

Study plan

Name of study plan: Electronics and Communications - Audiovisual and Signal Processing

Faculty/Institute/Others: Faculty of Electrical Engineering
 Department: Department of Telecommunications Engineering
 Branch of study guaranteed by the department:
 Garant 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	P

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.		
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Code of the group: 2018_MEKP2
 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 audiovizuální technika a zpracování signálů

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) Tutors, authors and guarantors (gar.)	Completion	Credits	Scope	Semester	Role
B2M32BTSA	Wireless Technologies Zdeněk Bečvář, Lukáš Vojtěch, Zbyněk Kocur Lukáš Vojtěch Zdeněk Bečvář (Gar.)	Z,ZK	6	2+2l	L	P
B2M37KASA	Compression of images and signals Stanislav Vitek, Karel Fliegel, František Rund Karel Fliegel Stanislav Vitek (Gar.)	Z,ZK	6	2p+2c	L	P
B2M37MAM	Microprocessors Stanislav Vitek, Petr Skalický, Pavel Máša Stanislav Vitek Stanislav Vitek (Gar.)	Z,ZK	6	2p+2l	Z	P
B2M37OBT	Image Technology Petr Páta, Miloš Klíma Petr Páta Petr Páta (Gar.)	Z,ZK	6	2p+2l	Z	P
B2M31DSP	Advanced DSP methods Pavel Sovka, Petr Pollák Pavel Sovka Pavel Sovka (Gar.)	Z,ZK	6	2p+2c	Z	P

B2MPROJ6	Project <i>František Rund, Pavel Máša, Jiří Jakovenko, Ivan Pravda, Jan Šístek, Lubor Jirásek, Tomáš Zeman, Ladislav Oppl František Rund František Rund (Gar.)</i>	Z	6	0p+6s		P
B2M31SYN	Synthesis of Audio Signals <i>Roman Čmejla Roman Čmejla Roman Čmejla (Gar.)</i>	Z,ZK	6	2P+2C	Z	P
B2M31ZRE	Speech Processing <i>Petr Pollák, Jiří Fiala Petr Pollák Petr Pollák (Gar.)</i>	Z,ZK	6	2p+2c	L	P
B2M99ZVT	Audio technology 1 <i>František Rund, Ondřej Jiříček, Libor Husník František Rund Ondřej Jiříček (Gar.)</i>	Z,ZK	6	2p+2l	Z	P

Characteristics of the courses of this group of Study Plan: Code=2018_MEKP2 Name=Compulsory subjects of the programme

B2M32BTSA	Wireless Technologies	Z,ZK	6	The lectures give overview of fundamental principles of wireless networks in various areas of their application. Students will understand architecture, principles and protocols used in different wireless technologies and learn how these technologies can be exploited in real world applications. The goal is to teach students how to solve problems related to deployment of wireless networks, their operation or development of wireless networks components.		
B2M37KASA	Compression of images and signals	Z,ZK	6	The subject deals with compression methods and techniques. Main goal is to introduce basic concepts of lossless and lossy compression of audiovisual information (entropy, redundancy and irrelevancy). Within the laboratory exercises students will work with implementations of particular algorithms, including objective and subjective methods of quality evaluation.		
B2M37MAM	Microprocessors	Z,ZK	6	The aim is to make students acquainted with the properties of microprocessor systems, make students familiar with on-chip peripherals, connect external circuit to the processor bus, and with implementation of the memory or I/O space address extension. Next, taught the students to make simple program in the assembly language, C language and combination of both. After completion of this subject student should be able to design and implement simpler microprocessor system including connection of necessary peripherals and software design.		
B2M37OBT	Image Technology	Z,ZK	6	This course deals with multimedia technology and it is focused mainly on acquisition, processing and reproduction of image information. It covers area of measurements in photometry, radiometry and colorimetry; design of objective lenses, image sensors and displays including their parameters. Further the course deals with cinematography, photography and with other special methods of image reproduction, e.g. polygraphy and digital printing techniques. Studied problems are completed with explanation of advanced methods of image processing (preprocessing, compression, image reconstruction, etc.).		
B2M31DSP	Advanced DSP methods	Z,ZK	6	The course follows the basic course in signal processing and introduces advanced methods of analysis and digital signal processing. Graduates will learn the methods of digital signals analysis and be able to practically use them. They learn to know the conditions of use of correlation, spectral and coherent analysis of random signals. They will become 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	Z	6	Independent work in the form of a project. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or branch departments. The project will be defended within the framework of a subject.		
B2M31SYN	Synthesis of Audio Signals	Z,ZK	6	This course introduces the fundamentals of sound synthesis algorithms (everyday, music and speech), digital audio effects and sonification. Audio synthetic signals are used in modern digital systems, virtual reality systems, computer animations, games and film. Understanding of theoretical concepts will be consolidated through practical programming assignments in Matlab.		
B2M31ZRE	Speech Processing	Z,ZK	6	The subject is devoted to basis of speech processing addressed to students of master program. Discussed speech technology is currently applied in many systems in different fields (e.g. information dialogue systems, voice controlled devices, dictation systems or transcription of audio-video recordings, support for language teaching, etc.). Students will learn basic algorithms for speech analysis (spectral analysis, LPC, cepstral analysis, pitch, formants, etc.), principles of speech recognition (GMM-HMM, ANN-HMM systems, small and large vocabulary recognizers), speaker recognition (based on VQ and GMM), speech synthesis or speech enhancement. Further information can be found at http://noel.feld.cvut.cz/vyu/ae2m31zre ; Pro zapsané studenty jsou detailní informace na výukovém portálu https://moodle.fel.cvut.cz ; Moodle FEL		
B2M99ZVT	Audio technology 1	Z,ZK	6	The course provides fundamentals of physical acoustics and acoustic measurement, including problems of noise from technical and perceptual point of view. In the second part principles of electroacoustic and electromechanical transducers are explained along with their analysis. Principles of sound compressing systems and spatial sound processing are also treated.		

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_MEKPV2

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 audiovizuální technika a zpracování signálů

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (Gar.)</i>	Completion	Credits	Scope	Semester	Role
B2M31ADAA	Adaptive signal processing <i>Radoslav Bortel Radoslav Bortel (Gar.)</i>	Z,ZK	6	2p+2c	Z	PV
B2M31AEDA	Experimental Data Analysis <i>Jan Rusz Jan Rusz (Gar.)</i>	Z,ZK	6	2p+2c	Z	PV

B2M31BSGA	Biological Signals <i>Roman Čmejla Roman Čmejla Roman Čmejla (Gar.)</i>	Z,ZK	6	2P+2L	L	PV
B2M37DTRA	Digital Video and Audio Broadcasting <i>Karel Ulovec Karel Ulovec Karel Ulovec (Gar.)</i>	Z,ZK	6	2p+2l	Z	PV
B2M37MOTA	Advanced areas in image and video technology <i>Karel Fliegel Karel Fliegel Karel Fliegel (Gar.)</i>	Z,ZK	6	2p+2l	Z	PV
B2M37OBFA	Image Photonics <i>Petr Páta Petr Páta Petr Páta (Gar.)</i>	Z,ZK	6	2p+2l	Z	PV
B2M37SSPA	Statistical Signal Processing <i>Pavel Sovka, Jan Sýkora Jan Sýkora Jan Sýkora (Gar.)</i>	Z,ZK	6	4p+0	L	PV
B2M31ZASA	Analog Signal Processing <i>Jiří Hospodka Jiří Hospodka Jiří Hospodka (Gar.)</i>	Z,ZK	6	2P+2S	L	PV
B2M37ZV2A	Audio Technology 2 <i>František Rund, Libor Husník František Rund František Rund (Gar.)</i>	Z,ZK	6	2p+2l	L	PV

Characteristics of the courses of this group of Study Plan: Code=2018_MEKPV2 Name=Compulsory subjects of the programme

B2M31ADAA	Adaptive signal processing This course provides a basic discourse on adaptive algorithms for filtering, decorrelation, separation and beamforming.	Z,ZK	6
B2M31AEDA	Experimental Data Analysis In the course of subject "Experimental Data Analysis", students will acquire knowledge regarding fundamental methods for data analysis and machine learning for evaluation and interpretation of data. In the course of practical lectures, students will solve individual tasks using real data from signal processing in neuroscience research. In the course of semestral project, student will solve complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental statistical methods as well as to teach students to use critical thinking and to acquire additional knowledge in solution of practical tasks.	Z,ZK	6
B2M31BSGA	Biological Signals The course is focused to the native and evoked biosignals used in clinical medicine and current methods of capturing, processing, recording and evaluating in the time and frequency domains. For important biological signals, the students are introduced with their genesis, and nature and physiological characteristics of the signals required for construction of instruments. Students are introduced also with the physical and mathematical models. In laboratory exercises, students have the opportunity to capture their own biological signals and their subsequent processing in MATLAB.	Z,ZK	6
B2M37DTRA	Digital Video and Audio Broadcasting The subject makes students familiar with topics related to video and audio transmission. Described are methods of data stream creation, methods of source and channel coding, error correction principles and modulation formats. Attention is paid to transmission systems standards with regard to transmission channel properties. The subject also deals with multimedia data services and with measurement in transmission systems.	Z,ZK	6
B2M37MOTA	Advanced areas in image and video technology This course focuses on the state-of-the-art techniques for digital image and video technology. These techniques and their applications cover almost all areas of technical professions dealing with human interaction. A significant part of the course is focused on the methods of image signal processing and main hardware and software functional blocks of related imaging systems. The aim of the laboratory exercises is to familiarize with advanced methods for capturing, processing and reproduction of image information. Due to the fast progress in this area, the content of the lectures and exercises is being continuously updated.	Z,ZK	6
B2M37OBFA	Image Photonics The subject offers a detailed overview of applied imaging photonic elements and systems. The subject deals with fundamentals of optics, Fourier optics and optical computing. 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.	Z,ZK	6
B2M37SSPA	Statistical Signal Processing The course provides fundamentals in three main domains of the statistical signal processing: 1) estimation theory, 2) detection theory, 3) optimal and adaptive filtering. The statistical signal processing is a core theory with many applications ranging from digital communications, audio and video processing, radar and radio navigation, measurement and experiment evaluation, etc.	Z,ZK	6
B2M31ZASA	Analog Signal Processing The course deals with analog input-output blocks for signal transmission and processing. They discussed circuit solution of amplifiers and filters, including their design process, simulation and measurement. Students learn the circuit concepts and possibilities for solving the contemporary analogue structures. The second part of the course describes the design and implementation of analog filters, including discrete-time circuits. The conclusion is devoted to the possibilities of computer optimization of electronic circuits and filters.	Z,ZK	6
B2M37ZV2A	Audio Technology 2 This course deals with advanced topics related to audio technology in recording studios, namely room acoustics, multichannel signal recording and reproduction, digital audio signal processing, its impact on auditory perception, audio signal optimization from the psychoacoustic point of view.	Z,ZK	6

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:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
B0M16FIL	Philosophy 2 <i>Peter Zamarovský Peter Zamarovský Peter Zamarovský (Gar.)</i>	Z,ZK	5	2p+2s	Z,L	v

B0M16HVT	History of science and technology 2 <i>Marcela Efmertová Marcela Efmertová Marcela Efmertová (Gar.)</i>	Z,ZK	5	2p+2s	Z,L	v
B0M16HSD1	History of economy and social studies <i>Marcela Efmertová Marcela Efmertová Marcela Efmertová (Gar.)</i>	Z,ZK	5	2p+2s	Z,L	v
B0M16PSM	Psychology <i>Jan Fiala, Josef Černohous Jan Fiala Jan Fiala (Gar.)</i>	Z,ZK	5	2p+2s	Z,L	v
A003TV	Physical Education	Z	2	0+2	L,Z	v
B0M16TEO	Theology <i>Vladimír Slámečka Vladimír Slámečka Vladimír Slámečka (Gar.)</i>	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	Philosophy 2	Z,ZK	5	The course is oriented on the transdisciplinary aspects of philosophy, informatics, physics, mathematics and biology.		
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 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 grows our civilization up.		

Code of the group: MTV

Name of the group: Tělesná výchova

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) <i>Tutors, authors and guarantors (gar.)</i>	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
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=Tělesná výchova

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:

Code	Name of the course	Completion	Credits
A003TV	Physical Education	Z	2
B0M16FIL	Philosophy 2 The course is oriented on the transdisciplinary aspects of philosophy, informatics, physics, mathematics and biology.	Z,ZK	5
B0M16HSD1	History of economy and social studies 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.	Z,ZK	5
B0M16HVT	History of science and technology 2 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	Z,ZK	5
B0M16PSM	Psychology	Z,ZK	5
B0M16TEO	Theology 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 grows our civilization up.	Z,ZK	5
B2M31ADAA	Adaptive signal processing This course provides a basic discourse on adaptive algorithms for filtering, decorrelation, separation and beamforming.	Z,ZK	6
B2M31AEDA	Eperimental Data Analysis In the course of subject "Experimental Data Analysis", students will acquire knowledge regarding fundamental methods for data analysis and machine learning for evaluation and interpretation of data. In the course of practical lectures, students will solve individual tasks using real data from signal processing in neuroscience research. In the course of semestral project, student will solve complex task and present obtained results. The aim of the subject is to introduce practical application of fundamental statistical methods as well as to teach students to use critical thinking and to acquire additional knowledge in solution of practical tasks.	Z,ZK	6
B2M31BSGA	Biological Signals The course is focused to the native and evoked biosignals used in clinical medicine and current methods of capturing, processing, recording and evaluating in the time and frequency domains. For important biological signals, the students are introduced with their genesis, and nature and physiological characteristics of the signals required for construction of instruments. Students are introduced also with the physical and mathematical models. In laboratory exercises, students have the opportunity to capture their own biological signals and their subsequent processing in MATLAB.	Z,ZK	6
B2M31DSP	Advanced DSP methods 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.	Z,ZK	6
B2M31SYN	Synthesis of Audio Signals This course introduces the fundamentals of sound synthesis algorithms (everyday, music and speech), digital audio effects and sonification. Audio synthetic signals are used in modern digital systems, virtual reality systems, computer animations, games and film. Understanding of theoretical concepts will be consolidated through practical programming assignments in Matlab.	Z,ZK	6
B2M31ZASA	Analog Signal Processing The course deals with analog input-output blocks for signal transmission and processing. They discussed circuit solution of amplifiers and filters, including their design process, simulation and measurement. Students learn the circuit concepts and possibilities for solving the contemporary analogue structures. The second part of the course describes the design and implementation of analog filters, including discrete-time circuits. The conclusion is devoted to the possibilities of computer optimization of electronic circuits and filters.	Z,ZK	6
B2M31ZRE	Speech Processing The subject is devoted to basis of speech processing addressed to students of master program. Discussed speech technology is currently applied in many systems in different fields (e.g. information dialogue systems, voice controlled devices, dictation systems or transcription of audio-video recordings, support for language teaching, etc.). Students will learn basic algorithms for speech analysis (spectral analysis, LPC, cepstral analysis, pitch, formants, etc.), principles of speech recognition (GMM-HMM, ANN-HMM systems, small and large vocabulary recognizers), speaker recognition (based on VQ and GMM), speech synthesis or speech enhancement. Further information can be found at http://noel.feld.cvut.cz/vyu/ae2m31zre<a>. Pro zapsané studenty jsou detailní informace na výukovém portálu Moodle FEL<a>.	Z,ZK	6
B2M32BTSA	Wireless Technologies 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.	Z,ZK	6
B2M37DTRA	Digital Video and Audio Broadcasting The subject makes students familiar with topics related to video and audio transmission. Described are methods of data stream creation, methods of source and channel coding, error correction principles and modulation formats. Attention is paid to transmission systems standards with regard to transmission channel properties. The subject also deals with multimedia data services and with measurement in transmission systems.	Z,ZK	6
B2M37KASA	Compression of images and signals The subject deals with compression methods and techniques. Main goal is to introduce basic concepts of lossless and lossy compression of audiovisual information (entropy, redundancy and irrelevancy). Within the laboratory exercises students will work with implementations of particular algorithms, including objective and subjective methods of quality evaluation.	Z,ZK	6
B2M37MAM	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 design.	Z,ZK	6

B2M37MOTA	Advanced areas in image and video technology	Z,ZK	6
This course focuses on the state-of-the-art techniques for digital image and video technology. These techniques and their applications cover almost all areas of technical professions dealing with human interaction. A significant part of the course is focused on the methods of image signal processing and main hardware and software functional blocks of related imaging systems. The aim of the laboratory exercises is to familiarize with advanced methods for capturing, processing and reproduction of image information. Due to the fast progress in this area, the content of the lectures and exercises is being continuously updated.			
B2M37OBFA	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 computing. 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.			
B2M37OBT	Image Technology	Z,ZK	6
This course deals with multimedia technology and it is focused mainly on acquisition, processing and reproduction of image information. It covers area of measurements in photometry, radiometry and colorimetry; design of objective lenses, image sensors and displays including their parameters. Further the course deals with cinematography, photography and with other special methods of image reproduction, e.g. polygraphy and digital printing techniques. Studied problems are completed with explanation of advanced methods of image processing (preprocessing, compression, image reconstruction, etc.).			
B2M37SSPA	Statistical Signal Processing	Z,ZK	6
The course provides fundamentals in three main domains of the statistical signal processing: 1) estimation theory, 2) detection theory, 3) optimal and adaptive filtering. The statistical signal processing is a core theory with many applications ranging from digital communications, audio and video processing, radar and radio navigation, measurement and experiment evaluation, etc.			
B2M37ZV2A	Audio Technology 2	Z,ZK	6
This course deals with advanced topics related to audio technology in recording studios, namely room acoustics, multichannel signal recording and reproduction, digital audio signal processing, its impact on auditory perception, audio signal optimization from the psychoacoustic point of view.			
B2M99ZVT	Audio technology 1	Z,ZK	6
The course provides fundamentals of physical acoustics and acoustic measurement, including problems of noise from technical and perceptual point of view. In the second part principles of electroacoustic and electromechanical transducers are explained along with their analysis. Principles of sound compressing systems and spacial sound processing are also treated.			
B2MPROJ6	Project	Z	6
Independent work in the form of a project. A student will choose a topic from a range of topics related to his or her branch of study, which will be specified by branch department or branch departments. The project will be defended within the framework of a subject.			
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.			
TV-V1	Physical education	Z	1
TVKLV	Physical Education Course	Z	0
TVKZV	Physical Education Course	Z	0
TVV	Physical education	Z	0
TVV0	Physical education	Z	0

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

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