 ntegrated
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.			
B2M34NIS	Design of Integrated Circuits	Z,ZK	6
Main tasks of inte	grated circuits designer; design abstraction levels - Y chart. Definitions of specification, feasibility study, criteria for technology and de	sign 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 ba	sic building blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analogue in	ntegrated circuit su	bsystems.
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.			
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			
	Custom Flectronics Design	K7	6
The course deals	with the design methodology of advanced custom electronics. The aim is to convert theoretical knowledge of previous studies into so	ecific proposals fo	r 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.			
B2M37ART	Architecture of radio receivers and transmitters	Z,ZK	6
The subject deals	with the architecture of the radio receivers and transmitters and software radio. The student s familiarize with the design and the mode	ern methods of opt	imization of
the radio receivers and transmitters' functional blocks and with the phenomena related with frequency conversion, noise sources and noise analyses. They learn conceptual radio			
receiver and transmitter design, including the level and frequency plans and their optimization. The course also deals with the digital signal processing blocks of the modern radio			
B2M37DKM	Digital communications	7 7K	6
The course provid	es fundamentals of digital communications theory: modulation, classical coding, channel models, and basic principles of decoding. The	ne exposition is sys	tematically
built along the theoretical lines which allow to reveal all inner connections and principles. This allows students to develop the knowledge and use it in an active way in a design and			
construction	of the communication systems. The course provides a necessary fundamental background for subsequent more advanced communi	cations theory cou	rses.
B2M37KDKA	Coding in digital communications	Z,ZK	6
This course extend	s and deepens the topics of the basic communication theory courses in the following main areas. 1) Advanced information theory in co	oding and Network	Information
Theory develop a framework for understanding the principles of the channel coding in single-user and multi-hode/multi-hode/multi-user scenarios. 2) The algebraic coding presents classical topics of block and convolutional codes. 3) Advanced decoding technique, namely			
iterative and multi-user decoding is a fundamental tool for decoding capacity approaching channel codes.			
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 extern	al circuit to the pro	cessor 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			
	uesign.	7.71/	6
The subject offers	a detailed overview of applied imaging photonic elements and systems. The subject deals with fundamentals of ontics. Fourier ontics	_ ∠,∠r and optical comput	tina. Fourier
optics. Image sensors - tube, CCD, CMOS. Image displays. Image converters and amplifiers. Photography and holography - sensitometry and densitometry. Photonic (optical) computing.			
Electron optics. Image processing in biosystems. Image processing for photonics.			
B2MPROJ6	Project	Z	6
Independent worl	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 specif	ied by branch depa	artment or
brand	ch departments. The project will be defended within the framework of a subject. Project list http://www.fel.cvut.cz/en/education/semesi	tral-projects.html	
B3M35PSR	Real - I ime Systems Programming	Z,ZK	6 The feature
is on embedded systems equipped with a real-time operating system (RTOS). Lectures will cover real-time systems theory, which can be used to formally verify timing correctness of			
such systems. Another set of lectures will introduce methods and techniques used for development of safety-critical systems, whose failure may have catastrophic consequences.			
During labs, students will first solve a few simple tasks to familiarize themselves with basic components of VxWorks RTOS and to benchmark the used OS and hardware (Xilinx Zynq).			
The obtained metrics represent the typical criteria for assessing the suitability of a given platform for the given application. After the simple tasks, students will solve a complex task of			
turne-critical motion control application which will require tull utilization of RTOS features. All the tasks at the labs will be implemented in C (or C++) language.			
BDIP25	Diploma Thesis		25
be specified by branch department or branch departments. The diploma thesis will be defended in front of the board of examiners for the comprehensive fipal examination			
TV-V1 Physical education Z 1			
T\/KI\/	Physical Education Course	7	0
T\/K7\/	Physical Education Course	7	0
TVV	Physical education	7	0
		<u> </u>	0 1
TVV0	Physical education	Z	0

For updated information see <u>http://bilakniha.cvut.cz/en/f3.html</u> Generated: day 2025-07-11, time 08:03.