Study plan

Name of study plan: Electronics and Communications - Radio Communications and Systems

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_MEKP7

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 radiové systémy

note on the group). Specializace radio	ove systemy				
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
B2M17ANT	Antennas Pavel Hazdra, Miloš Mazánek, Jan Kra ek Jan Kra ek Pavel Hazdra (Gar.)	Z,ZK	6	2P+2L	L	Р
B2M37ART	Architecture of radio receivers and transmitters Josef Dobeš, Pavel Ková Karel Ulovec Pavel Ková (Gar.)	Z,ZK	6	2P+2L	Z	Р
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	Р
B2M37DKM	Digital communications Jan Sýkora Jan Sýkora Jan Sýkora (Gar.)	Z,ZK	6	3P+1C	Z	Р
B2M37MAM	Microprocessors Petr Skalický, Stanislav Vítek Stanislav Vítek (Gar.)	Z,ZK	6	2P+2L	Z	Р
B2M17MIOA	Microwave Circuits Karel Hoffmann, P emysl Hudec P emysl Hudec Milan Polívka (Gar.)	Z,ZK	6	2P+2C	Z	Р

B2M31DSP	Advanced DSP methods Pavel Sovka, Petr Pollák Pavel Sovka Pavel Sovka (Gar.)	Z,ZK	6	2P+2C	Z,L	Р
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
B2M17SBS	Wave Propagation for Wireless Links	Z,ZK	6	2P+2C	L	Р

Characteristics of the courses of this group of Study Plan: Code=2018_MEKP7 Name=Compulsory subjects of the programme

Antennas

Student will get strong knowledge about theory of electromagnetic field radiation and basic principles of antenna design. Methods of analysis are demonstrated on various types of antennas and their arrays. Seminars are both theoretical (analytical and numerical calculation using MATLAB and EM simulators CST) and practical (measurement of antenna parameters)

B2M37ART Architecture of radio receivers and transmitters

The subject deals with the architecture of the radio receivers and transmitters and software radio. The student's familiarize with the design and the modern methods of optimization 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 receivers and their practical implementation.

B2M32BTSA Wireless Technologies

Z,ZK

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.

Digital communications

The course provides fundamentals of digital communications theory: modulation, classical coding, channel models, and basic principles of decoding. The exposition is systematically 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 communications theory courses

Microprocessors

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

B2M17MIOA Microwave Circuits Z.ZK

6

Subject is focused on the design of planar passive and active microwave circuits. B2M31DSP Advanced DSP methods

Z,ZK

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

B2MPROJ6 Project

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 Wave Propagation for Wireless Links

The aim of the course is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satellite wireless links. The syllabus includes both deeper theoretical 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 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 MEKPV7

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 radiové systémy

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
B2M31AEDA	Experimental Data Analysis Jan Rusz Jan Rusz Jan Rusz (Gar.)	Z,ZK	6	2P+2C	Z	PV
B2M17CADA	CAD in HF Technique Zbyn k Škvor Zbyn k Škvor Zbyn k Škvor (Gar.)	Z,ZK	6	2P+2C	L	PV
B2M37DTRA	Digital Video and Audio Broadcasting Karel Ulovec, Martin Bernas Karel Ulovec Karel Ulovec (Gar.)	Z,ZK	6	2P+2L	Z	PV
B2M37KDKA	Coding in digital communications Jan Sýkora Jan Sýkora Jan Sýkora (Gar.)	Z,ZK	6	3P+1C	L	PV

B2M17MIMA	Microwave Measurements Karel Hoffmann, Pemysl Hudec Viktor Adler Pemysl Hudec (Gar.)	Z,ZK	6	2P+2L	L	PV
B2M32MKSA	Mobile Networks Zden k Be vá, Pavel Mach, Robert Bešák Pavel Mach Zden k Be vá (Gar.)	Z,ZK	6	2P + 2L	Z	PV
B2M17NKA	Antennas Design and Technology Pavel Hazdra, Miloš Mazánek, Milan Polívka, Milan Švanda Milan Švanda Milan Polívka (Gar.)	Z,ZK	6	2P+2L	Z	PV
B2M34NSV	VLSI System Design Pavel Hazdra, Jakub Jirsa Pavel Hazdra Pavel Hazdra (Gar.)	Z,ZK	6	2P+2L	Z	PV
B2M99RAD	Radar systems Pavel Ková, Pavel Puri er, Tomáš Ko ínek Tomáš Ko ínek (Gar.)	Z,ZK	6	2P+2L	Z	PV
B2M37RNVA	Radio Navigation Pavel Ková Pavel Ková (Gar.)	Z,ZK	6	2P+2L	L	PV

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 mach	1 ' 1	uation and
interpretation of data. I	the course of practical lectures, students will solve individual tasks using real data from signal processing in neuroscience r	esearch. In the cours	se of semestra
project, student will sol	e complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental stat	istical methods as w	ell as to teach
students to use critical	thinking and to acquire additional knowledge in solution of practical tasks.		
B2M17CADA	CAD in HF Technique	Z,ZK	6
Introduction into princip	les and techniques used in modern microwave circuit design.		
B2M37DTRA	Digital Video and Audio Broadcasting	Z,ZK	6
The subject makes stu	lents familiar with topics related to video and audio transmission. Described are methods of data stream creation, methods o	of source and channe	el coding, erro
correction principles ar	d modulation formats. Attention is paid to transmission systems standards with regard to transmission channel properties. The	e subject also deals v	vith multimedi
data services and with	measurement in transmission systems.		
B2M37KDKA	Coding in digital communications	Z,ZK	6
This course extends ar	d deepens the topics of the basic communication theory courses in the following main areas. 1) Advanced information theory	in coding and Netwo	ork Informatio
	work for understanding the principles of the channel coding in single-user and multi-node/multi-user scenarios. 2) The algebr		
	nal codes. 3) Advanced coding technique focuses on turbo, LDPC, Space-Time codes and Wireless Network Coding. 4) Adv	anced decoding tech	nnique, name
	decoding is a fundamental tool for decoding capacity approaching channel codes.		
B2M17MIMA	Microwave Measurements	Z,ZK	6
•	reless radio data communications (both mobile and stationary) also results in requirements for measurement of numerous re	•	
	from hundreds of MHz to tens of GHz. The "Microwave measurements" subject brings description of all important measurem		
	ld. Instructions devoted to measurement devices also cover detailed inner structures, principles of operation, common measur		•
	measurement instruments and setups are discussed, for example those used for measurement of noise and non-linear par		
•	s commonly performed in the wireless communication field. Besides modern measurement instruments, students also learn a r	number of typical RF	and microway
	ubsystems and digitally modulated signals.	7.714	
B2M32MKSA	Mobile Networks	Z,ZK	6
	principles and functionalities of mobile networks with special focus on currently deployed technologies and future mobile net		architecture
<u>.</u>	oles of GSM, UMTS, LTE/LTE-A, and 5G will be explained. Then, selected key technologies for future mobile networks (6G)	 	
B2M17NKA	Antennas Design and Technology	Z,ZK	6
	nna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis)), design relationship	
•			s and specific
of antenna construction	using professional software tools. Design and manufacture of antenna sample. Practical measurements.		•
of antenna construction B2M34NSV	VLSI System Design	Z,ZK	6
of antenna construction B2M34NSV Introduction to basic be	VLSI System Design ilding blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analogu	ue integrated circuit	6 subsystems.
of antenna construction B2M34NSV Introduction to basic but Integrated system described.	VLSI System Design ilding blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analoguription and synthesis using cell libraries and IP cores. Synchronization, power consumption and parasitics reduction issues.	ue integrated circuit : Testing and reliabilit	6 subsystems.
of antenna construction B2M34NSV Introduction to basic be Integrated system desires systems. In seminars a	VLSI System Design ilding blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analoguription and synthesis using cell libraries and IP cores. Synchronization, power consumption and parasitics reduction issues. In labs, the hardware description language VHDL will be explained and used for practical design, synthesis and testing of a	ue integrated circuit : Testing and reliabilit system on chip.	6 subsystems. y of integrated
of antenna construction B2M34NSV Introduction to basic be Integrated system desi systems. In seminars a B2M99RAD	VLSI System Design ilding blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analoguription and synthesis using cell libraries and IP cores. Synchronization, power consumption and parasitics reduction issues. In labs, the hardware description language VHDL will be explained and used for practical design, synthesis and testing of a Radar systems	ue integrated circuit : Testing and reliabilit system on chip. Z,ZK	6 subsystems. y of integrated
of antenna construction B2M34NSV Introduction to basic be Integrated system desi systems. In seminars a B2M99RAD B2M37RNVA	VLSI System Design ilding blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analoguription and synthesis using cell libraries and IP cores. Synchronization, power consumption and parasitics reduction issues. In labs, the hardware description language VHDL will be explained and used for practical design, synthesis and testing of a Radar systems Radio Navigation	ue integrated circuit setting and reliabilit system on chip. Z,ZK Z,ZK	6 subsystems. y of integrated
of antenna construction B2M34NSV Introduction to basic by Integrated system designated systems. In seminars a B2M99RAD B2M37RNVA The course introduces	VLSI System Design ilding blocks, architecture and design methodologies of advanced VLSI systems. Structure and design of digital and analoguription and synthesis using cell libraries and IP cores. Synchronization, power consumption and parasitics reduction issues. In labs, the hardware description language VHDL will be explained and used for practical design, synthesis and testing of a Radar systems	ue integrated circuit : Testing and reliabilit system on chip. Z,ZK Z,ZK ystems, and of the s	6 subsystems. y of integrate 6 6 tructure of

Name of the block: Elective courses Minimal number of credits of the block: 0

Students get knowledge of practical applications and the integration of navigation systems.

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:

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 (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 (Gar.)	Z,ZK	5	2P+2S	Z,L	V
A003TV	Physical Education	Z	2	0+2	L,Z	V
B0M16TEO	Theology 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 ted	chnology 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 students' interest in 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 influence of technical engineers

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 and achieved results as well as the social and cultural development and coexistence of the various ethnical groups in the Czech countries.

B0M16PSM	Psychology	Z,ZK	5
A003TV	Physical Education	Z	2
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
A003TV	Physical Education	Z	2	0+2	L,Z	V
TV-V1	Physical education	Z	1	0+2	Z,L	V
TVV0	Physical education	Z	0	0+2	Z,L	V
TVKLV	Physical Education Course	Z	0	7dní	L	V
TVKZV	Physical Education Course	Z	0	7dní	Z	V

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

A003TV	Physical Education	Z	2
TVV	Physical education	Z	0
TV-V1	Physical education	Z	1
TVV0	Physical education	Z	0
TVKLV	Physical Education Course	Z	0
TVKZV	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: ~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:

	Name of the course C	completion	Credits
A003TV	Physical Education	Z	2
B0M16FIL	·	Z,ZK	5
B0M16HSD1	History of economy and social studies	Z,ZK	5
	with the history of the Czech society in the 19th - 21th centuries. It follows the forming of the Czech political representation, its aims and		ts as well a
	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
	historical developments in electrical engineering branches in the world and in the Czech Lands. Its ultimate goal is to stimulate students		-
raditions of the sub	oject, while highlighting the developments in technical education and professional organizations, the process of shaping scientific life an	d the influence	of technic
DOMACDOM	engineers	7 71/	
B0M16PSM	Psychology	Z,ZK	5
B0M16TEO	Theology	Z,ZK	5
	les to students the basic orientation in christian theology and requires no special previous education. After short philosophic lecture the	•	
ire gone through. I	he subject is determined not only to believer students who want to know the reliable theologic grounding but also above all to ones who w - religion from which graws our civilization up.	vani to get know	Christian
B2M17ANT	Antennas	Z,ZK	6
	Afficitions rong knowledge about theory of electromagnetic field radiation and basic principles of antenna design. Methods of analysis are demons		_
-	neir arrays. Seminars are both theoretical (analytical and numerical calculation using MATLAB and EM simulators CST) and practical (m		
antonnao ana a	parameters).	iododromoni or	antonna
B2M17CADA	CAD in HF Technique	Z,ZK	6
DZIVITI ONDIN	Introduction into principles and techniques used in modern microwave circuit design.	2,213	0
B2M17MIMA	Microwave Measurements	Z,ZK	6
	it of wireless radio data communications (both mobile and stationary) also results in requirements for measurement of numerous related		-
-	ging from hundreds of MHz to tens of GHz. The "Microwave measurements" subject brings description of all important measurement inst	-	
•	s field. Instructions devoted to measurement devices also cover detailed inner structures, principles of operation, common measurement s		
	plex measurement instruments and setups are discussed, for example those used for measurement of noise and non-linear parameters		
•	ents commonly performed in the wireless communication field. Besides modern measurement instruments, students also learn a number of		
	components, circuits, subsystems and digitally modulated signals.		
B2M17MIOA	Microwave Circuits	Z,ZK	6
'	Subject is focused on the design of planar passive and active microwave circuits.		
B2M17NKA	Antennas Design and Technology	Z,ZK	6
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Basics of practical a	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design		_
Basics of practical a		relationships a	_
Basics of practical a	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design	relationships a	_
B2M17SBS	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design of antenna construction using professional software tools. Design and manufacture of antenna sample. Practical measurements	relationships a	and specifi
B2M17SBS The aim of the course	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design of antenna construction using professional software tools. Design and manufacture of antenna sample. Practical measurements Wave Propagation for Wireless Links	relationships a Z,ZK wireless links.1	ind specific
B2M17SBS The aim of the cours	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design of antenna construction using professional software tools. Design and manufacture of antenna sample. Practical measurements Wave Propagation for Wireless Links se is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satellite or theoretical foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite, fixed in various frequency bands.	z,ZK wireless links. T and mobile com	ind specifi 6 The syllab
B2M17SBS The aim of the cours includes both deepe	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design of antenna construction using professional software tools. Design and manufacture of antenna sample. Practical measurements Wave Propagation for Wireless Links se is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satellite or theoretical foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite, fixed in various frequency bands. Experimental Data Analysis	z,ZK wireless links.1 and mobile com	nd specifi 6 The syllabi munication
B2M17SBS The aim of the cours includes both deepe B2M31AEDA In the course of s	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design of antenna construction using professional software tools. Design and manufacture of antenna sample. Practical measurements Wave Propagation for Wireless Links se is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satellite or theoretical foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite, fixed in various frequency bands. Experimental Data Analysis Experimental Data Analysis subject "Experimental Data Analysis", students will acquire knowledge regarding fundamental methods for data analysis and machine legistry.	z,ZK wireless links. T and mobile com	6 The syllab municatio 6 uation and
B2M17SBS The aim of the cours includes both deepe B2M31AEDA In the course of s interpretation of dat	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design of antenna construction using professional software tools. Design and manufacture of antenna sample. Practical measurements Wave Propagation for Wireless Links se is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satellite or theoretical foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite, fixed in various frequency bands. Experimental Data Analysis subject "Experimental Data Analysis", students will acquire knowledge regarding fundamental methods for data analysis and machine lea. In the course of practical lectures, students will solve individual tasks using real data from signal processing in neuroscience research	Z,ZK wireless links. The wireless links. The and mobile com Z,ZK earning for evaluation. In the course of	6 The syllab municatio 6 aution and of semesti
B2M17SBS The aim of the cours includes both deepe B2M31AEDA In the course of s interpretation of dat	antenna design for selected frequency bands and communication, identification and radar services. Modelling (full-wave analysis), design of antenna construction using professional software tools. Design and manufacture of antenna sample. Practical measurements Wave Propagation for Wireless Links se is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satellite or theoretical foundations of radio wave propagation in the atmosphere as well as ITU-R design procedures for terrestrial and satellite, fixed in various frequency bands. Experimental Data Analysis subject "Experimental Data Analysis", students will acquire knowledge regarding fundamental methods for data analysis and machine lea. In the course of practical lectures, students will solve individual tasks using real data from signal processing in neuroscience research solve complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental statistical neuroscience research as olve complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental statistical neuroscience research as olve complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental statistical neuroscience research as olve the subject is to introduce practical application of fundamental statistical neuroscience research as olve the subject is to introduce practical application of fundamental statistical neuroscience research as olve the subject is to introduce practical application of fundamental statistical neuroscience research as olve the subject is to introduce practical application of fundamental statistical neuroscience research as olve the subject is to introduce practical application of fundamental statistical neuroscience research as of the subject is to introduce practical application of fundamental statistical neuroscience research as of the sub	Z,ZK wireless links. The wireless links. The and mobile com Z,ZK earning for evaluation. In the course of	6 The syllab municatio 6 uation and
B2M17SBS The aim of the cours includes both deepe B2M31AEDA In the course of s interpretation of dat project, student will	wave Propagation for Wireless Links Wave Propagation for Wireless Links se is to study the wireless transmission channel in real environments focusing on wave propagation for planning of terrestrial and satellite in various frequency bands. Experimental Data Analysis subject "Experimental Data Analysis", students will acquire knowledge regarding fundamental methods for data analysis and machine le a. In the course of practical lectures, students will solve individual tasks using real data from signal processing in neuroscience research students to use critical thinking and to acquire additional knowledge in solution of practical tasks.	z,ZK wireless links. The and mobile com z,ZK carning for evaluation in the course onethods as well	6 The syllab municatio 6 aation and of semestras to tead
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B2M37DKM	Digital communications	Z,ZK	6
The course provide	es fundamentals of digital communications theory: modulation, classical coding, channel models, and basic principles of decoding. The	e exposition is sy	stematically
built along the the	coretical lines which allow to reveal all inner connections and principles. This allows students to develop the knowledge and use it in a	n active way in a	design and
construction	of the communication systems. The course provides a necessary fundamental background for subsequent more advanced communication	cations theory co	urses.
B2M37DTRA	Digital Video and Audio Broadcasting	Z,ZK	6
The subject makes	students familiar with topics related to video and audio transmission. Described are methods of data stream creation, methods of sou	irce and channel	coding, error
correction principles	s and modulation formats. Attention is paid to transmission systems standards with regard to transmission channel properties. The subj	ect also deals wit	h multimedia
	data services and with measurement in transmission systems.		
B2M37KDKA	Coding in digital communications	Z,ZK	6
	s and deepens the topics of the basic communication theory courses in the following main areas. 1) Advanced information theory in co	•	
	ramework for understanding the principles of the channel coding in single-user and multi-node/multi-user scenarios. 2) The algebraic co	• .	•
of block and convol	lutional codes. 3) Advanced coding technique focuses on turbo, LDPC, Space-Time codes and Wireless Network Coding. 4) Advanced	d decoding techn	ique, namely
D0140714414	iterative and multi-user decoding is a fundamental tool for decoding capacity approaching channel codes.	7 71/	
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 externa	al circuit to the pr	ocessor bus,
and with implement	tation of the memory or I/O space address extension. Next, taught the students to make simple program in the assembly language, C		
and with implement	letion of this subject student should be able to design and implement simpler microprocessor system including connection of necessar		
and with implement both. After compl	letion of this subject student should be able to design and implement simpler microprocessor system including connection of necessa design.	ıry peripherals an	d software
and with implement both. After complement B2M37RNVA	letion of this subject student should be able to design and implement simpler microprocessor system including connection of necessa design. Radio Navigation	ry peripherals an	d software
and with implement both. After compl B2M37RNVA The course introd	letion of this subject student should be able to design and implement simpler microprocessor system including connection of necessary design. Radio Navigation duces students to the terrestrial and satellite radio navigation and radar systems. Students get knowledge of the radio navigation systems.	Z,ZK ems, and of the s	d software 6 tructure of
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