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_MEKEP4 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

Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their Code Completion Credits Scope Semester Role members) Tutors, authors and guarantors (gar.) Advanced Networking Technologies BE2M32PST Z,ZK 6 2P + 2L Z,L Ρ Leoš Bohá Zbyn k Kocur Leoš Bohá (Gar.) **Digital Signal Processing** BE2M31DSPA Z,ZK 6 2P+2C Ζ Ρ Petr Pollák Petr Pollák Petr Pollák (Gar.) Integrated System Structures Ji í Jakovenko, Vladimír Janí ek **Ji í Jakovenko** Ji í Jakovenko (Gar.) 2P+2C Ζ BE2M34SIS Z,ZK 6 Р Microprocessors BE2M37MAM Z,ZK 6 2P+2L Ζ Ρ Stanislav Vítek Stanislav Vítek Stanislav Vítek (Gar.) **Microsystems** BE2M34MST Z,ZK 6 2P+2L L Miroslav Husák, Alexandr Laposa, Adam Bou a Miroslav Husák Miroslav Р Husák (Gar.) Mobile Networks BE2M32MKSA Z,ZK 6 2P + 2L Ζ Р Robert Bešák, Zden k Be vá, Pavel Mach Pavel Mach Zden k Be vá (Gar.) Project BE2MPROJ6 Ζ 6 Zden k Be vá , Jan Šístek, Pavel Máša, Ivan Pravda, Lubor Jirásek, František 0p+6s Р Rund František Rund František Rund (Gar.) Wave Propagation for Wireless Links BE2M17SBS Z,ZK 2P+2C L 6 Р Jan Kra ek, Pavel Pecha, Miloš Mazánek Jan Kra ek Pavel Pecha (Gar.) **Wireless Technologies** BE2M32BTSA Z.ZK 6 2P + 2l 7.1 Zbyn k Kocur, Zden k Be vá, Pavel Mach, Lukáš Vojt ch Ján Ku erák Р Zden k Be vá (Gar.)

Characteristics of the courses of this group of Study Plan: Code=2018_MEKEP4 Name=Compulsory subjects of the programme

 BE2M32PST
 Advanced Networking Technologies
 Z,ZK
 6

 The "Advanced Network Technologies" course is designed to expand students' insights into modern network technologies and deepen their understanding of advanced networking protocols within data networks. Students will engage in practical exercises involving Internet unicast routing, multicast routing, IPv6, and MPLS network design, using network simulation tools such as PacketTracer and EveNG. Given the course's emphasis on remote lab activities, instruction will predominantly be delivered online.
 Z,ZK
 6

 BE2M31DSPA
 Digital Signal Processing
 Z,ZK
 6

 The subject gives overview about basic methods of digital signal processing and their applications (examples from speech and biological signal processing): disrete-time signals and systems, signal characteristics in time and frequency domain, Fourier transform, fast algorithms for DFT computation, introduction to digital filter design, digital filtering in time and frequency domain, decimation and interpolation and their usage in filter banks, basics of LPC analysis. Further details can be found at <a
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href=http://noel.feld.cvut.cz/vyu/be2m31dspa>http://noel.feld.cvut.cz/vyu/be2m31dspa .

BE2M34SIS	Integrated System Structures	Z,ZK	6
	j methodologies of analog, digital and optoelectronic integrated systems; Detailed description of the technological process	,	-
	Ivanced sub-micron trends; IC chip topology, layout and design rules; Technology of micro-electro-mechanical systems MEMS	-	,
BE2M37MAM	Microprocessors	Z,ZK	6
-	dents acquainted with the properties of microprocessor systems, make students familiar with on-chip peripherals, connect ext	,	•
	on of the memory or I/O space address extension. Next, taught the students to make simple program in the assembly language		•
•	of this subject student should be able to design and implement simpler microprocessor system including connection of necess		
design.			
BE2M34MST	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	s 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 eler	nents and microactuators, whose operation is based on fundamental physical and biochemical principles, including basic appl	ications in micror	nanipulation,
microrobots, microdrive	es, microsurgery, multimedia, medical, industrial control, automotive, etc. In the course are presented the principles of touch scre	ens, microgenera	ators of electrical
energy. There are men	tioned basic elements of the use of nanotechnology and nanoelectronic structures and basic microsystem technologies.		
BE2M32MKSA	Mobile Networks	Z,ZK	6
The lectures introduce	principles and functionalities of mobile networks with special focus on currently deployed technologies and future mobile networks	orks. Furthermor	e, architecture
and fundamental princ	iples of GSM, UMTS, LTE/LTE-A, and 5G will be explained. Then, selected key technologies for future mobile networks (6G) w	ill be explained.	
BE2MPROJ6	Project	Z	6
Independent work in th	e 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 spe	cified by branch d	lepartment or
branch departments. T	he project will be defended within the framework of a subject. List of possible topics: http://www.fel.cvut.cz/en/education/seme:	stral-projects.htm	1
BE2M17SBS	Wave Propagation for Wireless Links	Z,ZK	6
The aim of the course i	s to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and s	atellite wireless lir	nks. The syllabus
includes both deeper th	eoretical foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite	, fixed and mobile	communications
in various frequency ba	ands.		
BE2M32BTSA	Wireless Technologies	Z,ZK	6
The lectures give over	view of fundamental principles of wireless networks in various areas of their application. Students will understand architecture,	, principles and pr	rotocols used in
different wireless techr	ologies and learn how these technologies can be exploited in real world applications. The goal is to teach students how to solv	e problems relate	ed to deployment
of wireless networks, the	neir operation or development of wireless networks components.		
Code of the a	roup: 2018_MEKEDIP		
-	•		
Name of the c	jroup: 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_MEKEDIP 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 of	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.						

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_MEKEPV4

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
BE2M17ANT	Antennas Jan Kra ek, Miloš Mazánek, Pavel Hazdra Jan Kra ek Miloš Mazánek (Gar.)	Z,ZK	6	2P+2L	L	PV
BE2M37ART	Architecture of Radio Receivers and Transmitters Josef Dobeš, Pavel Ková Karel Ulovec Pavel Ková (Gar.)	Z,ZK	6	2P+2L	Z	PV
BE2M37KDKA	Coding in Digital Communications Jan Sýkora Jan Sýkora Jan Sýkora (Gar.)	Z,ZK	6	3P+1C	L	PV

BE2M34ZETA	Custom Electronics Design Vladimír Janí ek Vladimír Janí ek (Gar.)	KZ	6	2P+2L	Z	PV
BE2M34NIS	Design of Integrated Circuits Vladimír Janí ek Vladimír Janí ek Ji í Jakovenko (Gar.)	Z,ZK	6	2P+2C	L	PV
BE2M37DKM	Digital Communications Pavel Puri er, Jan Sýkora Pavel Puri er Jan Sýkora (Gar.)	Z,ZK	6	3P+1C	Z	PV
BE2M37OBFA	Image Photonics	Z,ZK	6	2P+2L	Z	PV
BE2M32IBEA	Information Security Tomáš Van k, Peter Macejko Petr Hampl Robert Beš ák (Gar.)	Z,ZK	6	2P + 2C	L	PV
BE2M32DSAA	Network Application Diagnostics Radek Ma ik Radek Ma ik Radek Ma ik (Gar.)	Z,ZK	6	2P + 2C	Z	PV
BE2M34NSV	VLSI System Design Pavel Hazdra Pavel Hazdra (Gar.)	Z,ZK	6	2P+2L	Z	PV
Characteristics of the	courses of this group of Study Plan: Code=2018_MEKEPV4	Name=Compu	lsorv su	ibiects of	the progr	amme
· · · · · · · · · · · · · · · · · · ·	ennas				ZK	6
	edge about theory of electromagnetic field radiation and basic principles of antenna	a design. Methods of	f analvsis a	1	,	-
5 5	minars are both theoretical (analytical and numerical calculation using MATLAB and	•				
parameters).			,	(
. ,	hitecture of Radio Receivers and Transmitters			7	ZK	6
	chitecture of the radio receivers and transmitters and software radio. The student s	familiarize with the (hesian and	1	, ,	-
	nitters' functional blocks and with the phenomena related with frequency conversio		•			
	including the level and frequency plans and their optimization. The course also				-	
receivers and their practical in		deals with the digital	Signal pro	cessing block		annadio
	ding in Digital Communications			1	"ZK	6
	pens the topics of the basic communication theory courses in the following main are			-	-	
	for understanding the principles of the channel coding in single-user and multi-node,			-		
	des. 3) Advanced coding technique focuses on turbo, LDPC, Space-Time codes an ling is a fundamental tool for decoding capacity approaching channel codes.		County. 4)	Auvanceu ut	ecoding techni	ique, namely
	stom Electronics Design	I knowledge of provi	ouo otudio.		KZ	6
	sign methodology of advanced custom electronics. The aim is to convert theoretica					
	ng familiar with the problems encountered in the professional electronic design and i	manufacturing. This	course is b	ased on real	experience in	development
	atest technological trends and component base.				71/	-
	sign of Integrated Circuits			1	"ZK	6
	its designer; design abstraction levels - Y chart. Definitions of specification, feasibil					
	n methodologies. Main features of full custom design, gate array, standard cells, pr					
testbenches design and verifi	MS, VHDL-A. Logic and physical synthesis. Frond End and Back End design. Floorg cotion	planning, place and	route, layo	ut, parasitic e	extraction, time	e analysis,
					71/	0
	ital Communications				"ZK	6
	entals of digital communications theory: modulation, classical coding, channel mode		-	-		
_	s which allow to reveal all inner connections and principles. This allows students to ation systems. The course provides a necessary fundamental background for subs		-		-	esign and
		equent more auvan			-	
	ige Photonics	- fundamentals of a	ation Fouri		,ZK	6 uting Fourier
	overview of applied imaging photonic elements and systems. The subject deals with					-
	CCD, CMOS. Image displays. Image converters and amplifiers. Photography and hole using in biosystems. Image processing for photonics.	ography - sensitorne	li y anu uen	Silometry. Fi	otonic (optica	i) computing.
					71/	
	rmation Security	avatama and inform	ation took	1	,ZK	6
	rse provides a complete source of information on the field of security of information			0		
	sferred, stored in electronic form so information security is very important part of it. itives symmetric / asymmetric encryption, digital signatures, cryptographic hash fur					
	offered by the latest versions of the most important security protocols operating on t	-			-	
against these security protoco			360, TLO, V	5011, 1 OI <i>)</i> a		IOWIT ALLACKS
				7	,ZK	6
	work Application Diagnostics eals with complex network structures, their characteristics identification, with recogr	aition of both structu	ral atatia a	1	·	6
	the course is focused on specification methods of static and dynamic behavior and			, ,		
	ion issues. The special treatment is dedicated not only to network and cloud application					-
	in seminars where they solve practical problems in digital network domain.			alugnostic p		
				7	"ZK	6
1 .	SI System Design	re and docian of dia	ital and an			
-	blocks, architecture and design methodologies of advanced VLSI systems. Structur and synthesis using cell libraries and IP cores. Synchronization, power consumpti					
	s, the hardware description language VHDL will be explained and used for practica	-		-	-	. integrated
eyelenie. In commune and lab			and tooting	s. a system	on p.	
Nome of the black						
	: Elective courses					
Minimal number c	of credits of the block: 0					
The role of the blo	nck. V					

Code of the group: 2018_MEKEVOL Name of the group: Elective subjects Requirement credits in the group: Requirement courses in the group: Note on the group: ~Student can choose arbitrary subject of themagister's program (EEM - Electrical Engineering, Power Engineering and Management, EK - Electronics and Communications, KYR - Cybernetics and Robotics, OI - Open Informatics, OES - Open Electronics Systems) which is not part of his curriculum. Student can choose with consideration of recommendation of the branch guarantee. You can find a selection of optional courses organized by the departments on the web site http://www.fel.cvut.cz/cz/education/volitelne-predmety.html

Code of the group: 2018_MEKEH Name of the group: Humanities subjects Requirement credits in the group: Requirement courses in the group: Credits in the group: 0 Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
AE0M32KMP	Communications and Media Law	Z,ZK	4	2P + 2C	Z,L	V
BE0M16HSD	History of economy and social studies Marcela Efmertová Marcela Efmertová Marcela Efmertová (Gar.)	Z,ZK	4	2P+2S	Z,L	V
BE0M16HT2	History of science and technology 2 Marcela Efmertová	Z,ZK	4	2P+2S	L	V
BE0M16FI2	Philosophy II	Z,ZK	4	2P+2S	L	V
BE0M16MPS	Psychology	Z,ZK	4	2P+2S	L	V
BE0M16TE1	Theology	Z,ZK	4	2P+2S	L	V

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

AE0M32KMP	Communications and Media Law	Z,ZK	4			
A complex course dedicated to interdisciplinary problems - the legal aspects of electronic communications (information and communications systems), as well as media from the						
viewpoint of European and national law. It analyses the areas of informatics, electronic communications, information society services, copyright and general intellectual property rights,						
the protection of identity	, introduction to software law and the Internet as a global communication and information system.					
BE0M16HSD	History of economy and social studies	Z,ZK	4			
This subject deals with	he history of the European and Czech society in the 19th - 21th centuries. It follows the forming of the European and Czech	political represen	tation, its aims			
and achieved results as	well as the social, economical, technical and cultural development and coexistence of the various ethnical groups.					
BE0M16HT2	History of science and technology 2	Z,ZK	4			
This subject traces histo	prical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate si	tudents' interest ir	h 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						
BE0M16FI2	Philosophy II	Z,ZK	4			
The course is oriented of	on the transdisciplinar aspects of philosophy, informatics, physics, mathematics and biology.					
BE0M16MPS	Psychology	Z,ZK	4			
BE0M16TE1	Theology	Z,ZK	4			
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 gra	- religion from which graws our civilization up.					

List of courses of this pass:

Code	Name of the course	Completion	Credits			
AE0M32KMP	Communications and Media Law	Z,ZK	4			
A complex cours	e dedicated to interdisciplinary problems - the legal aspects of electronic communications (information and communications systems), as well as media	from the			
viewpoint of Europe	an and national law. It analyses the areas of informatics, electronic communications, information society services, copyright and gene	eral intellectual pro	perty rights,			
	the protection of identity, introduction to software law and the Internet as a global communication and information system.					
BDIP25	Diploma Thesis	Z	25			
Independent final	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 b	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.					
BE0M16FI2	Philosophy II	Z,ZK	4			
	The course is oriented on the transdisciplinar aspects of philosophy, informatics, physics, mathematics and biology.					

BE0M16HSD This subject deals with the h	History of economy and social studies history of the European and Czech society in the 19th - 21th centuries. It follows the forming of the European and Czech po	Z,ZK	4 ion. its aims
	hieved results as well as the social, economical, technical and cultural development and coexistence of the various ethnica		
BE0M16HT2	History of science and technology 2	Z,ZK	4
	developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate stude		-
traditions of the subject, whil	e highlighting the developments in technical education and professional organizations, the process of shaping scientific life	and the influence	e of technical
	engineers	771	4
BE0M16MPS	Psychology	Z,ZK	4
BE0M16TE1	Theology	Z,ZK	4
	dents the basic orientation in christian theology and requires no special previous education. After short philosophic lecture is the determined not only to believer students who want to know the reliable theologic grounding but also above all to ones wh	-	-
are gone through. The subject	- religion from which graws our civilization up.	o want to get know	N Offitional and
BE2M17ANT	Antennas	Z,ZK	6
	vledge about theory of electromagnetic field radiation and basic principles of antenna design. Methods of analysis are dem	1 1	-
	s. Seminars are both theoretical (analytical and numerical calculation using MATLAB and EM simulators CST) and practical		
	parameters).		
BE2M17SBS	Wave Propagation for Wireless Links	Z,ZK	6
	udy the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satel		-
includes both deeper theoreti	cal foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite, fix	ed and mobile con	nmunications
	in various frequency bands.	7 71/	
BE2M31DSPA	Digital Signal Processing	Z,ZK	6 6
	about basic methods of digital signal processing and their applications (examples from speech and biological signal proces tics in time and frequency domain, Fourier transform, fast algorithms for DFT computation, introduction to digital filter desig		
	cy domain, decimation and interpolation and their usage in filter banks, basics of LPC analysis. Further details can be foun		
	href=http://noel.feld.cvut.cz/vyu/be2m31dspa>http://noel.feld.cvut.cz/vyu/be2m31dspa .		
BE2M32BTSA	Wireless Technologies	Z.ZK	6
	f fundamental principles of wireless networks in various areas of their application. Students will understand architecture, pr	1 '	-
different wireless technologie	s 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	o deployment
	of wireless networks, their operation or development of wireless networks components.		
BE2M32DSAA	Network Application Diagnostics	Z,ZK	6
	deals with complex network structures, their characteristics identification, with recognition of both structural static and dyn	-	-
	the course is focused on specification methods of static and dynamic behavior and their verification. The use of the methods		
	ation issues. The special treatment is dedicated not only to network and cloud applications, but also to posibilities of diagno	slic process auto	
	students dain sufficient skills in seminars where they solve practical problems in digital network domain		
	students gain sufficient skills in seminars where they solve practical problems in digital network domain.	7 7K	6
BE2M32IBEA	Information Security	Z,ZK	6 ormation in
BE2M32IBEA	Information Security ourse provides a complete source of information on the field of security of information systems and information technologie	s. The most of infe	ormation in
BE2M32IBEA The Information Security co today's world is created, trai	Information Security ourse provides a complete source of information on the field of security of information systems and information technologie nsferred, stored in electronic form so information security is very important part of it. On successful completion of this course	s. The most of info	ormation in d be able to
BE2M32IBEA The Information Security or today's world is created, tran define the cryptographic pr	Information Security ourse provides a complete source of information on the field of security of information systems and information technologie	s. The most of info se, students shoul odes. They should	ormation in d be able to be able to
BE2M32IBEA The Information Security of today's world is created, trai define the cryptographic pr explain the security features	Information Security ourse provides a complete source of information on the field of security of information systems and information technologie nsferred, stored in electronic form so information security is very important part of it. On successful completion of this cours imitives symmetric / asymmetric encryption, digital signatures, cryptographic hash function, and message authentication of	s. The most of info se, students shoul odes. They should	ormation in d be able to be able to
BE2M32IBEA The Information Security of today's world is created, trai define the cryptographic pr explain the security features BE2M32MKSA	Information Security burse provides a complete source of information on the field of security of information systems and information technologie insferred, stored in electronic form so information security is very important part of it. On successful completion of this cours imitives symmetric / asymmetric encryption, digital signatures, cryptographic hash function, and message authentication of offered by the latest versions of the most important security protocols operating on the TCP/IP stack (IPsec, TLS, SSH, PGI against these security protocols. Mobile Networks	s. The most of info se, students shoul odes. They should P) and describe k	ormation in Id be able to I be able to nown attacks
BE2M32IBEA The Information Security of today's world is created, trai define the cryptographic pr explain the security features BE2M32MKSA The lectures introduce princ	Information Security purse provides a complete source of information on the field of security of information systems and information technologie insferred, stored in electronic form so information security is very important part of it. On successful completion of this cours imitives symmetric / asymmetric encryption, digital signatures, cryptographic hash function, and message authentication co offered by the latest versions of the most important security protocols operating on the TCP/IP stack (IPsec, TLS, SSH, PGI against these security protocols. Mobile Networks tiples and functionalities of mobile networks with special focus on currently deployed technologies and future mobile network	s. The most of info se, students shoul odes. They should P) and describe k Z,ZK rks. Furthermore,	ormation in Id be able to I be able to nown attacks 6 architecture
BE2M32IBEA The Information Security of today's world is created, trai define the cryptographic pr explain the security features BE2M32MKSA The lectures introduce princi and fundamental princi	Information Security purse provides a complete source of information on the field of security of information systems and information technologie nsferred, stored in electronic form so information security is very important part of it. On successful completion of this cours imitives symmetric / asymmetric encryption, digital signatures, cryptographic hash function, and message authentication co offered by the latest versions of the most important security protocols operating on the TCP/IP stack (IPsec, TLS, SSH, PGI against these security protocols. Mobile Networks iples and functionalities of mobile networks with special focus on currently deployed technologies and future mobile networks (s. The most of info se, students shoul odes. They should P) and describe k Z,ZK rks. Furthermore, 6G) will be explain	bormation in d be able to d be able to nown attacks 6 architecture ned.
BE2M32IBEA The Information Security of today's world is created, trai define the cryptographic pr explain the security features BE2M32MKSA The lectures introduce prince and fundamental prince BE2M32PST	Information Security purse provides a complete source of information on the field of security of information systems and information technologie asferred, stored in electronic form so information security is very important part of it. On successful completion of this cours imitives symmetric / asymmetric encryption, digital signatures, cryptographic hash function, and message authentication co offered by the latest versions of the most important security protocols operating on the TCP/IP stack (IPsec, TLS, SSH, PGI against these security protocols. Mobile Networks iples and functionalities of mobile networks with special focus on currently deployed technologies and future mobile networks (Advanced Networking Technologies	s. The most of info se, students should odes. They should P) and describe k Z,ZK GG) will be explain Z,ZK	bormation in d be able to d be able to nown attacks 6 architecture ned. 6
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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

receivers and their practical implementation.						
BE2M37DKM Digital Communications	Z,ZK	6				
The course provides fundamentals of digital communications theory: modulation, classical coding, channel models, and basic principles of decoding. The	ne exposition is sys	stematically				
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 a	in active way in a d	lesign and				
construction of the communication systems. The course provides a necessary fundamental background for subsequent more advanced communi	cations theory cou	irses.				
BE2M37KDKA Coding in Digital Communications	Z,ZK	6				
This course extends 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-node/multi-user scenarios. 2) The algebraic c	oding presents clas	ssical topics				
of block and convolutional codes. 3) Advanced coding technique focuses on turbo, LDPC, Space-Time codes and Wireless Network Coding. 4) Advance	d decoding technic	que, namely				
iterative and multi-user decoding is a fundamental tool for decoding capacity approaching channel codes.						
BE2M37MAM 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 cor	nbination of				
both. After completion of this subject student should be able to design and implement simpler microprocessor system including connection of necessa	ary peripherals and	software				
design.						
BE2M37OBFA Image Photonics	Z,ZK	6				
The subject offers a detailed overview of applied imaging photonic elements and systems. The subject deals with fundamentals of optics, Fourier optics	and optical compu	ting. 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.						
BE2MPROJ6 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 specif	ied by branch dep	artment or				

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. List of possible topics: http://www.fel.cvut.cz/en/education/semestral-projects.html

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

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